EXPLORING A RELATIONSHIP BETWEEN SCHOOL LEADERSHIP EFFECTIVENESS AND TEACHER TECHNOLOGY INTEGRATION: A CORRELATIVE STUDY

by

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ABSTRACT

The pervasive nature of technology in society is not reflected in schools. Research indicates that teachers are reluctant to integrate technology to the levels that are expected by organizations such as the International Society for Technology in Education (ISTE), the author of the national standards used to assess technology in schools. Included in the ISTE standards are standards for educational administrators that place the responsibility for leading the change towards integration firmly in the hands of the principals as the educational leaders of the schools.

While there is no clear definition of leadership, the common thread is the ability to create change in the beliefs and actions of followers. According to the Situational Leadership ® theory, an effective leader is one who uses the appropriate leadership strategy to create and manage change in the given situation. The LEAD other instrument is used to assess the effectiveness of leaders as perceived by their followers. The purpose of this study was to explore the existence of a relationship between effective leadership as measured by the LEAD other instrument and teachers' levels of technology integration as measured by the Mankato Technology Survey. While not indicating causality, a positive correlation would indicate that principal leadership effectiveness needs to be further explored in the process of understanding why technology integration is not occurring at expected levels. The results of the study did not provide sufficient support to reject the null hypothesis, thus suggesting that no relationship exists between principal leadership effectiveness and the level of teacher technology integration. The lack of a significant relationship suggests that additional research is required to determine if in fact the responsibility for technology integration and comfort has been inappropriately placed on the principal, and to examine what other factors require further consideration.

DEDICATION

This marathon is dedicated to Jennette, my long suffering wife, Caleb and Enoch, who I hope still remember who their Daddy is, and Rosalie, my mother who told me I could do anything.

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1: INTRODUCTION

Twenty-first century students are growing up immersed in digital technology (Caine, 2011). The term "digital native" describes the new generation of technology-savvy youth, indicating their increased access to and familiarity with the abundance of digital information available to them, while the label "digital immigrant" describes the previous generation of technology users. These contrasting terms illustrate the rapid increase in the prevalence of technology in the lives of students (Prensky, 2010). "Digital natives" are not only immersed in digital information, but they also have become the authors and creators of digital materials (Jones & Hafner, 2012). The only time when "digital natives" do not seem to be immersed in the digital world is when they are at school. It seems that there is a vast difference in the nature and depth of student interactions with technology, specifically information technology, in educational and non-educational settings (Caine, 2011; Waycott, Bennett, Kennedy, Dalgarno, & Gray, 2010). There is an apparent difference in student expectations of the learning process in different environments (Moje, 2011), as well as an apparent inability to transfer learning from one environment to the other fluidly (Gee, 2013). While perhaps some of the inability lies in the students' expectations, there is also an apparent disconnection between the way students use technology and how those who provide formalized education use technology in the school setting (Gee, 2013).

When a growing amount of financial resources is being committed to the development of technology in society, it is no surprise that there is an expectation that students leave school ready to use technology (Brown & Joshua, 2010). Technology integration refers to the process of embedding information and communication technologies into classroom pedagogies in a meaningful manner that increases educational outcomes and students' technological proficiency

(Borsheim, Merritt, & Reed, 2008). According to Gosmire and Grady (2007), technology expenditures in schools have tripled in the last three decades. In some cases, these expenditures have included the purchase of laptops for every teacher in the school district (Parr & Ward, 2011; Zucker & King, 2009). Unfortunately, the increased expenditure of the last three decades has not created the expected increased educational outcomes (Gosmire & Grady, 2007). Something appears to be missing from the technology integration process. Staples, Pugach, and Himes (2005) regarded school leadership as one of the three scaffolds required for effective technology integration. Chen and Silverthorne (2005) found that the more effective a leader was, the more employees were willing to perform the given task even if there was a level of discomfort involved. Effective school leadership is potentially the missing component of the technology integration process.

Statement of the Problem

Background to the Problem

The creation and proliferation of digital communications technologies have changed the world (Turusheva, 2009). Students of the early 21st century are growing up with the Internet as a commonplace part of their lives (Badke, 2009). The fact that many of their teachers grew up in a time before it existed presents an opportunity for a large disconnect between generations (Wolsey & Grisham, 2011). The volume of information available and generated each year is increasing at such a rate that not having a tool like the Internet to access, search, and sort it is unthinkable (Turusheva, 2009). The students of the 21st century are sometimes called "digital natives", a term coined by Prensky (2010), to describe people who are growing up with technology as an integral part of their lives. Prensky (2010) also coined the name "digital immigrants" to describe people who have migrated into the digital world (Brown & Czerniewicz,

2010). Despite the familiarity brought about by status as a "native," native status does not necessarily imply that students of the 21st century are all technologically competent (Brown & Joshua, 2010; Bybee, 2003) or that they have the necessary academic skills in relation to the use of this technology. These 21st century students need to learn information literacy skills so that they can decide on the academic value of a paper written by a learned professor as compared to the spurious, uneducated, or deliberately deceitful statements from an unknown source (Badke, 2009).

Throughout the past 50 years, a number of differing theories have arisen regarding how learning occurs (Ornstein, Levine, Gutek, & Vocke, 2013). Each of these theories reflects a unique perspective on the role of technology in education. For example, a constructivist teacher may argue that students need the opportunity to use technology in an educational setting in order to construct the schema necessary for technology use to become an integrated part of the learning paradigm (Martinez, 2010). Meanwhile, a social-cognitivist teacher may argue that a teacher needs to model the use of technology in the appropriate ways for students to learn the required skills (Gredler, 2009). The arguments of a behaviorist teacher are likely similar to a social-cognitivist with the additional expectation that the students copy the expected behaviors (Ormrod, 2011). In all of these cases, the common component in the process of students acquiring the necessary academic information technology skills is the successful integration of the technology into the classroom (Palak & Walls, 2009).

Technology integration has been recognized as important for over 20 years (Bonk, 2010). In the late twentieth century, findings from research suggested that society expected schools to use technology in order to create a cadre of graduates who were literate in technology skills and competent in their usage (Brown & Joshua, 2010). The findings of more recent studies indicate

that the learning of technology skills is not occurring in an effective manner (Gosmire & Grady, 2007); in fact, the results from these recent studies have suggested teachers are largely using the same tools they have always used (Ertmer & Ottenbreit-Leftwich, 2010). When schools have integrated technology, it has been predominantly to increase computer skills rather than to develop the information-literacies needed for the digital world (Lambert & Gong, 2010).

Schaffhauser (2013) described the process of integration of technology as requiring the inclusion of a combination of technology and pedagogical content into the teaching process. The emphasis in the inclusion process is on the appropriate pedagogical use of technology (Borsheim et al., 2008). In order for teachers to begin to use technology in the most pedagogically efficient manner, the resounding message of researchers is the need for effective and sufficient professional development (Bhasin, 2012; Bjekic, Krneta, & Milosevic, 2010; Giardina, 2010; Jianwei, 2010).

While professional development is a common theme in the research on technology integration, other researchers see it as only a single step in the process. Another step is effective technology leadership, particularly on the part of the principal (Afshari, Bakar, Luan, & Siraj, 2012; Eren & Kurt, 2011). The role of the principal in schools is increasing in complexity (Ibukun, Oyewole, & Abe, 2011; Stanfill, 2000). In the past, principals were required to act more like managers than the educational leaders they are required to be today (Mendels, 2012). Marion and Gonzales (2013) defined leaders as those who manage and control change in organizations as distinct from managers who are responsible for the day-to-day functioning of the organization. Principals in schools are required to be both leaders and managers (Caffyn, 2010), and to add another level of complexity, each school requires a separate and individual set of leadership behaviors in order to provide effective leadership (Stanfill, 2000). The advent of

digital technology has simply added another area in which principals are required to lead and manage (Afshari et al., 2012).

The Problem in Context

The selected school district is a suburban school district in Colorado. The district has 57 schools: 40 elementary schools serving kindergarten through fifth grade, 11 middle schools serving sixth through eighth grade, and 6 high schools serving ninth through twelfth grade (National Center for Educational Statistics, 2012). The overall demographics provided by the district state that 62% of students are white, 15% are black, 14 % are Hispanic, 8% are Asian or Pacific Islander, and 1% are Native American. These races are not evenly distributed amongst the schools, however, with some neighborhoods having a disparate amount of a select racial demographic. The highest proportion of white families by neighborhood, as delineated by postcode, has 95.9% white families. In another neighborhood, there are 32.3% Hispanic families. Meanwhile, a different neighborhood again has 24.6% black families (Proximity, 2012).

The same divergence seen in racial demographics applies to socioeconomic status demographics. The common indicator of socioeconomic status in schools is the percentage of students on free or reduced lunches (Harwell & LeBeau, 2010). While the district total of students in the free and reduced lunch program is 27%, this percentage is not indicative of the whole district. Of the 57 schools in the district, six have over 60% of students receiving free or reduced lunch, the highest being over 80%. Of these schools, five are elementary schools, and the other is a middle school. Meanwhile, an equal number of schools have less than 5% of students receiving free or reduced lunch, with the lowest having less than 0.5%. All six of these

schools are elementary schools (Colorado Department of Education, 2012). Such a disparity in socioeconomic status reflects the divergent population of the selected school district.

While the district leadership is proud of the fact that it contains some high-performing elementary, middle, and high schools, it also contains some schools whose standardized test scores are well below the state averages. Several schools in the district, particularly those in affluent areas, have very active parent organizations who have supplied funds for a large number of technology purchases such as interactive white boards and projectors for classrooms. The district has also funded a laptop program for teachers that supplied each teacher with a district owned net-book supported by the technology departments of each school. Schools are site-based, meaning that while advice and direction is given to principals from the district level, and district level subject specialists exist, the predominant part of the responsibility for school decisions and planning lies in the hands of the school's principal and administration team. While the district is site-based in management style, there has been a recent increase in district level technology staff and Science, Technology, Engineering, and Math (STEM) coaches whose role is to assist in the process of technology integration at the classroom level.

Problem Statement

Research has shown that teachers are reluctant to make changes in their teaching in relation to the inclusion of new methods of instruction or changes in curriculum (Ertmer & Ottenbreit-Leftwich, 2010). Principals, as leaders of the school, can be an important component in encouraging technology integration by actively demonstrating and encouraging the use of technology in the education setting (Kara-Soteriou, 2009). Indeed, Kannan, Sharma, and Abdullah (2012) went further when they stated that the successful implementation of technology into the curriculum can only occur when the principal supports it by modeling technology

integration, encouraging technology integration, and ensuring that sufficient staff development and support exist to enable technology integration.

Although school leaders have been given the responsibility of addressing the issue of technology integration in the schools (International Society for Technology in Education, 2009), this goal is not being met as broadly as policy makers seem to desire (Ertmer & Ottenbreit-Leftwich, 2010; Gosmire & Grady, 2009). If leadership is not a component of the process of technology integration, then the principal's responsibility for integration may be misplaced or over-emphasized. If there is not a relationship between principal leadership effectiveness and levels of teacher technology integration, then principals may be being unfairly assessed in this area of their performance. Additionally, resources that are being used to increase leadership effectiveness in principals in order to positively influence levels of teacher technology integration may be better directed to other areas. These resources could be better allocated to some other factor that is in fact related to the level of teachers' technology integration and comfort, thus increasing the levels of technology integration in schools. The specific problem is that decisions as to responsibility and resource allocation are being made based upon an assumption that principal leadership is a factor in the teacher technology integration process when limited research exists to establish the existence of a relationship between effective school leaders and increased technology integration in the classroom by teachers. The results of this study add to the body of knowledge to assist in determining the level of importance that leadership plays in the successful implementation of technology in schools and teacher comfort levels with technology.

Purpose of the Study

The purpose of the quantitative correlational study was to determine if there is a relationship between the leadership effectiveness of three principals in the selected school district in Colorado, and the level of technology integration and comfort of a sample of 30 teachers from each principal's school as measured by the Mankato Technology Survey (Szafranski, 2009). The existence of such a relationship may indicate a need to hold principals more accountable for the success of school technology integration and suggest leadership effectiveness training for principals as a method of increasing technology integration. The existence of no relationship may indicate that principal leadership effectiveness has little or no association with technology integration and that other factors need exploration. Technology integration in the context of this research refers to the inclusion of technology into instruction in schools, as well as technology being embedded into the school curriculum (Shapley, Sheehan, Maloney, & Caranikas-Walker, 2010). Leadership effectiveness in the context of this research refers to the ability of the principal to create an environment in the school that encourages ongoing development of improved teaching and learning for staff and students (Afshari et al., 2010).

Significance of the Study

The increase in expenditure on technology in schools in the last decade (Gosmire & Grady, 2007) illustrates the perceived relative importance of technology integration in the educational context. However, programs that supply all teachers with laptop computers, at great expense, in the hope that increased technology integration will logically follow, are inconclusive in their results (Cowie, Jones, & Harlow, 2011; Klieger, Ben-Hur & Bar-Yossef, 2010). In a study to identify technology leadership characteristics, Sincar (2013) stressed the importance of school leadership to technology integration, rating it as more important than the technology

infrastructure**.** Research has indicated a positive correlation between the use of technology by school leaders and that of their staff (Szafranski, 2009), which would suggest leadership by example is an effective method of encouraging technology integration. Despite these conclusions, many teachers are still not effectively integrating technology in a meaningful way, as there seems to be no relationship between computer use and a move towards a more student-centered teaching and learning paradigm, the student-centered paradigm being the one that research indicates as most effective for technology integration (Palak & Walls, 2009). Afshari, Bakar, Luan, and Siraj (2012) have conducted research on the relationship between transformational school leadership and technology use in Tehran, but little if any research has been done to relate leadership effectiveness to the level of technology integration by teachers. The conclusions of this study may assist in clarifying the relative importance of principal leadership effectiveness in the technology integration process.

Significance of the Study to Leadership

In 1970, Blanchard and Hersey wrote that the increasing level of complexity of schools was creating new challenges for those who fill the role of school principal. Over 40 years later, the trend of increasing complexity has not abated (Ibukun et al., 2011). The role of the principal of a school involves managing the day-to-day minutiae of the school, as well acting as an instructional leader in times of change (Gülcan, 2012), a role of increasing importance as many districts move to site-based management paradigms (Stanfill, 2000). In light of the increasing importance of school leaders, it is interesting to note that there is no set definition of what constitutes an educational leader (Marturano, 2014). Consequently, effective principals in schools are not homogeneous. The unique nature of each school requires a specific set of leadership abilities and knowledge in order for the principal to perform effectively (Caffyn,

2010). A principal who can use knowledge of leadership theory in an effective manner can create a positive school culture for success and change (Kelley, Thornton, & Daugherty, 2005).

In relation to technology in schools, it is important to note that there is not a clearly defined role for principals in terms of technological leadership (Eren & Kurt, 2011). A lack of a clearly defined role does not imply a lack of assigned responsibility. Principals are clearly responsible for technology implementation in schools (Afshari et al., 2012; Brooks-Young, 2013; Eren, & Kurt, 2011). Research findings have correlated principal leadership to student achievement, (Mendels, 2012), positive school climate (Grace, 2000; Zigarmi, Edebum, & Blanchard, 1991), and teacher job satisfaction (Yılmaz & Ceylan, 2011). In addition, some research has found a relationship between principals and technology integration and use in schools via the vehicle of principal modeling of technology (Kara-Soteriou, 2009; Szafranski, 2009). However, little research exists to explore whether a relationship exists between principal leadership effectiveness and the incidence of technology integration.

Nature of the Study

A qualitative method for this study, specifically, a phenomenological study of the experience of technology integration, was one option for this study. A phenomenological study explores the nature of a situation or phenomenon using a detailed personal immersion and study of the situation by the researcher through conversation and other personal and open question-based data collection (Giorgi, 2014). A phenomenological study would have allowed a discourse on the experience of teachers with technology integration and what influences the teacher feels that principal leadership effectiveness has on the technology integration process. A phenomenological study would not have established the existence of a measureable connection between these two factors (Borrego, Douglas, & Amelink, 2009). Mayer (2012) stated that the

research question should define the type of research technique that is used. Quantitative methods are based on the assumption that the scientific method is the best technique for gaining information about how and why things occur (Borrego et al., 2009). The purpose of correlational methodology is to generalize from a smaller sample of data a condition that exists in a larger population (Kelle, 2006). In the case of this study, a quantitative correlational study best addresses the question of whether a relationship exists between principal leadership effectiveness and teacher technology integration (Leedy & Ormrod, 2009). Correlational studies are considered non-experimental as these studies do not test the cause and effect nature of a relationship, merely whether a relationship exists (Braakmann & Benetka, 2008). Once the existence or lack of a correlation is established, a future study using qualitative methods would be appropriate to explore the nature of the relationship further.

The study was a quantitative correlational study using two established instruments. The data from Hersey and Blanchard's LEAD other was used to collect information on the effective leadership of the principal. Hersey and Blanchard designed the LEAD other instrument to be completed by subordinates of the leader to gain their perspective of the leader's effectiveness (Chen & Silverthorne, 2005). The second instrument is a modified Mankato Technology Survey. Johnson (2003) designed the Mankato Technology Survey instrument in Mankato, Minnesota to evaluate the level of technology usage and users' comfort with technology. Modifications made increase the brevity and directness of the instrument and update technology options due to advances in technology since the instrument's design (Szafranski, 2009). Both of these instruments were delivered in an electronic form using a centralized data collection point and non-identifying labels, thus protecting the anonymity of the respondents. The use of these existing instruments with established validity and reliability increased the overall reliability of

the study. Christensen (2010) defined reliability as the ability of the research tool to supply consistent results from the variables tested. The validity of an instrument provides a numerical measure of the instrument's ability to measure the factor or factors that the instrument was designed to measure (Christensen, 2010). Both the LEAD other and Mankato Technology Survey are frequently used because of their validity in testing leadership effectiveness and technology integration in schools respectively. While these instruments had not been used together in a descriptive correlation study before, their individual reliability and validity would indicate that meaningful data was collected.

Hersey and Blanchard designed the LEAD other to be administered to peers and subordinates of leaders to gain insight into their perceptions of the leaders' effectiveness (Chen & Silverthorne, 2005). The leader's peers and subordinates complete the questionnaire about the leader in relation to a variety of leadership activities that leaders may be required to perform. The basis of the instrument is the Situational Leadership® theory that effective leaders will use the leadership styles and behavior that is most appropriate in a given situation (Yilmaz & Ceylan, 2011). The LEAD other measure of effectiveness has shown strong positive correlations between effectiveness scores and school climate variables such as willingness to adopt change (Zigarmi et al., 1991).

Johnson (2007) designed the Mankato Technology Survey in the Mankato School District based upon the National Education Technology Standards (NETS) (International Society for Technology Education, 2009). The questions focus primarily on the frequency of technology use and the level of benefit from technology use (Szafranski, 2009). It takes into account factors such as access to technology and teacher proficiency in technology use. For the purposes of this study, a modified version of the survey designed by Szafranski (2009) was used. The modified

version is substantially the same as the original apart from the elimination of extraneous questions relating to areas of the NETS not being considered by this research and technology questions updated to include recent technological advances and remove obsolete technology.

Hypothesis/Research Question

Since technology has had such a large impact on most aspects of society, one can expect that it would also have such an impact on education (Noeth & Volkov, 2004). While there is agreement as to the potential impact of technology (Camp, 2007), there is also agreement as to the lack of the predicted impact eventuating (Gosmire & Grady, 2007). In an effort to isolate factors that are contributing to the phenomenon, the question becomes, what is the relationship between principal leadership effectiveness and the level of teacher comfort with and integration of technology in a school? In an attempt to answer the question, the focus of this quantitative study is principal leadership effectiveness and the level of teacher technology integration in the classroom in schools. Principal leadership effectiveness was treated as the predictor variable and teacher integration as the criterion variable.

$H1_0$: There is not a positive relationship between principal leadership effectiveness and the level of teacher comfort with and integration of technology in the classroom.

$H1_A$: There is a positive relationship between principal leadership effectiveness and the level of teacher comfort with and integration of technology in the classroom.

Theoretical Framework

The problem statement for the study, that despite the assumption that school leadership is a factor in the teacher integration process, limited research exists to establish the existence of a relationship between effective school leaders and increased technology integration in the classroom by teachers, encapsulates the basis of the theoretical framework for the study. The

theoretical framework of the study was the ability of effective leaders to create a desired change in the actions of their followers (Marion & Gonzales, 2013). In this study, the leaders in question were the school principals and the desired change was the presence of technology integration in the classroom. Although there are many models of leadership, all involve the ability of the leader to create a situation where followers perform an action or form an opinion that is desired by the leader (Ibukun et al., 2011). In heroic or charismatic leadership theory, as an example, the leader uses the force of personality to create change in the follower (Yukl, 2012), while in transactional leadership theory, the change is an exchange managed by the leader, essentially bribing the follower to create the desired activity or mindset (Avolio & Yammarino, 2013). Transformational and servant leadership operate on a more emotional and ethical level. In transformational leadership, the leader creates a moral imperative in the followers for the change being proposed (Yukl, 2012) while a servant leader models a change in priority from the self to the other with the intention that this be propagated and replicated amongst followers (van Dierendonck, 2011).

The fact that researchers and theorists posit many varying definitions of how and why a change in behavior occurs requires that a broad definition of leadership effectiveness be used (Caffyn, 2010). In this study, effective leadership was measured using the Situational Leadership® model that allows for a variety of leadership behaviors (Hersey & Blanchard, 1982; Nahavandi, 2011). Situational Leadership® as measured by the LEAD other instrument defines effective leadership as when the leader chooses the most appropriate leadership strategy to create follower change in a given situation (Chen & Silverthorne, 2005).

The leaders this study examined are school principals. Previous research has emphasized the role of the school principal in influencing a wide variety of attitudes and behaviors in the

school context (Gulcan, 2012). The areas of successful influence for the principal include school climate (Grace, 2000; Zigarmi et al., 1991), student achievement (Gulcan, 2012; Mendels, 2012), and teacher job satisfaction (Yılmaz & Ceylan, 2011). Research specifically related to principal leadership and technology integration has indicated that principal modeling for technology use has a positive correlation to teacher technology use (Szafranski, 2009).

The question of whether a relationship exists between principal leadership effectiveness and technology integration stems from research that indicates that technology integration is not being consistently and effectively carried out in the school setting (Jianwei, 2010). Technology integration in this context refers to the implementation of a technology-rich curriculum and teaching paradigm (Aldunate & Nussbaum, 2013). Technology integration in the educational setting refers to not just the physical presence of technology but also the active embedding of information literacies into classroom practice (Derakhshan & Singh, 2011). Information literacies or multiliteracies refer to the ability to use information technology to find, validate, and synthesize information in order to create meaningful answers to questions posed (Wolfe & Flewitt, 2010). Without educational technology integration embedded in an information literacy-rich curriculum, school education runs the risk of becoming obsolete and irrelevant (Bhasin, 2012) in a world where students are immersed in this technology growing up as "digital natives" (Brown & Czerniewicz, 2010; Prensky, 2010) and future careers will be more dependent upon information literacies than factual recall (Borsheim et al., 2008).

The lack of effective educational technology integration is despite the high level of importance that society and professional educational organizations (Bonk, 2010) place on technology integration in schools. Research has repeatedly demonstrated that teachers are resistant to change (Ertmer & Ottenbreit-Leftwich, 2010) and that they need to be led in order for

changes to occur (Banoglu, 2011). Additionally, successful technological implementation occurs when the technology implementation is well planned and well led (Bellamy, 2007).

Definition of Terms

Throughout the study, a number of terms will be used that require a common definition in order to ensure understanding of the work carried out. Those words are defined here, and these definitions are used throughout the paper.

Behaviorist teachers are those who ascribe to the behaviorist model of learning. This model considers learning to be a change in behavior that arises from a positive or negative experience related to the behavior (Ormrod, 2011; Patchen & Crawford, 2011).

Constructivist teachers are those who believe that students build their own knowledge based upon their interactions with their environment. These teachers try to shape the interactions and encourage reflection on the part of the student about their learning (Taber, 2011).

Effective leadership is problematic to define as the model used to define leadership limits the behaviors that are accepted as demonstrating effective leadership (Haber, 2011). In the case of the study, the term *effective leadership* refers specifically to the ability of the principal of the school being able to choose the appropriate leadership actions in order to influence their followers according to the tenets of the Situational Leadership® theory. Situational Leadership® theory describes leadership as effective when the leader can adapt his or her leadership to the situation and followers, and in doing so, achieve his or her objective (Blanchard & Hersey, 1996; Nahavandi, 2011). Consequently, the LEAD other instrument, based upon the Situational Leadership® theory, was used to measure leadership effectiveness.

Information Literacy Skills refer to the ability to search out and find information, verifying its legitimacy and then evaluating all the information collected to find an answer to a question (Bush, 2012).

Leadership is an enigmatic topic; it has evolved over time and has many definitions and theories and no single concise picture of what leadership is and how it works (Sahoo & Mohanty, 2010). In the study, *leadership* describes the process of managing and controlling change (Wilson & Foltz, 2012).

Technology, specifically *Educational Technology*, in the study is defined as any piece of electronic or mechanical equipment that assists students in the learning process (Davies, 2011).

Technology Integration is a teaching and learning program where information technologies are embedded in the pedagogy in a meaningful way in order to encourage student learning and teacher productivity (Aldunate & Nussbaum, 2013). In the context of the study, the level of technology integration will be measured by the Mankato Technology Survey (Johnson, 2009).

Assumptions

The research conducted by this research study was based upon three assumptions. The first is that the teachers answered all questions truthfully and diligently on both the instruments. The second is that the administration of two instruments simultaneously did not interfere with the individual validity of the separate instruments. The final assumption is that a correlation between the responses to these instruments indicates a correlation of the factors that they are individually measuring.

Scope

The study involved the selection of three middle schools in the selected school district from across the breadth of the district geographically. From all three of these schools, a total of 90 respondents completed both the Hersey and Blanchard's LEAD other and the Mankato Technology Survey. Hersey and Blanchard's LEAD other (Appendix C) was used to collect data on principal leadership effectiveness as indicated by the teachers who follow them, while the Mankato Technology Survey (Appendix D) was used to provide a score that represents the subjects' combined comfort level and technology integration level. The results from these instruments gave a minimum of 90 data points referring to the leadership of three separate school principals and the technology integration and comfort level of over 90 different teachers. While this study was limited in scope, the data points should be sufficient to determine whether a meaningful correlation exists within the sample selected (StatSoft, 2013).

Limitations

In general, descriptive correlational statistics are limited in that they provide the results of a voluntary sample group at a given time and assume honesty and accuracy in their reporting process (Berksteiner, 2013). In addition, correlational statistics are merely the first step in the process of an investigation of a relationship; they establish whether covariance occurs, not whether the factors are directly related, and certainly not that one causes the other (Creswell, 2013). In the case of this study, the variables in question, principal leadership effectiveness and the level of teacher technology integration and comfort, were measured for evidence of a relationship. If the results of this study had indicated evidence of a positive relationship, it would not necessarily have meant that effective principal leadership caused increased teacher technology integration and comfort; indeed, the possibility exists that the two variables are

connected by relationship to one or more intermediate factors that connect the two and create the appearance of a direct relationship.

Additionally, the study was limited in size due to financial and time constraints. The limited size potentially hindered the ability to generalize the findings. The sample size of over 90 data points made of the combination of three schools, each with more than 30 staff member responses associated with each one, should be sufficient to complete a Spearman rho calculation with a high measure of reliability (StatSoft, 2013).

The localization of the subjects, being all from the one school district, and only middle school teachers, limits the ability to generalize results beyond similar groups of teachers in districts with a similar demographic.

The use of the Situational Leadership® model as the measure of effective leadership may not allow for leaders who are considered effective under other leadership models, which may have caused some erroneous results. The ability of the Situational Leadership® model to allow for a variety of different leadership styles (Hersey & Blanchard, 1982) should ameliorate these results.

The LEAD other instrument uses the responses of peers and subordinates to measure the leadership style and effectiveness of the leader (Hersey & Blanchard, 1982). In the case of the study, the teaching staff of the school completed the instrument and thus provided the data relating to the effectiveness of the principal. Consequently, the study was limited in that it provided evidence for the existence or lack of existence of a correlation between the teachers' perception of principal leadership effectiveness and teacher technology integration. The limitation caused by using follower perspectives is a result of the nature of the instrument used, but is not unique to the LEAD other particular instrument. The use of data collected from

subordinates, or followers, is a common method used to create data about the leadership of individuals (Avolio & Yammarino, 2013).

Delimitations

The study was limited to the three middle schools of the selected school district in Colorado in the USA who voluntarily took part in the research. In addition, the instruments chosen, while robust, are not the only instruments that measure these phenomena and, as such, other instruments may give differing results. The LEAD instrument comes in two forms, LEAD self and LEAD other, with the term *self* or *other* indicating the person that completes the survey regarding the leadership effectiveness of the person in question. The selection of LEAD other for the study may give differing results than if the LEAD self had been used. These factors limit the generalization of the study to similar middle schools in Colorado from the perspective of the Situational Leadership® theory.

Summary

The growing concern with technology in society and the preparation of school students to be academically prepared to take their place in the society and workforce of the future has led to growing interest in the study of technology integration in schools (Bhasin, 2012; Giardina, 2010). The responsibility of the endeavor to integrate technology lies with the school principal (Brooks-Young, 2013). Research findings indicate a pervading belief that the actions of the principal as the school leader directly influence the level of technology use and the level of technology integration of teachers (Eren & Kurt, 2011). What has not been explored is whether the level of effectiveness of the leadership supplied by the principal is related with the level of teacher comfort with technology and integration of technology into the classroom. The existence of such a positive relationship, while not proving causality, would establish a need for further

study into the causal nature of such a relationship and how it can be best used to ensure that technology integration is occurring in pedagogically effective ways. The absence of such a relationship will bring into question the assumption that the principal should be the ultimate responsibility for the level of technology integration in the school. Chapter Two will include a review of the relevant literature beginning with a discussion of leadership in general and then a more focused approach to principal leadership. The literature relating to technology integration will then be explored, followed by a discussion of the literature connecting principal leadership and technology integration in schools.

CHAPTER 2: LITERATURE REVIEW

The review of literature addresses the topics of effective leadership, technology integration, and principal leadership in technology. The purpose of this study is to explore the existence of a relationship between principal leadership effectiveness and teacher technology integration in order to expand the research available on this issue. Consequently, the search was conducted using the terms effective leadership, technology integration, principal leadership, and combinations of these in a variety of orders due to the lack of efficiency of academic databases. The literature search was made using a combination of three academic databases, specifically Ebsco, Proquest, and Eric. A large amount of research was present on effective leadership, though the definition of the term varied amongst the literature. There was also a large amount of research relating to technology integration in schools. However, there was less research on the relationship between principal leadership and technology. Criteria for inclusion in this review consisted of a combination of relevance, depth of discussion, and the recentness of the research. The inclusion of some articles led to the inclusion of others that were heavily cited in those articles even though they may not have been as current. Chapter 2 represents literature on effective leadership, beginning with a definition of leadership itself and an outline of a variety of views of what differing models of leadership define as effective. Also included in Chapter 2 is a discussion of literature on the role of the school principal as a leader. Lastly, this chapter contains literature on the topic of technology integration in schools and concludes with an exploration of recent literature regarding the relationship between these two areas and the need for further research.

Effective Leadership

Marion and Gonzales (2013) defined leadership as the ability to manage, control, and direct change. Leadership is distinct from management, which is defined as the oversight and planning of day-to-day tasks (Răducan & Răducan, 2014). In a world with unprecedented technological and social change (Brown & Joshua, 2010), a competent and successful leader who can lead effectively is a highly desirable commodity. Chen and Silverthorne (2005) found that leader effectiveness was integral to follower attitude changes and the follower's willingness to adopt structural change, particularly uncomfortable change. The wide variety of situations and leadership styles makes the definition of effective leadership a difficult one, as what may well be effective in one situation is likely not to be effective in another (Nahavandi, 2011). The lack of a clear singular definition has given rise to a number of leadership theories with disparate models of what is considered leadership, and therefore equally disparate models of what is considered effective leadership. Additionally, the definition of what is considered good leadership will ensure that only the aspects covered in that definition are assessed as a measure of effectiveness (Haber, 2011). In a leadership model like Hersey and Blanchard's (1979) Situational Leadership®, the effective leader selects the leadership behavior that suits a given situation. In broadening the definition of successful effective leadership strategies, the Situational Leadership® model alters the definition of the concept of effective leadership to include the choice of leadership strategy, as well as the use of that strategy (Nahavandi, 2011).

Early Models of Leadership

Early leadership studies seem to be concentrated upon retroactive examination of leaders who had a profound effect upon their followers (Harris, Berendt, Malindretos, Scoullis, & Williams, 2012). In these cases, the priority was to understand what made these people able to

have such a strong effect on their followers, with an emphasis on what made them different from those who followed. The two main theories of the early period dealt with the heroic leader and the servant leader (Yukl, 2012). These two divergent models were the beginning of the multiplicity of theories and models of leadership that exist today (Sahoo & Mohanty, 2010).

Heroic leadership. One of the earliest models of leadership was the idea of the heroic leader. In the heroic model, the concept of leadership was synonymous with military or civil authority. Early writings such as those by Sun Tsu (Circa.600 BCE, trans, 2012) or Machiavelli (1532/2013), or more recent analyses of past leaders such as Moses (Freud, 1967), described leadership in terms of a charismatic model or transformational leadership (Yukl, 2012) in which the leader was the ultimate authority. Sun Tsu (trans, 2012) described effective leaders as possessing ethics, wisdom, honesty, discipline, and courage. Machiavelli (1532/2013) was less idealistic and offered leaders the choice of being loved or feared, describing the process of achieving either and the benefits of each. In their retrospective analysis of Moses as a leader, Harris et al. (2012) described Moses's actions through the lens of charismatic leadership, describing him as having personal qualities such as a high level of integrity and strong beliefs that, when added to the ability to inspire others, made him an effective leader. All of these leaders fit the description given by Carlyle (1902) of leaders of the past being the "noblest" and "most able" of men who were followed because of their strength of conviction and obvious superiority. While some principals may fit the heroic description of nobility and ability, many will not, and it is necessary to seek elsewhere for an understanding of principal leadership in schools.

Leaders as servants. The charismatic, heroic leader is not the only early model of leadership. Lao Tsu (Heider, 1988) described leaders as servants of the people, a similar concept

to that espoused by Jesus of Nazareth when He said "the greatest among you should be like the youngest, and the one who rules like the one who serves" Luke 22:26b (New International Version). The fifteenth United States President Abraham Lincoln also echoed the same sentiment in the Gettysburg Address when he referred to a "government of the people, by the people, for the people" (Goodwin, 2012, p.586). The servant leadership idea of leaders working for followers rather than exclusively for their own benefit seems contrary to heroic leadership where the leaders wielded absolute power. However, these servant leaders could also be said to fit Carlyle's (1902) description of the "noblest" and "most able," illustrating an early existence of divergent ideas of the definition of leadership (Cronin, 1995).

Winston Churchill described effective leadership as being able to inspire people to look beyond their personal interests to work towards the greater good (Boseman, 2008). Churchill looked to the results of leadership rather than the components or attributes of the leader as being the important indicator of effective leadership. Using Churchill's assertion as a starting point, one vision of effective leadership focuses on the results obtained rather than the process used. If Churchill's definition is reworded to slightly alter the emphasis, the definition of effective leadership becomes to use the correct process for the situation in order to attain the desired results. As with heroic leadership, while the historic viewpoint could describe some principals in some contexts, a more broad and detailed understanding of leadership is needed to explain those situations where the principal is not acting out of a servant mindset. At the start of the twentieth century, a number of new leadership theories were developed in an effort to create a deeper understanding of the phenomenon of leadership.

Twentieth and Twenty-First Century Leadership Models

Chemers (1984) broke the modern study of leadership into three periods, beginning in 1910. These three periods expressed the dominant leadership paradigms underlying the theories developed in that period. According to Chemers (1984), the three leadership paradigms are, in order of occurrence, trait theories, behavioral theories, and contingency theories. The progression in leadership studies reflects a change in the understanding of what leadership entails. One of these changes is a move from studying the heroic leaders towards the relationship between leaders and followers (Hughes, Ginnett & Curphy, 2011) and studying the actions of failed and poor leaders in order to better understand their failures (Kellerman, 2012). Leadership, by implication, requires that someone is being led. These followers, the crisis or objective towards which the leadership is focused, as well as the leaders themselves, make up the totality of the leadership picture (Bennis, 2011). Some notable leadership models include Transactional Leadership (Burns, 1982), Transformational and Charismatic Leadership (Avolio, & Yammarino, 2013), Servant Leadership (Greenleaf, 2002), and Situational Leadership® (Hersey and Blanchard, 1979). Each of these theories is examined below in relation to the definition of effective leadership under that theory or model.

Transactional leadership. In order to understand effective leadership, there must be understanding of both those who are being led and the situation of the leadership. If followers are considered individuals with their own agendas who follow leaders who will best serve these agendas, the definition of effective leadership becomes the ability to understand and meet the needs of the followers. In the Transactional Leadership Model, originally delineated by Weber in 1947, expanded by Downton in 1973, and refined by Bass in 1981, the leadership process is described as a series of transactions between the leaders and the followers (Avolio &

Yammarino, 2013; Burns, 1982; Yukl, 2012). While the transactional leadership model provides insight into the motivations and objectives of those who follow, its objective rationality fails to explain in a satisfactory way the inherently emotional experience that many followers attach to leaders (Clawson, 2011). Kellerman's (2012) research into what can be learned from the experience of failed and poor leaders demonstrates a multiplicity of occasions in which the actions of the followers defied the logic inherent in the Transactional Leadership Model.

Transformational and charismatic leadership. Clawson (2011) described leadership as addressing levels of need in the follower. Level one leadership addresses the follower's needs, while level two addresses thoughts of the follower, and level three addresses the follower's values. In the transformational leadership model, leaders are described as going beyond the first level of the hierarchy to include the emotional and inspirational effect of leaders (Avolio & Yammarino, 2013). In Burns' original model, the process of transforming leadership created changes in both the leader and the follower (Couto, 1995). When Bass formalized the model, in the process changing the name to transformational leadership and focusing on business rather than societal leadership, he placed the emphasis on the changes the leadership created in the followers. The vision of leadership in the transformational leadership model is for leaders to inspire a raised consciousness amongst their followers about ethical issues and create needed change (Avolio & Yammarino, 2013; Yukl, 2012). Effective leadership under the transformational leadership model is defined by the influence of the leader creating an ethical change in the follower through motivational and charismatic influences and intellectual stimulation (Hoffman, Woehr, Maldagen-Youngjohn, & Lyons, 2011; Sosik & Jung, 2011; Yukl, 2012). In the context of the study, the proof of effective leadership would exist if a change in teachers occurred that created a desire to integrate technology. Conversely, using the

transformational leadership model, a lack of desired technology integration due to a lack of teacher action would be defined as lack of effective transformational leadership. The transformational leadership model does not allow for other factors affecting the process of leadership or technology integration.

Servant leadership. Greenleaf (2002) developed the historical theme of leaders as servants into a coherent leadership model. In the Servant Leadership Model, Greenleaf described an effective leader as one who inspires others to act as servants of the common good by example rather than rhetoric or force of personality. Greenleaf (2002) proposed that "the only authority deserving one's allegiance is that which is freely and knowingly granted by the led to the leader in response to, and in proportion to, the clearly evident servant nature of the leader" (p.24). Greenleaf's theory proposes a change in the way leadership is interpreted and applied. An effective leader under Greenleaf's model is one who others choose to follow due to his or her proven record of accomplishment as a servant who ensures that others' needs are being met. In short, these are leaders who care. Rosette and Ciarrochi (2005) stated that higher emotional intelligence was associated with higher leadership effectiveness, indicating that caring and effective leadership are related. While servant leadership is an admirable form of leadership, a method for measuring effective leadership under this model does not exist, mostly because the model is not prevalent in Western society (Paynton, 2010).

Situational Leadership®. Until the creation of a unifying leadership model, the synthesis of a discussion on leadership will always be that no single model encompasses all situations and experiences of leadership (Haber, 2011). A model that represents a variety of leadership actions based upon the prevailing factors such as the Situational Leadership® Model devised by Hersey and Blanchard (1979) represents a sound option in measuring leadership

effectiveness. The underlying idea behind Situational Leadership® is that the type of leadership that is most effective will depend upon a given situation (Lorinkova, Pearsall, & Sims, 2013).

In the Situational Leadership® Model, Hersey and Blanchard (1979) described leadership as a complex interaction between the situation, the leader, and those following that leader (Hughes et al., 2011). In Situational Leadership® theory, leaders are either relational or task-oriented, followers are mature or immature, and situations are controlled or less controlled (Chemers, 1984; Hersey & Blanchard, 1979; Nahavandi, 2011; Yukl, 2012). As a result, a three-dimensional spectrum of possible situations arises, reflecting the combinations of each of the three factors. Hersey and Blanchard (1979) stated in their Situational Leadership® Model that successful leadership occurs when leaders are able to adapt their leadership style to the followers and situation. Effective leadership, then, is the ability of the leader to change his or her style to fit the situation or to change the situation to fit his or her style (Nahavandi, 2011). The ability to change styles is seen as beneficial in the complex and constantly changing world of contemporary organizations (Hoffman et al., 2011). Another positive outcome of the Situational Leadership® Model is that the interest in the engagement level of the followers requires leaders to seek ways to improve the skills and readiness of those followers who are not displaying a high level of engagement in an active way rather than maintaining the status quo (Yukl, 2012). Situational Leadership® emphasizes the importance of training and the acknowledgement of followers as an integral part of the leadership process. According to the Situational Leadership® Model, leaders can enhance their effectiveness through understanding their followers and the situation (Nahavandi, 2011). In the Situational Leadership® Model, the definition of effective leadership lies in the leader's ability to adapt to situations and use the appropriate leadership tools well in the relevant situation (Hersey & Blanchard, 1979). The Situational Leadership®

Model is constructed to allow for a variety of leadership actions, depending upon the leadership environment (Lerstrom, 2008). As such, the LEAD other instrument, written to test leaders under the Situational Leadership® Model, is appropriate for use in evaluating principal leadership behaviors in relation to technology due to the complex nature of both the technology integration process (Afshari et al., 2012) and school organizations (Ibukun et al., 2011).

Principals as Leaders

In the early 21st century, the role of the principal in a United States public school has become increasingly complex in comparison to the late twentieth century (Ibukun, Oyewole & Abe, 2011). The principal deals with the community, other administrators, teaching staff, non-teaching staff, and students in a leadership capacity in relation to creating and managing change (Dunn & Dunn, 1983). In all of these change efforts, the leadership of the principal is the central component in the success of these relationships (Gulcan, 2012; Stanfill, 2000). The increasingly complex array of activities and expectations of the role of the principal (Gulcan, 2012; Ibukun, Oyewole & Abe, 2011) requires that a single leadership style will not be sufficient (Blanchard & Hersey, 1970; Ibukun, Oyewole & Abe, 2011, Rowley, 1997; Yilmaz & Ceylan, 2011).

In researching the effectiveness of school principals in Texas, Fernandez et al. (2007) used a list of seven separate indicators as a measure of the success. These seven indicators dealt with separate aspects of the leadership of the principal and included areas as diverse as staff turnover and student attendance. Due perhaps to the breadth of the indicators, the only statistically significant characteristic of principal effectiveness reported by the authors was experience (Fernandez, et.al, 2007). Other research further supported the importance of experience as an indicator of principal leadership effectiveness (Deng & Gibson, 2008; Ibukun, Oyewole & Abe, 2011). The inability to use other indicators of leadership effectiveness

supported previous work by Stanfill (2000) who stated that the nature of the role of the principal is such that comparisons between principals and schools in terms of their leadership style and leadership effectiveness should not be made. One of the reasons for the wide variety of leadership amongst principals is that every school, indeed every teacher and student, has a unique set of needs and expectations (Yilmaz & Ceylan, 2011).

The logical question then becomes, how necessary is the school principal's leadership to the success of the school. Research has shown relationships between effective principal leadership and school climate (Grace, 2000; Zigarmi et al., 1991); teacher job satisfaction (Kelley et al., 2005; Yilmaz & Ceylan, 2011); student performance in standardized testing (Gulcan, 2012; Mendels, 2012); and the school's ability to cope with change (Kelley et al., 2005; Mendels, 2012; Stanfill, 2000).

In order for the principal to be a successful leader in the complex arena of the modern school environment, research repeatedly isolated two features. The first of these features is for the principal to have high personal standards in relation to personal excellence and ethics (Grace, 2000; Ibukun, Oyewole & Abe, 2011; Rowley, 1997). The second feature repeatedly emphasized is a flexible leadership style such as is described in the Situational Leadership® model (Caffyn, 2010; Dunn & Dunn, 1983; Hersey & Blanchard, 1970; Kelley, Thornton & Daugherty, 2005; Stanfill, 2000; Yilmaz & Ceylan, 2011).

While these models represent the more traditional views on leadership, new and alternative views exist, including a Distributed Leadership Model such as the one proposed by Kowch (2013) that describes the principal as playing a less dominant role as a part of a leadership team. However, the concept of a more democratic leadership paradigm is not new. In the past, the title of principal was just a short version of principal teacher (Mendels, 2012), just

as the English term Head Master simply meant the leading teacher (Grace, 2000) in what was more like a first-among-equals relationship. The Distributed Leadership Model, rather than being new, simply reflects another style of leadership to be adopted in order to lead effectively (Kelley, Thornton & Daugherty, 2005).

Summary of Leadership Literature

While there is no single definition of what makes up effective leadership, the breadth of models that exist suggests that a model that requires flexibility in leadership style is one method to achieve effective leadership (Kelley et al., 2005). Research has indicated the existence of a relationship between the leadership of the principal and a variety of positive school outcomes, reinforcing the importance of the principal's leadership relationship in the life of the school (Mendels, 2012). In order to be effective as a leader, principals need to have high ethical standards and be flexible in leadership style as the situation arises (Mendels, 2012). As will be demonstrated in the literature review below, if there is anywhere such leadership is needed, it is in the process of technology integration in schools (Afshari et al., 2012; Carr, 2010).

Technology Integration

Students growing up in the 21st century have an unprecedented amount of technological change occurring in their lives on an ongoing basis. Teachers in the 21st century have the task of preparing these students to live in an age when almost nothing is permanent and change is the norm. Technology integration is defined as the process of assimilating technology into the school curriculum in a manner that is pedagogically sound (Brooks-Young, 2013). Technology integration depends upon the availability of technology and the ability and desire of teachers to make use of that technology in the educational context (Allsopp, McHatton, & Cranston-Gingras, 2009). The introduction of technology into schools has been part of the effort to

prepare students for the world of the future, but it has not been completely successful (Borsheim et al., 2008). Many teachers are simply using technology in the classroom as a new tool to provide the same learning experiences of the past (Ertmer & Ottenbreit-Leftwich, 2010). What is needed is a pedagogical shift that uses the unique learning opportunities provided by information technology to create truly student-centered pedagogy (Palak & Walls, 2009).

Growth of Technology in Education

In this time of dramatic and continuous technological change, the potential exists for education to fall behind society in respect to the information age (Bhasin, 2012). Society has placed technology as its centerpiece (Brown & Joshua, 2010), and the ability to use technology is expected in most occupations. With the expectation of technology use in occupations comes an expectation that schools are preparing technologically literate graduates for the future (Davies, 2011). Research also indicates that information technology is a potential asset to the area of education itself (Ertmer & Ottenbreit-Leftwich, 2010). In the period from 1980 until 2000, two variations of the theme of technology integration existed. One variation saw technology as a tool for personalizing instruction through software that substituted and enhanced teacher instruction. The second variation saw technology as a tool for research and the presentation of information (Al Musawi, 2011). In both of these cases, the technology was added into the existing traditional curriculum rather than being the instigator of the radical change in education that these new technologies have the potential to create. There seems to be little dissent with the agenda supporting the incorporation of technology into schools, and this lack of dissent corresponds with a rapid rise in expenditure on hardware, software, and training. Gosmire and Grady (2007) reported a near tripling of technology expenses in schools in the last three decades. This trend is a reflection of the fact that in a poll surveying the aspects of education that were perceived as

important, 98% listed technology as being important for students to understand and be able to use (Brown & Joshua, 2010). The question of whether this money and effort is well spent is a necessary one. Ertmer and Ottenbreit-Leftwich (2010) described teachers of the 21st century as using predominantly the same tools as teachers of the past. Despite the large sums of money spent on the acquisition of new technologies, there has been little change in the overall pedagogy in schools. In many cases when new technology is used, Ertmer and Ottenbreit-Leftwich (2010) described it as simply replacing old technology in the same pedagogical paradigm. The interactive white board of the 21st century becomes a slightly more useful blackboard rather than as a tool to change the way education occurs. There are several possible reasons for this disconnection including teacher rigidity, lack of curriculum change, lack of appropriate professional development and pre-service training, and lack of leadership.

Teacher rigidity. The area of teacher rigidity refers to observations that even when teachers have technology, they are reluctant to use it in a manner outside of their usual practice (Ertmer & Ottenbreit-Leftwich, 2010; Hutchison, 2009). Common uses of technology can take the form of ritualizing the computer use or limiting it to low-order procedures as opposed to deep learning and high-order thinking (Jianwei, 2010; Palak & Walls, 2009). The key component seems to be the teacher's attitude to the technology (Palak & Walls, 2009). If teachers have a social-constructivist philosophy, they are more likely to integrate the technology in a manner that promotes student-centered learning (Bjekic, Krneta, & Milosevic, 2010). A factor in the attitude of the teacher is the process of technology implementation. Bellamy (2007) advocated a systematic and organized approach to the management of technology due to the rapid changes and far-reaching effects that technology has the potential to yield in organizations. The existence of such a process of integration prior to the implementation of the technology has the potential to

increase technological outcomes (Bellamy, 2007). The unfortunate fact is that whereas most studies show that teachers' use of technology is increasing, teachers' use of technology is most frequent for preparation, administration, and management purposes, but rare when it comes to facilitating student-centered pedagogy even among those teachers who work in technology-rich schools and are comfortable with technology (Palak & Walls, 2009).

In many cases, how teachers are using the technology is not pedagogical and has no connection to the learning outcomes they are teaching (Ertmer & Ottenbreit-Leftwich, 2010). There is a clear shift in the classrooms to be technological, but there seems to be a failure to make the corresponding pedagogical shift (Borsheim et al., 2008). Borsheim et al. (2008) gave the solution to the lack of effective integration as teachers needing to adapt their teaching methods and pedagogy to the introduction of technology rather than just adapting the technology to fit in with what they are already doing in the classroom.

Lack of curriculum change. The teachers are not the only cause of inadequate integration of technology. The state and national curricula are also partly to blame. It is not enough to merely supply the teachers with new technology and expect them to use it in new and innovative ways when the very curriculum they are teaching has no well-defined place for technology (Borsheim et al., 2008; Brown & Joshua, 2010). The advent of the No Child Left Behind Legislation in 2002 and other high stakes testing programs have also had a deleterious effect on the use of technology. The increase of accountability for teachers that is related to these high stakes tests means that many teachers are using teaching methods that will garner the best possible results in these tests, not those that create long-term learning (Clarke-Midura & Dede, 2010). While technology can be used in such a limited fashion, these uses are not the

student-centered teaching that presents the greatest potential for pedagogical advancement through technology integration (Ertmer & Ottenbreit-Leftwich, 2010).

Lack of professional development. The most salient question regarding the lack of full integration of technology is the question, why are new teachers, who are "digital natives", not able to make the transition to teaching with technology (Chesley & Jordan, 2012; Tondeur et al., 2012). Bhasin (2012) answered with a description of a system called *human-ware* that requires technology integration to include professional development during pre-service and in-service in order for technology integration to be successful. Professional development has been identified as one of the most important components for change, and yet as a nation, professional development does not seem to be getting the emphasis it needs to ensure that all students and teachers are benefiting from high quality professional development for teachers (Bhasin, 2012). The professional development needs a change in focus. In the past, the subject of the majority of in-service teacher training has been the use of new technology rather than the pedagogy and instructional processes involved in using the new technology (Jianwei, 2010). According to Martin et al. (2010), those teachers who are successfully implementing technology in their classrooms report previously experiencing professional development that helped them connect the technology to the curriculum in meaningful and demonstrable ways.

Of course, one dose of successful professional development is not going to rectify the situation and create technological classrooms of the future. Ertmer and Ottenbreit-Leftwich (2010) gave a clear image of the difficulty of maintaining technological currency when they suggested that for teachers to learn all that is needed about educational technology would be impossible as the standards of what is required are constantly moving. Despite this negative prognosis, the rewards for successful implementation of a technology-rich curriculum are worth

the trouble once teachers and administrators have undergone the necessary mind shift to understand that technology is only a tool, not a panacea to all the problems in education (McDougall, 2010).

Pre-service training. Despite the evident obstacles, the need for technology integration is not something that can just fade away. The future must hold an education system in which technology is a key part of enhancing the education of all students. Strides in this direction are occurring; several teacher pre-service and professional development programs have been designed to overcome the obstacles itemized above (Palak & Walls, 2009). Research indicates that less structured training programs are more effective such as pairing teachers with a variety of levels of technological competency. Each teacher would bring a level of expertise to the mix that would benefit the other (Davis, Preston, & Sahin, 2009). The assumption that new teachers coming out of training will gradually replace the technophobes that are not able and willing to integrate technology appropriately is unfortunately a fallacy. Studies show that a larger proportion of graduates from teacher preparation programs do not enter schools prepared to integrate technology into their curriculum successfully (Davis et al., 2009). The lack of adequate beginning teacher preparation means that many new teachers, despite being technologically perceptive, are ignorant about the effective utilization of technology to enhance student learning.

Leadership of technology integration. School leadership, particularly principals, needs to be actively involved in the process of technology integration by leading for change (Kara-Soteriou, 2009). School leadership needs to involve modeling of technology use, supporting technology integrators, and providing adequate and effective professional development (Kannan, Sharma, & Abdullah, 2012). School leadership has been given the responsibility to address the issue of technology integration (International Society for Technology in Education, 2009) as

policy makers are of the opinion that it is not occurring as widely as it could (Ertmer & Ottenbreit-Leftwich, 2010; Gosmire & Grady, 2009).

Summary of Technology Integration

The future of education will include education that fully incorporates technology. Such a future will involve a paradigm shift from teacher-centered to student-centered teaching strategies and a focus on what Borsheim et al. (2008) referred to as *multiliteracies*. Borsheim et al. (2008) defined multiliteracies as not just reading information given, but using technology to find, verify the accuracy of, and synthesize and evaluate information in order to find an answer to a given question. While Borsheim et al (2008) were describing an English class, this description would equally apply in other classes where the teacher expects the students to engage with learning in an active way rather than passively absorbing knowledge from the teacher (Gorski, 2004). Students in these classes will become excited by learning and will re-evaluate skills and knowledge that they previously considered boring as they see the importance of this knowledge in the world of the future (Bhasin, 2012). The future of education is likely to prove both interesting and challenging for educators as they seek to stay abreast of technology that changes every day and to adapt their pedagogy to use it to its full potential (Lin, 2007). Strides in professional development and research will be of assistance, but a paradigm shift away from teacher-focused and toward student-focused learning is essential for the successful integration of new technologies to reach the potential that researchers believe to be possible (Gosmire & Grady, 2007). Such a change in paradigm will need effective leadership (Marion & Gonzales, 2013).

Leadership and Technology Relationships

Principals as Technology Leaders

In a study relating to technology implementation, Bellamy (2007) suggested that the schools and teachers use a method to implement technology in the educational setting may significantly affect the success of the implementation. In a school setting, Bellamy's (2007) study is pertinent as one of the major barriers to effective technology use in the classroom is the adoption of the technology by the teachers and the teachers' subsequent adaptation of the curriculum to use the new technology. If, as Bellamy (2007) stated, the manner of the implementation is a key component, then a starting point to increasing the effectiveness of that implementation is the person responsible for the implementation strategy, the principal.

The desire to make technology an integral part of the education curriculum is representative of the view of those teachers that McPheeters (2009) labeled *technophiles*. Not all teachers fit into that group; those McPheeters (2009) labeled *technophobes* are active resistors of technology integration. A third, smaller group of teachers, who McPheeters (2009) labeled *cyborgs*, are those who wish to use technology to alter the educational paradigm in a radical way. With all the research and government emphasis on technology in schools, one would expect that the technophiles and cyborgs are in the majority and that technology use is rampant in schools. According to Gosmire and Grady (2007), such a scenario is not the case. They stated that the integration of technology has not delivered the increase in student achievement that many authors feel it has the potential to create. Ertmer and Ottenbreit-Leftwich (2010) saw almost no change at all with the same practices being used in the classroom as those that have been used in the past. Consequently, the obvious question is why the technology revolution in schools is not occurring. Ertmer and Ottenbreit-Leftwich (2010) blamed teachers, stating that generally

teachers are not willing to adopt new changes in curriculum or changes in instructional paradigm. The comfortable system in place is apparently much more appealing than the potential benefits offered by technology integration.

If teachers are the issue, presumably this issue arises because they are older and not technologically literate and confident with the logical response to employ recent college graduates as, presumably, new teachers are much more technologically literate and thus much more likely to integrate technology into their curriculum (Tondeur et al., 2012). Research indicates that this assumption is not necessarily the case (McDougall, 2010). Nadelson et al. (2013), following a social learning theory paradigm, suggested that the degree that instructors model the integration of technology will directly affect the degree that the pre-service teachers enact technology integration. While many higher educational institutions structure their teacher training around the use of technology in an effort to change teaching practices, it would seem that many of the faculty at these higher learning institutions either cannot or do not assist in this process (Bjekic, Krneta, & Milosevic, 2010; Davis et al., 2009). Therefore, large numbers of beginning teachers feel ill equipped to enter schools as technology integrators (Davis et al., 2009).

While it is of concern that teacher preparatory programs are not adequate and these programs doubtless need to be examined and changed, the lack of technology integration in education is an important issue that needs addressing in a more immediate sense. The burden of this task therefore devolves to the leaders of schools, specifically the principals. Bellamy (2007) found that the process of integrating technology demonstrates better outcomes when there is a system in place within organizations to introduce and support integration. In a more specific sense, principals need to be proficient technology users and need to be actively supporting the

process of technology integration in the school context (Afshari et.al, 2012, Eren, & Kurt, 2011, I-Hua, 2012).

The first standard of the International Society of Technology in Education standards for administrators reads, "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" (Newton, da Costa, Peters, & Montgomerie, 2011). When the principal accepts the responsibility of leading technology integration, research by I-Hua (2012) demonstrated a positive teacher response. Szafranski (2009), in a study that examined the level of correlation between the computer usage of teachers in a school and the computer usage of their principal, found a strong direct relationship between the level of technology use by the principals and the level of technology by the teachers they manage.

However, just modeling technology use may not be sufficient. Palak and Walls (2009) found that it is the attitudes of the teachers towards technology that is the most consistent predictor of the level of technology integration in a classroom. Szafranski's (2009) second finding was that there is an indirect relationship between the attitudes of teachers and their administrators towards technology usage. If leadership is defined as changing the attitudes and behaviors of the followers (Chen & Silverthorne, 2005), this definition presents an interesting possibility. If teacher attitudes are the major indicator of technology integration, and teacher attitudes correlate to principal attitudes, there exists the possibility that effective principal leadership is at least a part of the equation of technology integration. Principals who are positive about technology integration and are effective leaders could influence the attitudes of some teachers towards a more positive attitude towards technology integration. Conversely, while the

principal's positive feelings about technology may affect the teachers, it is important to note that the principal's negative attitudes and actions also have an effect. If principals are unaware of the nature of technology integration and are unaware of the demands of the technology integration process, they can adversely affect the level of interest in technology integration in a school (Banoglu, 2011).

Chen and Silverthorne (2005) found that leader effectiveness was integral to follower attitude changes and the follower's willingness to embrace change, particularly uncomfortable change. The lack of willingness to embrace technology integration described by authors such as Bellamy (2007); Borsheim, Merritt, and Reed (2008); Brown and Joshua (2010); and Palak and Walls (2009) suggests that technology integration is the sort of uncomfortable change to which Chen and Silverthorne (2005) referred. If the assumption were made that principals are in fact in favor of technology integration, as the National Educational Technology Standards (2004) requires, then this assumption would suggest a relationship exists between principal effectiveness and the level of technology integration in schools.

Gaps in the Literature

There has been a number of studies done at the doctoral level in the last ten years that specifically target the area of principal leadership and technology integration. In 2004, Seay found that leadership was probably the most important aspect of the technology integration process and recommended that further study be done to explore the relationships between these two factors. Seay (2004) indicated that knowing if there was a correlation between the principal's ability to lead and the school's level of technology integration would be useful in the exploration of the technology integration topic. Persaud (2006) followed this research with a qualitative study regarding administrators' perceived role in technology integration, finding that

this perception is highly important in the success of the process. Camp (2007) specifically explored the area of principal leadership in the success of a technology integration initiative using a single case study approach in a school where technology integration was deemed to have been highly successful. Camp (2007) recommended further study in this area exploring how similar leadership would affect other teacher groups in other schools with a less positive climate. Nolasco (2009) attempted to discover which leadership behaviors principals perceived to be important to the process of technology integration, finding that monitoring, communication, and visibility were the factors that principals perceived as most important. Szafranski (2009) used a quantitative methodology to explore a relationship between technology comfort levels and usage in the principals and the teachers in their schools, finding a positive correlation but not a causal relationship. Szafranski (2009) recommended following this research with a study exploring a possible relationship between leadership behaviors and teacher integration of technology.

Carr (2010) conducted a qualitative case study of leadership styles that are most beneficial to successful technology integration. Carr (2010) found that the complex nature of the role of the principal in the 21st century requires a combination of leadership styles and approaches which is consistent with a model such as Situational Leadership®. Jones (2010), Thomas (2010), and Rivard (2010) conducted similar studies relating to principal leadership and the technology integration process. The results of these studies all indicated that further research needs to be undertaken to explore the role of leadership as a factor in the technology process; specifically, more research needs to be conducted to ascertain whether principal leadership affects change in the integration of technology in the classroom setting.

Lafont (2011) undertook a study to explore a relationship between principal leadership in technology and teacher technology integration but found only a small non-significant

relationship. This study used a highly specific instrument that examined a group of behaviors purported to relate to technology leadership rather than a broad leadership instrument examining a broad range of leadership behaviors. Despite all of the studies that examine facets of the principal leadership and technology integration issue, there is a dearth of research exploring whether such a relationship exists (Lafont, 2011). Indeed all of the studies mentioned in this section assume a relationship between technology leadership and technology integration, but such a relationship has not yet been established.

Theoretical Framework for the Chosen Methodology

Despite the variety of leadership models and theories, one underlying commonality is the ability of leaders to influence and direct the actions of followers (Paynton, 2010). In relation to the integration of technology, this commonality would suggest that successful leadership would mean a higher degree of technology integration. In cases where effective leadership is not leading to the creation of the desired behavior, other factors could be influencing follower behavior. In order to establish whether such factors exist in the case of teacher technology integration, it must first be established whether leadership is creating the desired effect of increasing technology integration.

The research question should dictate the selection of a research methodology (Mayer, 2012). In the case of this research, the research question, whether there is a relationship between effective leadership and technology integration in the school setting, implies a desire to infer a general relationship from a limited study. In this case, a quantitative methodology is appropriate (Borrego et al., 2009) as it allows the creation of a general conclusion from the research (Salehi & Golafshani, 2010).

The purpose of a quantitative correlational study is to create a correlation coefficient that quantifies the strength of the relationship between two variables and hence the mathematical likelihood of a relationship between these variables (Neuman, 2011). It is important to note that the existence of such a mathematical relationship does not imply causality or even the existence of an actual relationship between the two variables predicted (Neuman, 2011).

The theoretical framework draws from a vast body of work on leadership that indicates a relationship between leadership and change (Marion & Gonzales, 2013). In the case of this study, school building principals provide the leadership, and the desired change is an increase in the level of technology integration by teachers. Not all changes desired by the leader occur as changes in the followers (Kellerman, 2013). One possible reason for the lack of change adoption is the lack of effective leadership to the level that would create the impetuous for change. If effective leadership is present, then research would suggest that the desired changes should be occurring (Summerfield, 2014). If effective leadership is present in the school, a correlational study should show a positive correlation between leadership effectiveness and the level of technology integration of the teachers unless other factors are influencing the integration process.

Recent research in the area of technology integration includes several quantitative correlational studies and several qualitative studies. The correlational studies consisted of an exploration of relationships between technology integration and other factors such as principal technology use (Szafranski, 2009). A large number of qualitative research studies has been done in this area to examine the nature of relationships between the technology integration and other factors such as leadership style (Carr, 2010). The nature of these studies and the relative lack of research in the specific area of technology integration and principal leadership effectiveness

require that a study be done to explore the existence of such a relationship before future studies explore the causal nature of such a relationship should it exist.

Summary of Literature Review

Technology integration in schools is an important 21st century educational issue (Brown & Joshua, 2010). The position requirement of the principal has grown in complexity (Ibukun et al., 2011) and now includes responsibility for the level of technology integration occurring within the school (International Society for Technology in Education, 2009). Technology integration represents a potentially enormous paradigm shift in the way education occurs that will incorporate multiliteracies (Borsheim et al., 2008) and more student-centered teaching (Gorski, 2004). This potential paradigm shift, when research shows that many teachers are inherently resistant to change (Ertmer & Ottenbreit-Leftwich, 2010), can only be achieved through effective leadership (Marion & Gonzales, 2013). The lack of a universally accepted and valid definition of leadership creates a situation where the notion of effective leadership is enigmatic at best (Haber, 2011; Summerfield, 2014). The highly complex nature of the school as a leadership environment (Gulcan, 2012; Ibukun, Oyewole & Abe, 2011) coupled with the lack of a coherent definition of effective leadership requires that measures of leadership effectiveness must include the ability to explore and use a variety of leadership tools and strategies (Mendels, 2012; Kelley et al., 2005).

Recent studies in this area include the relationship between technology integration levels of principals and the technology integration levels of staff (Szafranski, 2009) and principal leadership and technology integration in a qualitative fashion (Carr, 2010; Jones 2010; Rivard 2010; Thomas 2010). Common to all of these studies is the assumption of the existence of a relationship between effective principal leadership and higher levels of teacher technology

integration, but no such relationship has been established (Lafont, 2011). Several of the aforementioned studies included a recommendation that the possibility of a relationship between effective principal leadership and the levels of teacher technology integration be explored (Camp, 2007; Carr, 2010; Jones 2010; Rivard 2010; Seay, 2004; Szafranski, 2009; Thomas 2010). Such a study would need to use a broad definition of what constitutes effective leadership in order to allow for the complex nature of the school environment and the level of leadership flexibility required in the principal (Blanchard & Hersey, 1970; Hersey & Blanchard, 1979).

The LEAD other instrument, designed to evaluate effective leadership using the Situational Leadership® Model, allows for breadth in the definition of what is measured as effective leadership (Chen & Silverthorne, 2005). When coupled with a modified Mankato Technology Survey, based upon the National Educational Technology Standards (Johnson, 2003, 2007), this combination provides an opportunity to explore whether a connection between these two factors exists as a positive correlation. In the following chapter, the methodology for this study will be explored in more depth, including a discussion of the instruments used and the sample to be measured in the study.

CHAPTER 3: RESEARCH METHODOLOGY

The question of whether a relationship exists between principal leadership effectiveness and technology integration stems from research that indicates that technology integration is not being consistently and effectively carried out in the school setting (Ertmer & Ottenbreit-Leftwich, 2010) and assumptions that the principal is responsible for the overall level of technology integration (Lafont, 2011). This lack of effective integration occurs despite the high level of importance that society (Bonk, 2010) and professional educational organizations place on technology integration in schools. The purpose of the study is to determine if there is a relationship between the leadership effectiveness of three principals in the selected school district in Colorado and the level of technology integration by teachers in those schools. Chapter 3 includes the structure of the research carried out with discussion as to the foundational reasoning that is behind the selection of the research methods, instruments, and subjects. The intent of the discourse is to provide an explanation of the framework of the research, as well as the scope and logic of the process. The discussion will be an examination of the research design; the rationale behind the design selected; an explanation of the subjects and their selection process; a description of the method of protection of subjects' rights; a discussion of the instruments, including their respective validities and reliabilities; and a summary of the data analysis.

Research Design

Chapter 1 provided an introductory examination of the theoretical basis of the connection between the nature of technology integration in schools and effective leadership. Chapter 2 included an in-depth literature review of the nature of effective leadership, the principal as a leadership role, technology integration in schools, and finally, a review of recent research relating these two factors. The problem is while an assumption has been made that principal

leadership is related to teacher technology integration levels, little if any research exists to relate the leadership effectiveness of principals with the level of technology integration of their teaching staff. The purpose of the study is to determine if a relationship exists between effective principal leadership and the level of teacher technology integration.

Appropriateness of Research Design

The problem statement for the study is that despite the assumption being made that school leadership is a factor in the teacher integration process, limited research exists to establish the existence of a relationship between effective school leaders and increased technology integration in the classroom by teachers. The factors under consideration in this case are the level of technology integration and principal leadership effectiveness. The research question should dictate the selection of a research style and methodology (Mayer, 2012). In the study, the underlying research concept is to generalize whether a relationship exists between these two variables from a smaller sample.

A qualitative method for this study, specifically, a phenomenological study of the experience of technology integration was one option for this study. A phenomenological study explores the nature of a situation or phenomenon using a detailed personal immersion and study of the situation by the researcher through conversation and other personal and open question-based data collection (Giorgi, 2014). A phenomenological study would have allowed a discourse on the experience of teachers with technology integration and what impact the teacher feels that principal leadership effectiveness has on this process. A phenomenological study would not have established the existence of a measureable connection between these two factors (Borrego et al., 2009). Mayer (2012) stated that the type of research technique that is used should be defined by the research question.

Quantitative methods are based on the assumption that the scientific method is the best technique for gaining information about how and why things occur (Borrego et al., 2009). The purpose of this methodology is to generalize from a smaller sample of data a condition that exists in a larger population (Kelle, 2006). The lack of research about the existence of a relationship between principal leadership effectiveness and the level of teacher technology comfort and integration requires that before a cause and effect study is carried out, the existence of such a relationship needs to be established (Leedy & Ormrod, 2009). A correlational study between the two factors is the established method to identify and quantify the existence of a relationship between two factors (Christensen, Johnson, & Turner, 2010). In this case, the question of whether a relationship exists between principal leadership effectiveness and teacher technology integration would be best served by a quantitative correlational study (Leedy & Ormrod, 2009). Correlational studies are considered non-experimental as these studies do not test the cause and effect nature of a relationship, merely whether a relationship exists (Braakmann & Benetka, 2008). If the existence of a correlation is established, a future study using qualitative or experimental methods would be appropriate to further explore the nature of the relationship. If no correlation were established, further study into what factors are affecting the levels of teacher technology integration would be appropriate to gain a greater understanding of this process.

Specific Nature of the Research Design

This research project utilised two established instruments that each measure one of the specific variables. The first instrument is Hersey and Blanchard's Leadership Effectiveness Adaptability Description other (LEAD other), which incorporates the principles of the Situation Leadership ® model to establish a measure of a leader's effectiveness. The LEAD other instrument (Appendix C) is designed to be completed by followers or peers of the leader rather

than the leader himself or herself (Hersey & Blanchard, 1982) in order to avoid the tendency for subjects who are completing survey instruments towards self-aggrandizement (Christensen et al., 2010). Additionally, using the LEAD other instrument as opposed to the LEAD self instrument allowed the creation of multiple data points for each leader.

The LEAD other instrument consists of 12 questions that offer leadership situations with four possible options for the respondent to choose as the most likely actions of the leader in question. The answers provide a summative score that displays the leader's dominant leadership style based upon which leadership style(s) is/are chosen most often. The instrument can also return a score of leadership effectiveness. The leadership effectiveness measurement gauges the responses based upon whether the respondent chooses the leadership style that the Situation Leadership ® theory deems to be the most effective in each case. The scores for the effectiveness element range are on an interval scale from 0 to 36, with 36 indicating a highly effective leader and 0 an ineffective leader based upon the ability of the leader to adapt their leadership behavior to the one that is defined under Situational Leadership® theory as the most suitable for the given situation. The measure of leadership effectiveness is of primary interest in this particular study and was treated as the predictor variable.

The second instrument is a modified Mankato Technology Survey (Appendix D). The Mankato Technology Survey originated in Mankato, Minnesota as an instrument designed to gather information about the technology use in schools (Johnson, 2003). The Mankato Technology Survey incorporates the National Educational Technology Standards (NETS) (Johnson, 2003, 2007) as a basis for the questions posed. The NETS have been subsequently revised to become the International Society for Technology in Education (ISTE) standards for administrators (Newton et al., 2011). These standards have been used several times as a measure

of technology integration or as the basis to create a model to measure technology integration (Britten & Cassady, 2005; D'Onofrio & Bowes, 2005; Hsu, 2010). The modified survey was used by Szafranski (2009) to explore relationships between principal levels of technology use and comfort with technology and the level of technology use and comfort of their teachers. The modifications remove aspects of the survey that are not directly related to the areas of demographics, technology use, and comfort in order to shorten the test and remove irrelevant information. The modified survey has 59 questions including basic demographic data, frequency of use, proficiency with software, and attitudes towards technology use in schools. The survey uses a Likert-type scale for the majority of the responses. The Likert-type scale used in the modified Mankato Technology Survey is based upon observable levels of variation between the values, allowing for them to be treated as interval scores and for a combined score to be generated (Hartley, 2013). The demographic questions included years of experience, subject taught, and gender. Gender and subject specialization were treated as nominal scales for the purposes of this study, while years of teaching were treated as ordinal. Participants selected a value for years of experience from a range of scores from 0-29, with an additional score of 30+ for those with greater levels of experience. Participants selected their primary teaching assignment from a list consisting of math, science, language arts (English), social studies, art, music, physical education, technology, and other. The Mankato Technology Survey is under a creative commons license, and thus, permission is not required for use in research.

Hypotheses

The hypotheses for this study treated principal leadership effectiveness as the predictor variable and teacher technology integration and comfort level as the criterion variable.

$H1_0$: There is not a positive relationship between principal leadership effectiveness and the level of teacher comfort with and integration of technology in the classroom.

$H1_A$: There is a positive relationship between principal leadership effectiveness and the level of teacher comfort with and integration of technology in the classroom.

Population, Sampling, and Data Collection

Population

The Spearman Rho does not have an accepted measure of sample size calculation; in fact, matched order correlational tools such as the Spearman Rho are often used for small sample sizes due to the increase of power these tools provide (Helsel & Hirsch, 2002). The generally accepted minimum sample size for a correlation study using Spearmans' Rho is $n > 20$ due to the potential for increased inaccuracy below this minimum (Tomkins, 2006). In some cases, the suggested procedure is to use the sample size calculation that exists for Pearson *r* (Salar, 1989). With an objective of an alpha value of .05 and beta value of .2, the required sample size for a correlation of 70 percent using the calculation for Pearson *r* is approximately 85 (Suresh & Chandrashekara, 2012). The sample for the study included a selection of 90 teachers from three middle schools in the selected school district. This sample provided the minimum sample-size from each of the schools as well as exceeding the sample sized required for the Pearson *r*.

These 90 teachers were drawn from the population of teachers from three of the 11 middle schools in a Colorado school district and allowed for the possibility of some withdrawal of consent without falling below the minimum sample size of 85. Teachers came from a variety of subject disciplines from the four core academic classes of math, English, social studies, and science, as well as the elective classes including physical education, art, and technology classes. The teachers have varying years of experience in the teaching profession from initial year

probationary teachers to teachers nearing retirement. Both genders were included, and no effort was made to balance the genders based upon actual ratios in the school. Members of the school administration team such as assistant principals, coordinators of student achievement, deans, and technology coordinators were not represented in the population of the study as they do not represent teacher technology integration.

Sampling

The three middle schools were selected from the 11 middle schools in the selected school district on the basis of availability and principal approval for the process to occur in their school site. Requests for participation by schools was by random number selection using an electronic random number generator in order to decrease the likelihood of socioeconomic status being a factor as different areas of the school district have different socioeconomic profiles. Initially, all of the teachers of a selected school either attended an information session about the purpose of the research or received an email with the same information, depending upon the requirements of the school. This information session or email included the purpose of the study, the method, the purpose of data collected, and the measures of data security used to protect respondents. Following the information session, teachers from the selected schools received an email inviting them to participate in the research, including a copy of the informed consent form (Appendix A). Teachers who responded by completing the consent form were provided access to the survey instruments. This process continued until the minimum of 30 responses per school was met. One of the schools failed to reach the target of thirty completed surveys and so additional people were accepted from the other two schools to reach the overall target of 90 participants. The demographic information provided in the Mankato Technology Survey was used to describe the participants as a group in relationship to their years of experience, gender, and primary subject

area-based teaching responsibility. For the purposes of the information session and data analysis, the variables of the study are referred to as *perceived principal leadership effectiveness* and *the level of teacher technology integration and comfort*.

Protection of participants' rights. Ethical practices were used throughout the study to ensure that the anonymity of the subjects is preserved and confidentiality is maintained. Subjects were notified of the intent, process, and purpose of all stages of data gathering, analysis, and use of results in order to create transparency. Each participant was allocated an identification number for use while completing the instruments. Data were collected using the identification number only with all other identifying information stored in a key file that exists in a local location that is not accessible via network connection. This measure allowed all responses to remain anonymous, as only the code was used to identify participants. All participants were required to complete a detailed consent form prior to the commencement of their participation in the study (Appendix A). The process of opening the opportunity for participation to all members of the school teaching staff and then randomly selecting 30 of the respondents for inclusion in the study allowed for the creation of a random sample of participants (Christensen et al., 2010). Although subjects were initially self-selecting, which can create a potential for bias (Leedy & Ormrod, 2009), the need for informed consent made this impossible to avoid.

Data Collection

Collection of the data for analysis was the key component for the completion of research (Mayer, 2012). The data for the study was collected via electronic versions of the two instruments distributed via email to the selected participants. Data collection included demographic information such as years of teaching experience, gender, and subject specialization. A key that connected the user name and identification key was created and stored

in an offline computer file and destroyed once analysis was completed. Participants were informed of all aspects of the data collection process prior to the completion of the consent form and the commencement of the data collection process.

In the school where a presentation was made, follow-up consisted of an initial email to the teachers that invited then to participate in the study, informed them of the process to be followed, and provided a copy of the consent form for those wishing to participate. This meeting did not require participants to identify themselves publicly. All participants were offered the opportunity to opt out of the data collection process at any point with no detriment or loss for the individual. No participants did this, though a small number did sign a consent form but then did not complete the instruments within the timeframe of the study.

The subjects were provided with a hyperlink to the two instruments and an identification number to use for the completion of those instruments. After completed, the subjects were provided with a hyperlink to the completed study where they can read the study if they desire.

Instruments. The first instrument, Hersey and Blanchard's Leader Effectiveness and Adaptability Description (LEAD) Other, contained questions relating to information on the leadership effectiveness of the principals as perceived by the teachers. The LEAD other instrument is deemed by the Center for Leadership Studies, the owners of the copyright on the instrument, to be proprietary in nature and as such, a copy of the instrument is not included in the appendices. A copy of the LEAD self instrument, which is substantively similar, is included for reference as Appendix C. Teachers are required to answer a series of 12 questions that pose a situation with a list of four different possible leadership responses. The teachers predict which of the four responses the principal is most likely to take in that situation. Each response is then scored on the basis of what the theory of Situation Leadership ® determines the most appropriate

and effective leadership style to be on a scale of 0 to 3, with 3 being the most effective leadership practice and 0 being the least effective leadership practice. The combination of these values gives a cumulative score from 0 to 36 that indicates the perceived leadership effectiveness of the principal. While earlier versions of the instrument called this score the leadership effectiveness score, the latest revision refers to this score as the *style adaptability probability of success* (Blanchard, 2007). Despite the name change, the score is the same measurement of the leader's ability to adapt their leadership style to the one that is most likely to succeed given the situation.

The second instrument, the Mankato Technology Survey, (Appendix D), contains a series of questions relating to evidence of the International Society for Technology in Education Standards. The original study consisted of 99 items that subjects completed using a Likert-type response scale. These questions include frequency and purpose of technology use, as well as questions relating to comfort levels (Johnson, 2003). This study consisted of a version of the instrument that was modified to reduce time and to eliminate question areas that are not relevant to the study (Szafranski, 2009). The final score quantifies the level of technology integration and comfort, with a higher score indicating a higher level of integration and comfort.

Data Analysis

The purpose of the data analysis is to address the stated hypotheses:

$H1_0$: There is no relationship between principal leadership effectiveness and the level of teacher comfort with and integration of technology in the classroom.

$H1_A$: There is a positive relationship between principal leadership effectiveness and the level of teacher comfort with and integration of technology in the classroom.

The data collated was analyzed using SPSS statistical software, which is specifically designed for the purpose of statistical analysis. The results from the LEAD other instrument are

interval scale measurements from 0 to 36 relating to the perceived principal leadership effectiveness. This instrument has been used in research in the past, sometimes with the assumption that the results returned a normal distribution and other times with an assumption of non-parametric results. Jacobs (2006) examined relationships between the LEAD other instrument and the Servant Leader Assessment and used a Pearson product-moment correlation coefficient and one-way ANOVA to compare results. This action displays an assumption that these instruments returned normal distributions (Statsoft, 2013). Much earlier, Rice, Bishop, Acker-Hocevar, and Pounders (1997) examined a relationship between results from the LEAD other instrument and the Power Base Profile-Superintendents instrument. In this case, non-parametric factor-based analysis was used, indicating that at least one of the two measures was perhaps not parametric (Statsoft, 2013). Based upon this data, it could be assumed that the LEAD other returned a normal distribution of results; no specific research to this effect was found.

The results from the modified Mankato Technology Survey consist of responses based upon a Likert-type scale. While some research has suggested that Likert-type scales require non-parametric analysis, Murray (2013) found that there was no significant difference between analyses done using parametric and non-parametric methods. Previous research using this instrument by Szafranski (2009) used a Pearson product-moment correlation coefficient, indicating an assumption of normal distribution for the data. In this case, the relationship being examined consisted of data from two different groups using the same instrument. An examination carried out by D'Onofrio and Bowes (2005) examined the reliability and consistency of the Mankato Technology Survey instrument but did not report that data collected formed a normal distribution.

While in the past there have been prior uses of these instruments with an assumption of parametric results, this study is the first time the instruments have been used together. With the factor of doubt introduced by the use of non-parametric measures by Rice et al. (1997) for the LEAD other, and the noticeable lack of information of the parametric nature of the Mankato Technology Survey instrument (D'Onofrio & Bowes, 2005), it would seem that this assumption may be unfounded. In a situation where the nature of the instruments is not proved to be parametric, alternative, non-parametric, measures are appropriate (Statsoft, 2013). In the case of this study, rather than using a Pearson product-moment correlation coefficient or Pearson *r*, a parametric test, the calculation of Spearman's rank correlation coefficient or Spearman rho, a non-parametric measure of relationship, was the determinant of the presence of a positive relationship between principal leadership effectiveness and teacher technology integration and comfort.

The primary purpose of the analysis is to determine whether a positive relationship exists between principal leadership effectiveness and levels of teacher technology integration. As such, the presence of a negative result was ignored. Consequently, a single-tailed analysis was used for the data analysis (Pyrczak, 2010). Initially, the data were collated and simple statistical processes used to determine values for mean, median, mode, range, and standard deviation for each instrument. Demographic data were collated using percentage for gender, subject area, and years of service with histograms created for ease of analysis. Data were analyzed as one unit and then divided based on gender, subject area, and years of experience to establish the influence of other variables. The purpose of the disaggregation based upon demographic or descriptive statistics is to explore the possibility that these factors may alter the existence or strength of any relationship found. Consequently, the Spearman Rho correlation statistic was generated with

these disaggregated groups to compare to the total correlation found, as well as other subgroups when the disaggregated group was large enough to provide a statistically valid sample. The generally accepted minimum sample size for a correlation study is thirty (Tompkins, 2006); as such, these calculations were only be made if the disaggregated group exceeded this sample size. Visual tools such as scatter plots with regression lines were used during analysis to provide clarity to findings, allowing comparisons to be more visually apparent. A linear regression using Spearman's rank correlation coefficient (Statsoft, 2013) was used to generate a numerical value of the correlation between the level of teachers' technology integration and comfort and the level of principal leadership effectiveness.

Validity and Reliability

Reliability

The term reliability refers to how consistently an instrument or test measures what it attempts to measure (Christensen, 2010). The Mankato Technology Survey has a calculated Cronbach's alpha value of 0.94 ($p < .01$), demonstrating a high level of internal consistency (D'Onofrio & Bowes, 2005).

Researchers have questioned the reliability of the LEAD other instrument as it was not originally designed as a research instrument (Johansen, 2006). Despite questions relating to reliability, the LEAD other instrument has been widely used and Walter, Caldwell,and Marshall (1980) have found that a study of the instrument's internal consistency yielded reliability scores of 0.810 and 0.613 from two separate measures of reliability. These scores both indicate a significant measure of reliability for the instrument.

Validity

External validity of research refers to the measure of the extent that the research data gathered is applicable in the broader context (Mitchell, 2012; Neuman, 2011). Internal validity deals with the development of causal relationships within the research instrument (Neuman, 2011). The research did not attempt to determine a causal relationship between the variables, merely if such a relationship exists and the strength of that relationship if it does exist; consequently, this aspect of validity does not apply (Ohlund & Yu, 2012).

External validity refers to the ability for the research to be applied in other contexts (Neuman, 2011). It is important to note that the variables of technology integration and leadership effectiveness are not fixed and unchangeable. The measurements collected during the study represent measurement of these variables at a particular time, and a future iteration of the study may return different scores for each of the variables. The nature of the schools and school district in question, including the access to technology provided and the cultural and socioeconomic factors affecting this sample and population, may affect the ability to generalize the findings beyond the population in question. The teacher demographics such as gender, age, and experience were examined as factors in the existence or lack of existence of a relationship between school leadership and the teacher's level of technology comfort and integration. The nature of the instruments used, being online in administration, decreases the data collector as an influence in the results collected in the study (Christensen et al., 2010).

Summary

Chapter 3 focused on the specific methodology that was used during the conduct of the research. The completion of the study employed a quantitative correlational approach to explore the possibility of a relationship between principal leadership effectiveness and teacher

technology integration. The primary focus was to establish the existence and strength of a correlation between these two factors.

In the completion of the study, Hersey and Blanchard's LEAD other was employed as a measure of leadership effectiveness (Hersey & Blanchard, 1982). The LEAD other instrument was completed by the teachers and provides a measure of the perception of principal leadership effectiveness that each teacher has. The LEAD other instrument is based upon the Situation Leadership ® theory and provides a score of the leader's dominant leadership style under this theory and a score relating to leadership effectiveness and adaptability. The effectiveness and adaptability score is the one used to establish the existence of a correlation in the study.

A modified version of the Mankato Technology Survey was used to generate a score that measures teacher technology integration. This instrument was developed using the National Educational Technology Standards as a basis (Szafranski, 2009). The instrument measures the level of technology use, level of educationally relevant technology use, and technology user comfort level. In this case, the modified survey was created for brevity with extraneous questions being removed and updated in relation to the technology referred to in the survey.

The subjects for the study were selected using convenience sampling from three randomly selected middle schools in the selected school district in Colorado based on response to an email request. The purpose and nature of the study and the data storage and confidentiality protocols that were used were explained to the subjects prior to the completion of consent forms and data collection. Subjects responded using an identification number on both instruments. The record of identification numbers and the corresponding subjects' personal information were stored in an offline computer file and destroyed at the completion of data analysis.

Data analysis included the generation of a line of regression and a correlation coefficient using the Spearman rank order correlation in order to allow for the possibility of non-parametric results. Other visual representations of the data were created and analyzed to explore whether the descriptive values of gender, subject area specialization, and years of teaching experience alter the strength of any relationship found. Data will be presented in Chapter 4 and the implications discussed in Chapter 5.

CHAPTER 4: RESULTS

The problem addressed in the current study is that while school leaders have been given the responsibility of addressing the issue of technology integration in the schools (International Society for Technology in Education, 2009), limited research exists to describe the link between effective school leaders and increased technology integration in the classroom by teachers. The purpose of this study was to explore the existence of a relationship between principal leadership effectiveness as perceived by teachers and measured by the LEAD other instrument and teacher technology integration and comfort levels as measured by the Mankato Technology Survey.

Three middle schools in a suburban school district in Colorado were involved in the study. This district was selected due to its recent adoption of a teacher laptop program, thus diminishing the lack of access to computers as a factor in technology adoption (Cowie, Jones, & Harlow, 2011; Parr & Ward, 2011). The middle schools were selected based on the willingness of the principal to be a part of the research and allow teachers to be approached to become subjects for the research. The existence of a relationship between these factors could assist in determining the level of importance leadership plays in the successful implementation of technology in schools. Chapter 4 consists of an introduction including the research question, hypotheses, data collection process and sample information; a description of the data analysis, including a description of the demographic characteristics of the sample as well as a description of the statistical analyses; and a summary of the results and analyses.

Introduction

Research Question

Chapter 4 contains the results and analyses addressing the underpinning question of this study: Is there a relationship between a principal's leadership effectiveness and the level of

teacher comfort with and integration of technology in a school? In order to discover if such a relationship exists, this study focused on the level of leadership effectiveness as measured via teacher completion of the LEAD other instrument based upon the Situational Leadership® theory and the level of teacher technology integration and comfort as measured via the Mankato Technology Survey.

Hypotheses

The analysis of the data in Chapter 4 provides information to accept or reject the following hypotheses related to principal leadership effectiveness and teacher technology integration and comfort. The hypotheses for this study treated principal leadership as the independent variable and teacher technology integration as the dependent variable.

$H1_0$: There is no relationship between principal leadership effectiveness and the level of teacher comfort with and integration of technology in the classroom.

$H1_A$: There is a positive relationship between principal leadership effectiveness and the level of teacher comfort with and integration of technology in the classroom.

Data Collection

Data collection began with acquiring district level permission to conduct the research. Once this permission was granted (Appendix E), individual schools were approached and a meeting describing the purpose of the research was set up. Informed consent forms (Appendix A) were distributed during this meeting, and an opportunity was given to staff to ask any questions regarding the research and opt out procedures. In two cases, the schedule of the schools precluded the possibility of a meeting, and in this case, the information was distributed to the staff via email with the informed consent forms being distributed and questions being answered via the same medium. The verbal and email information included an explanation of

the use of assigned numerical codes for each participant used during data collection and data analysis to protect the anonymity of the subjects.

The first of the instruments used, the Mankato Technology Survey (Appendix D) consists of three parts. The first part dealt with frequency of use of various common types of hardware and software, the second part was focused on the availability of hardware and software in the educational setting, and the third part dealt with the attitudes and beliefs of the subject about competency with technology. Subjects completed the test in a variation of its original online delivery method using a Google Drive form, which delivered responses to a spreadsheet for analysis. Responses were indexed using the assigned teacher identity number, which protected the anonymity of the respondents.

The second instrument was a paper version of the Leader Effectiveness and Adaptability Description (LEAD) designed for completion by peers and subordinates of the leader. This version, known as LEAD other, is the most recent version of the instrument and is protected by intellectual property rights by the owner, The Center for Leadership Studies. A similar instrument, the LEAD self, designed to be completed by the leader (Appendix C), shows the format of the instrument. The instrument consists of 12 situations, each with four possible actions the leader could take in response to the situation. Subjects were required to choose the one most similar to the actions they predict their principal would take in the given situation. The responses to this instrument were also submitted via a Google Drive form in order to consolidate the data and create a higher level of anonymity for the subjects. The total time commitment for the completion of both instruments was approximately 15 to 20 minutes.

Sample Information

The three schools initially selected for this study have a combined teaching staff of over

150 teachers. Of these, the initial intention was to obtain a minimum of 30 subjects from each school for a total of 90 subjects. While the school one and school two met this figure with little difficulty, school three had a lower return rate and only returned 25 completed surveys. The target of 90 responses was met between the three schools. In each school, all certified teaching staff were given the opportunity to view the informed consent form and participate in the study or not as they chose. The total data collection time for all three schools combined was 57 days from the first to the last survey completed.

Data Analysis

The data analysis of this study is in two parts. The first part will consist of an examination of the demographics of the sample relating to gender, number of years teaching, number of years with the current principal, and the area of teaching specialty. The second part consists of the statistical analysis of the data using Spearman Rho correlation analysis for the entire group and then for smaller groups based upon demographic groupings where sufficient responses existed to create meaningful data.

Table 1

Participants by School and Gender

School	One	Two	Three	Total
Male %	36.7%	16.1%	28.0%	30.0%
Female %	63.3%	83.9%	72.0%	70.0%
N=	31	34	25	90

Demographic Analysis

The subjects self selected for participation in the study through electing to complete the informed consent form and subsequently complete the survey instrument. A total of nine teachers completed the informed consent form but then did not complete the survey instruments

in the time allowed and are not included in the correlative analysis. As can be seen in Table 1, the preponderance of the subjects was female; however, the high proportion of female respondents is consistent with the overall proportions of the genders in the schools as a whole. Similarly, the sample reflects a range of subject specialties, with a higher population of participants in what are traditionally called core subject areas (see Table 2). The larger number of teachers in these subject areas, again, corresponds to the fact that middle schools tend to have a higher rate of teachers in these core-classes, as all students must take them. Non-core or elective classes in which students choose to participate have a lower representation in the school teaching populations and a corresponding low representation in participant numbers. Special education teachers represent 11.1% of the total participants; while this number is not evenly distributed across the schools, it is proportional to the number of special education teachers across the schools as a whole. The category labeled *other* includes teacher librarians, speech pathologists, and other teachers on special assignment.

Table 2

Participants by Teaching Specialty

School	One	Two	Three	Overall
Subject				
Math	25.8%	8.8%	12.0%	15.6%
Science	22.6%	11.8%	16.0%	16.7%
English/Language Arts	16.1%	35.3%	28.0%	24.4%
Social Studies	12.9%	8.8%	8.0%	10.0%
Music	6.5%	-	4.0%	3.3%
Art	-	-	8.0%	2.2%
Physical Education	3.2%	5.9%	4.0%	4.4%
Special Education	3.2%	14.7%	12.0%	11.1%
Languages	6.5%	2.9%	-	3.3%
Technology	3.2%	5.9%	4.0%	3.3%
Other	-	5.9%	4.0%	2.2%

TOTAL	100.0%	100.0	100.0%	100.0%
N=	31	34	25	90

The survey questions included two other related items of data for each participant. The first related to the number of years of experience the participant had a classroom teacher. Ertmer and Ottenbreit-Leftwich (2010) stated that teachers tend to be rigid and resistant to change. The number of years of teaching experience can be a predictor of the strength of the teacher's resistance to change; the longer the teacher has been teaching, the more likely the teacher is going to be resistant to change (Bourke, 2010). This particular school district has a high level of experienced staff as is seen in Table 3. Over two-thirds of the staff have more than 10 years of experience in the classroom, with 24% having more than 20 years of experience.

Table 3

Years of Experience Teaching

Years	%
>30	3.3%
21-30	21.1%
11-20	44.4%
0-10	31.1%
N=	90

Table 4 shows that the majority of the staff has a limited time with their current principal. Fewer than 6% have been with their current principal for more than ten years. In contrast, over 85% of the staff have less than five years with their current principal, and of those 85%, two-thirds have been with the principal for less than two years. This lack of continuity with the principal may be due to a highly transitory staff of either teachers or administrators or relative inexperience of administrators in their current positions.

Table 4

Years with Current Principal

Number of Years	Participants
>10	6.7%
6-10	7.8%
3-5	21.1%
1-2	64.4%
Total	100.0%
N=	90

Statistical Analysis

Statistical analysis of the data was created using a combination of Excel and SPSS software due to Excel's ease of use and SPSS's inbuilt statistical functions such as the Spearman Rho calculation that was the basis of the comparisons for this study. As the Spearman Rho calculation has no accepted sample size calculation, one method that has been used in the past is to use the Pearson *r* sample size calculation, as the Spearman Rho is a modified version of Pearson *r* (Salar, 1989). With an objective of an alpha value of .05 and a beta value of .2, the required sample size for a correlation of .70 using the calculation for Pearson *r* is approximately 85 (Suresh & Chandrashekara, 2012). The initial statistical analysis that was carried out used all of the participants (n=90) in order to ensure that the minimum number indicated was exceeded.

LEAD other instrument. Scores for the LEAD other instrument were initially tabulated in Excel to derive a dominant leadership style for each principal. In the case of the LEAD other instrument, the higher the score, the more the leader uses a particular style of leadership. Table 5 shows the mean and standard deviation, as well as the median and interquartile range for the distributions for each leadership style. Both measures of center and spread are provided due to

the previously indicated discrepancy in prior uses of the instrument where some researchers treated the instrument as ratio data yielding a normal distribution and others as ordinal data. The four styles are referred to as S1 through S4 with the corresponding labels of Telling (S1), Selling (S2), Participating (S3), and Delegating (S4) as being a description of the actions of the leader in respect to the follower (Yilmaz & Ceylan, 2011). Additionally, the work of Hersey and Blanchard in 2007 suggested that leadership style is made up of a basic style and a support style, resulting in six leadership profiles: Profile S1-S2, S1-S3, S1-S4, S2-S3, S2-S4, and S3-S4. All three of the principals scored highest in Selling (S2) and had Participating (S3) as their support style. This choice of S2 and S3 leadership styles indicates a high focus of relationship driven leadership behavior that is supportive in nature. Of the other two styles, the one least represented was delegating (S4). Delegating was the only style that no participant allocated as the primary style of his or her principal.

Table 5

Leadership Style from LEAD other

	Telling (S1)		Selling (S2)		Participating (S3)		Delegating (S4)		Leadership Style
School	Mean/ St dev	Med/ IQR	Mean/ St dev	Med/ IQR	Mean/ St dev	Med/ IQR	Mean/ St dev	Med/ IQR	Basic/ Support
One	1.84/ 1.19	2 / 2	5.16/ 1.81	5 / 2	3.94/ 2.13	3 / 3	1.06/ 1.15	1 / 2	S2 / S3
Two	2.09 / 1.42	2 / 2	4.53/ 2.08	5 / 3	4.09/ 1.38	4 / 2	1.29/ 1.27	1 / 2	S2 / S3
Three	2.04/ 0.98	2 / 2	4.68/ 2.15	5 / 2	4.20/ 2.10	4 / 3	1.08/ 1.08	1 / 1	S2 / S3

Initial calculations of the descriptive statistics provided a mean for the LEAD other adaptability/effectiveness score of 25.11 with a standard deviation of 3.29 (see Table 6). As for the leadership style, the median and interquartile range are provided for comparison. In all cases, the two alternative measures of center and distribution were quite similar. The guideline for

interpreting these scores, as provided by the Center for Leadership Studies and supported by the authors of the instrument, define a score of 0-23 as representing a leader who is not responsive to the situation in their choice of leadership action. A score of 24-29 indicated a moderate level of responsiveness to the situation in their choice of leadership action, while a score of 30-36 indicated a high level of responsiveness (Al-Omari, 2005). Responsiveness in this case refers to the ability of the leaders to choose the appropriate action for the task readiness level of the follower as defined by Situational Leadership ® (Hersey & Blanchard, 1982). The individual principals scored similarly to each other with the exception of a slightly lower range and standard deviation for school one. A score of 25.11 would indicate a moderate level of responsiveness on the part of the principals to the situation.

Table 6

LEAD other A*daptability/Effectiveness Score Descriptive Statistics*

	Range	Minimum	Maximum	Median	IQR	M	SD	N
School One	10	21	31	26	4.5	25.42	2.51	31
School Two	16	15	31	25.5	4	24.77	4.07	34
School Three	10	20	30	26	5	25.20	3.03	25
All schools	16	15	31	26	4	25.11	3.29	90

Mankato Technology Survey instrument. The Mankato Technology Survey is designed to include a variety of subareas, such as accessibility of technology and attitudes towards professional development, due to the instrument's origins as a school technology climate tool (Szafranski, 2009). Some of these areas are not relevant to the level of technology use and comfort and were omitted from the calculation of a final score using this instrument. The areas of the Mankato Technology Survey that were included in the new abbreviated score were

proficiency, frequency of use of hardware and software, importance of software to the teaching role, attitudes to technology, and overall commitment. The areas of the Mankato Technology Survey that were omitted referred to availability, location of use, and in-service availability (see Table 8). This final score represents an abbreviated Mankato Technology Survey score, consisting of a total of the answers to the relevant questions using a Likert-style system (1-5). The abbreviated Mankato Technology Survey score has a minimum of 74 and a maximum of 370. The combined totals for the schools provided a mean of 257.13, a standard deviation of 29.28 if treated as a ratio scale, and a median of 259 with and interquartile range of 32.75 if treated as an ordinal scale. While there is no systematized scoring protocol for this instrument, both of the measures of center reflect a high number of extreme positive selections on the Likert-style scale and therefore a high degree of technology use and integration across the sample and a high level of consistency in the scores.

Table 7

Mankato Technology Survey Descriptive Statistics

	Range	Min	Max	Median	IQR	Mean	Std. Dev	N
School One	117	193	310	263	32	263.71	27.59	31
School Two	123	183	306	247	45	249.56	30.40	34
School Three	137	190	327	260	26	259.28	28.07	25
All schools	144	183	327	259	32.8	257.13	29.28	90

Correlation statistics. In the initial correlation calculation (see Table 9), the abbreviated Mankato Technology Survey score was correlated with the Leadership adaptability/effectiveness score provided by the LEAD other. This correlation statistic was developed using the Spearman Rho calculation using a one-tailed test. The correlation was 0.086 with a significance of 0.211, indicating an almost non-existent level of correlation between the two instruments. This lack of

a significant correlation would suggest that principal leadership effectiveness and teacher technology integration and comfort are not related.

The Spearman Rho correlation coefficient does not have an accepted measure of sample size and is often used for smaller sample sizes due to the increased power a matched pair correlation provides (Helsel & Hirsch, 2002). In carrying out the statistical analysis, the generally accepted rule of using a sample size n>20 for Spearman Rho was used for analyses of subgroups of the participants such as those based upon individual schools, gender, and indicated dominant leadership style as per Situational Leadership® theory.

Correlation by school. The subjects were broken down by school and then the same correlation was run to examine whether different schools had differing levels of relationship. The results by school were as follows, school one ($r_s = -0.053$; $p = .389$), school two ($r_s = 0.13$; $p = .231$), school three ($r_s = 0.051$, $p = .404$). When the scores were broken down by school, there were no statistically significant relationship between LEAD other and abbreviated Mankato Technology Survey scores.

Correlations by leadership style and gender. Correlation between data disaggregated by leadership style and the indicated dominant leadership style with the associated abbreviated Mankato Technology Survey score was conducted. Of the four leadership styles indicted by the Situational Leadership® theory, only Selling (S2) and Participating (S3) had n>20. Delegating (S4) had n=0 and Telling (S1) returned n=6, and so both were insufficient for meaningful analysis using the guideline of n>20. Of the leadership styles that had sufficient data for meaningful correlation testing, results revealed no statistically significant difference between principal leadership effectiveness and the level of teacher comfort with and integration of

technology in the classroom for (S2) Selling (rs = 0.174,p=0.118, n= 48) and (S3) Participating (rs = -0.095, p=0.291, n=36).

When the data were disaggregated by gender, reported perceptions differed significantly between males and females; however, estimates were weak with a slightly higher statistic for males (rs = 0.353, p=.035, n=27) than females (rs = 0.270, p=.016, n=63).

Summary

None of the correlations were sufficient to reject the null hypothesis and accept the alternate hypothesis that a relationship exists between principal leadership effectiveness as measured by the LEAD other instrument and teacher technology comfort and integration levels as measured by the Mankato Technology Survey. Correlations in every case were low, with the highest being only 0.35 (p= 0.035, n=27) for males. The majority of the correlations were less than 0.2, indicating that any relationship was extremely weak if it existed at all. Indeed, some of the correlations returned a negative result. While many of the p-values indicated a high probability rating that the results could be the effect of random sampling, the highest probability being .40 for school three, several of the disaggregated correlations had p values approaching or below the $p<0.05$ threshold that is required for a single-tailed test to be considered significant. Interestingly, while the p value for the entire group was p=.211, this probability dropped when the data were disaggregated by gender to p=.035 for males and p=.016 for females.

Demographic statistics indicated a representative sample in terms of subject area and gender but a noticeable difference between the number of years of teaching experience and the number of years with the current principal. A large number of the subjects (over 68%) had spent

two years or less with their current principal. Contrasting with the lack of time with the principal is that a similar proportion (over 68%) of the teachers had over 10 years of experience as teachers. Chapter 5 includes the implications and conclusions from these results as well as the recommendations for further study in this area.

CHAPTER 5: DISCUSSION AND CONCLUSIONS

The purpose of this correlative study was to explore the existence of a relationship between principal leadership effectiveness and the level of teacher technology integration and comfort. In this study, principal leadership effectiveness was measured by the LEAD other instrument, and the level of teacher technology integration and comfort was measured by the Mankato Technology Survey. The results indicate that such a relationship was weak to non-existent, as no correlation was found of sufficient strength to reject the null hypothesis.

The Problem

As shown in Chapter 1 and Chapter 2, technology in education is an important educational issue (Brown & Joshua, 2010). With the school principals holding the responsibility for encouraging technology integration by teachers (International Society for Technology in Education, 2009), another level of complexity has been added to the role of the principal (Ibukun et al., 2011). The potentially enormous paradigm shift that technology education represents is likely to be resisted by members of a profession that is inherently resistant to change (Ertmer & Ottenbreit-Leftwich, 2010). The role of an effective educational leader is to overcome this resistance and encourage the needed change in paradigm (Marion & Gonzales, 2013). Recent studies in this area have included explorations of a relationship between levels of technology integration in principals and in their staff (Szafranski, 2009) and several qualitative studies exploring the effects of leadership on technology integration of teachers (Carr, 2010; Jones 2010; Rivard 2010; Thomas 2010). However, little evidence exists to establish the existence of a relationship between effective principal leadership and levels of teacher technology integration and comfort (Lafont, 2011). Using the LEAD other instrument to measure leadership effectiveness and the Mankato Technology Survey to measure technology integration and

comfort, this study was designed to examine the existence or lack of existence of such a relationship.

Review of Findings

This study treated principal leadership effectiveness as the independent variable and teacher technology integration and comfort as the dependent variable. As such, the hypotheses for this study were:

$H1_0$: There is not a positive relationship between principal leadership effectiveness and the level of teacher comfort with and integration of technology in the classroom.

$H1_A$: There is a positive relationship between principal leadership effectiveness and the level of teacher comfort with and integration of technology in the classroom.

In order for the null hypothesis to be rejected and the existence of a relationship to be supported, a correlation coefficient of .8 ($p<.1$) was needed (StatSoft, 2013). This requirement was not met; indeed, the correlation coefficient of the entire sample falling short of the required limits. Research design assumes that the null hypothesis is true unless proven otherwise by establishing the hypothesis (StatSoft, 2013). In this study, the hypothesis was not established, and indeed, the discovered correlation is very low. Such a low correlation suggests that little to no relationship exists between principal leadership effectiveness and teacher technology integration and comfort levels. Several other correlations were examined using smaller sample sizes of different subgroups of the total number of participants in order to explore the existence of a relationship in smaller subgroupings. As the sample consisted of three schools, all with female principals with potentially different leadership styles, correlation subgroups consisted of the following: the three schools, gender groupings, and groups based upon perceived primary leadership style as indicated by Situational Leadership®.

Correlation by Subgrouping

Comparisons disaggregated by school did not establish a significant correlation for any of the three schools. The subgroup analysis of school one actually returned a negative correlation, though a very weak one. All correlations were close to zero and none of the correlations were deemed statistically significant.

When the data were disaggregated by leadership style, it was interesting to note that only two of the four leadership styles had sufficient data points for a correlation calculation ($n>20$). This may be indicative of the accuracy of the LEAD other to isolate the principal's primary leadership style, but the lack of either S1 (Telling) or S4 (Delegating) allows for the possibility that the leadership style of the leader is a possible factor in the lack of significant relationship. The results of this study did not achieve a significant result for the two leadership styles that were tested; both fell well short of the requirements for a significant relationship.

Analysis by subgroups based upon gender were slightly more positive, with the correlation for males being the highest recorded correlation, and females being slightly less. Both of these scores were the only ones to establish results with definitive significance ($p<0.1$). This result is interesting in that the data needed to be disaggregated by gender to achieve the significant result, and in both cases, the correlation strength was stronger than when the genders were grouped together. In both cases, the low correlation value indicates a very low level of correlation between the two factors.

Demographic Analysis

One factor that arose from the demographic analysis of the subjects that was worthy of comment was the apparent disparity between the number of years of teacher experience and the amount of time with the current principal. The analysis of the data revealed that 68% of the

teachers had greater than 10 years teaching experience, and 68% of the teachers had two years or less of time with the current principal. These two factors may also have affected the results of the study. Teachers with more experience seem to be less likely to embrace change (Ertmer & Ottenbreit-Leftwich, 2010), and the less time with the current principal may exacerbate this reluctance to change and thereby further diminish the effect of their leadership on the teacher levels of technology integration and comfort (Burke, 2010).

Conclusions

Correlative studies are unable to prove causality; as such, studies are only designed to indicate the existence and strength of relationships. In this case, the lack of ability to clearly establish any sort of significant relationship, except for a weak positive one when the data were disaggregated by gender, suggests that the assumption of a relationship between these two factors may be an error. This conclusion is also consistent with the results when the data are disaggregated by leadership style. Neither of the two leadership styles examined showed the existence of a significant relationship between the two factors. The lack of presence of the other two leadership styles is consistent with the genders of the leaders in question as female leaders are more likely to adopt more relational leadership styles (Rosener, 2011). This default to relational styles may explain the lack of S1 and S4 leadership results. In situations where the Situational Leadership® theory would require the use of S1 and S4 (Telling and Delegating), the default to more relational styles would also potentially limit the adaptability/effectiveness score for the principal. Such a limit would perhaps explain the more moderate scores seen in the results.

The presence of a significant relationship, albeit a weak one, when the genders are disaggregated suggests that results in leadership studies need to examine the differences in

responses to leadership by gender, particularly in light of the fact that in this case, all three of the principals were female. It is possible that the female leadership was a factor in the responses of the teachers to the leadership styles used, although the LEAD other returned scores that indicated that the teachers perceived the principals to be moderately effective in choosing the appropriate leadership style for the given situation regardless of gender.

Implications

The results of this study indicate a lack of ability to reject the null hypothesis that there is no relationship between principal leadership effectiveness and levels of teacher technology integration and comfort. The inability to reject the null hypothesis suggests that these factors may not be in fact related, or in the case of the results disaggregated by gender, any relationship that does exist is a weak one. While the presence of a relationship or lack of one does not indicate causality, the evidence that principals are responsible for the levels of teacher technology integration as a part of their role suggests a likely desire for principals to effect a change (International Society for Technology in Education, 2009). The lack of a relationship between leadership effectiveness, assuming the validity of the measure, suggests that holding principals accountable for this change may not be appropriate.

An alternate conclusion is that the levels of comfort and technology integration have reached some kind of saturation point beyond which principals are unable to effect change. Such a saturation phenomenon could be caused by the high levels of experience of the staff and the high levels of access to technology indicated in the survey. Such a conclusion would suggest, again, that principals' responsibility in this area is unfounded.

A final possibility lies in the disparity between teacher experience levels and the time with the current principal. Two possible causes for this disparity lie in either a high mobility of

either teaching staff or principals or a relative lack of experience on the part of the principals in the study. This lack of time with the principal, when coupled with the propensity of all three principals towards more relational leadership styles (S2 and S3), may suggest a reason for a lack of effectiveness on the part of the principal as a leaders. Relational leaders, by definition, lead through the strength of their relationship with their followers (Cunliffe & Eriksen, 2011). Such relationships take time to develop; consequently, while the teacher may have answered that the principal would have chosen the incorrect response for a given situation, this response may not have occurred had there been more time invested in the relationship (Cunliffe & Eriksen, 2011). In the case of this final possibility, the implication of a weak correlation between these factors suggests that some time in the future a stronger correlation may possibly develop. Once the relationship between teacher and principal is developed, a more accurate evaluation of principal leadership effectiveness on teacher technology integration and comfort may occur. Should this scenario be accurate, then evaluations of principals who use a more relational leadership style (S2 and S3) in the short term may appear less able to affect a change in teacher technology integration and comfort levels than those principals who prefer less relational leadership styles (S1 and S4). If less relational leadership styles were being privileged in the short term, such relational styles being more usually associated with masculine leaders (Rosener, 2011), the implications for how principals are evaluated, and subsequently promoted based upon these evaluations, would be in need of further exploration.

Limitations

Limitations for the generalization of this research arise from several sources. The first source of limitations relates to the instruments used in the research. While the Mankato Technology Survey has research supporting its validity in scoring teacher technology usage and

comfort (D'Onofrio & Bowes, 2005), it has a limited history as a research tool. Conversely, the LEAD other instrument has a long history of use both as primarily an industry tool but also as a research instrument (Yoshioka, 2006). However, not all researchers agree on either the reliability or validity of the tool. Some of the criticism of the LEAD instrument is based upon criticism of the Situational Leadership® theory itself, while the *other* appellation is based upon the fact that the instrument was developed to be an industry tool rather than a research instrument (Johansen, 2006). Although there is a base of support for the instrument in research (Yoshioka, 2006), this doubt could limit the ability of these results to be generalized more broadly. However, with the lack of an accepted definition of leadership and the subsequent development of an instrument for measuring leadership effectiveness using such a definition (Haber, 2011; Marturano, 2014), perhaps the same could be said for any tool used for similar research, unless of course the definition is so simplistic that it loses all meaning (Summerfield, 2014).

The second source of limitation lies in the subjects' location and demographics. The subjects and their respective principals represent a single demographic based upon the particular school district's teacher and student population demographics and the location and level of socioeconomic status of the residents of the district. Additionally, the participants in the study were only middle school teachers commenting on their own technology integration and comfort and leadership of their respective middle school principals. These factors limit the generalization to groups with similar demographics, including the gender of the principals, level of technology availability to both the schools and students, and to schools in Colorado or with similar demographics and situations.

Another aspect of the demographic limitations is the relative levels of experience of the teachers and the time with the principal. As indicated above, the limited time with the principal,

coupled with high levels of teaching experience of the teachers, may indicate either a lack of experience of the principal or a highly transitory teaching staff. Either of these factors could influence the results obtained and would limit the ability for generalization to groups with similar characteristics.

Recommendations

The nature of research is that every question asked raises more questions. In this case, the lack of a definitive answer regarding the existence of a relationship and a reliance on the contingency of the null hypothesis creates a situation in which the questions seem even more numerous. Broadly, these questions can be grouped into questions relating to the study of leadership in general and questions that are focused particularly on the aspects of this study, specifically principal leadership and technology integration.

Recommendations for Leadership

One of the most apparent recommendations for the study of leadership is the lack of a coherent definition of leadership and subsequent instrument to measure leadership effectiveness that is at least somewhat universally accepted and readily available. While the LEAD other has a long-standing history of usage, several researchers have vocally criticized the instrument (Johansen, 2006) and indeed the foundation of Situational Leadership®. A synthesized leadership theory with an associated instrument that can broadly measure leadership actions and their effects would potentially make research in leadership more precise and consistent.

One intriguing result of this study was the difference in results when the group was disaggregated by gender. Only after disaggregation occurred was a statistically significant result obtained. Additionally, the strength of the recorded correlation increased for both genders, with a 6% rise for females and a 14% increase for males than for the combined group. According to

Situational Leadership®, the two leadership styles that were perceived by the teachers were those that contained a higher relational component (Nahavandi, 2011). The apparent high reliance on these relational styles could be a product of a gender predisposition to relational leadership styles (Rosener, 2011). If so, when coupled with the low levels of time with the principal, the amount of time needing to be invested in order to successfully lead in a relational manner (Cunliffe & Eriksen, 2011) may be a contributing factor to the low levels of correlation. More research is needed on the short and long-term effectiveness of differing leadership styles. Perhaps a correlational study of leadership style and speed of promotion based upon leadership success would be a method to ascertain the relationship more clearly.

Recommendations for Future Research

The limitations of this study in terms of the demographics of the subjects suggest the first recommendation for further research. Another similar study should be undertaken in which the principals represent both genders and the teacher time with the principal is greater in order to establish the level of effect of these factors. Additionally, although the LEAD other and Mankato Technology survey were selected as the best available instruments, they are by no means the only ones. Subsequent study using combinations of alternative instruments would be valuable in supporting the results of this study and allowing for greater generalization.

Finally, the implications of this study, particularly that principal leadership and teacher technology integration and comfort levels are not related, suggest a need for further study in this area. If principal leadership is not related to teacher technology integration and comfort levels, it is important to establish what factors or combination of factors are related to teacher technology integration and comfort levels and, subsequently, the nature of the causality of this relationship

in order to understand how to affect greater levels of teacher technology integration and comfort in the future.

Summary

The lack of a significant and sizable positive relationship between principal leadership and teacher technology integration and comfort levels was not surprising. Research findings demonstrate that teachers are a difficult group of followers to influence into making changes (Ertmer & Ottenbreit-Leftwich, 2010). More than one author has commented that unlike almost every other profession, a teacher from 100 years ago could walk into a modern classroom and feel little dislocation (Ertmer & Ottenbreit-Leftwich, 2010). While this research is not conclusive in nature, it does add to a potential body of evidence that suggests that principals are not the key component in the technology integration puzzle. The precise nature of what causes teachers to adopt technology integration may be as simple as effective professional development that leads to a change in the teacher's attitude to technology (Martin et al., 2010) rather than principal guidance or inspirational leadership. No matter what relationship is found, technology in education is likely to be a dominant issue in the future (Postman, 2011). As such, questions need to be asked and answered in relation to the role of technology in education and how the technology integration can be facilitated and encouraged to create the most effective education for students of the present as well as the future.

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APPENDIX A

INFORMED CONSENT: PARTICIPANTS 18 YEARS OF AGE AND OLDER

INFORMED CONSENT: PARTICIPANTS 18 YEARS OF AGE AND OLDER

Dear ,
My name is Barclie Gallogray and I am a student at the University of Phoenix working on a Doctorate in Education degree. I am doing a research study entitled **Exploring a Relationship between School Leadership Effectiveness and Teacher Technology Integration**. The purpose of the research study is to see if a correlation exists between leadership effectiveness in principals and the level of technology comfort and integration of the teachers on their staff.

Your participation will involve the completion of two survey instruments, one on the leadership of your principal and the other on your level of technology use and comfort. These instruments should take approximately 20 minutes to complete and are completed online. Approximately 30 teachers from each of three middle schools will be completing the surveys. You can decide to be a part of this study or not. Once you start, you can withdraw from the study at any time without any penalty or loss of benefits. The results of the research study may be published but your identity will remain confidential and your name will not be made known to any outside party. In this research, there are no foreseeable risks to you. Although there may be no direct benefit to you, a possible benefit from your being part of this study is to create a deeper understanding of how to increase the level of technology integration in schools in an effective manner.

If you have any questions about the research study, please call me at 303-549-6957 or bgallogray@cherrycreekschools.org. For questions about your rights as a study participant, or any concerns or complaints, please contact the University of Phoenix Institutional Review Board via email at IRB@phoenix.edu.

As a participant in this study, you should understand the following:

1. You may decide not to be part of this study or you may want to withdraw from the study at any time. If you want to withdraw, you can do so without any problems.
2. Your identity will be kept confidential.
3. Barclie Gallogray, the researcher, has fully explained the nature of the research study and has answered all of your questions and concerns.
4. The researcher will develop a way to code the data to assure that your name is protected.
5. Data will be kept in a secure and locked area. The data will be kept for three years, and then destroyed.
6. The results of this study may be published.

"By signing this form, you agree that you understand the nature of the study, the possible risks to you as a participant, and how your identity will be kept confidential. When you sign this form, this means that you are 18 years old or older and that you give your permission to volunteer as a participant in the study that is described here."

(☐) I accept the above terms. (☐) I do not accept the above terms. (CHECK ONE)

Signature of the interviewee _____ Date _____

Signature of the researcher _____ Date _____

APPENDIX B

SIGNED CONSENT TO USE AN EXISTING SURVEY

We Build Leaders.

Permission Granted

March 7, 2013

Reference: Permission Request 2012-10-31A

Dear Barclie Gallogray,

I am writing on behalf of the Center for Leadership Studies (CLS).

At this time, permission to use our intellectual property, more specifically the results of our online LEAD Self and LEAD Other assessments, in research associated with your dissertation has been approved. To recap, you have agreed not to reproduce (put a copy of) our copyrighted material in the body of your dissertation but have been granted an educational discount ($49.95 setup fee + $2.95 per assessment) to use our online scoring site for delivery and management of the LEAD assessments. You may use the results of the assessments in your dissertation and have the right to publish those results based upon the use of said instruments. Permission is granted for this current project only. Permission to publish the results has been granted for printed text, *non-exclusive* distributions only. None of our copyrighted material may be made available electronically unless otherwise indicated herein.

Additionally, permission to reproduce our copyrighted figure in your dissertation in the manner consistent with Addendum A has been approved. To recap, you have agreed to use the 2006 copyrighted version of the model (Addendum A) with the credit line: "© Copyright 2006 Reprinted with permission of the Center for Leadership Studies, Inc. Escondido, CA 92025. All rights reserved." Permission is granted for this current project only. Our material may not be used in derivative works. Permission has been granted for printed text, *non-exclusive* distributions only. None of our copyrighted material may be made available electronically unless otherwise indicated herein.

You agree to mail a complete copy of the dissertation to CLS as submitted to your accredited college. Use of our copyrighted material in your body of work will be construed as agreement to allow CLS to make use of said documents as submitted to us available for any such use as CLS wishes to make of them to include but not limited to promotional and marketing materials. You also grant CLS the right to make those documents available for use by other academics, either in their original form or as modified by CLS. Furthermore, other individuals who use such material have the right to modify or adapt the material themselves in print media only with proper reference to the author (you) who created it.

All references to Situational Leadership® or Performance Readiness ® therein must be capitalized and have the ® follow whenever it appears.

We are pleased to grant permission and wish you much success.

I hereby represent and warrant that I have the right to grant permission to use the material specified above without violation of third party rights.

Brandy Archambeault
Copyright and Permissions Officer

THE CENTER FOR LEADERSHIP STUDIES

120 Preston Executive Dr., Suite 101, Cary, NC 27513 / Phone: 760 741-6595 / Fax: 760 747-9384 / www.situational.com

APPENDIX C

COPY OF LEAD INSTRUMENT

Leader Effectiveness and Adaptability Description (LEAD)
By Paul Hersey and Kenneth H. Blanchard*

Directions: Assume you are involved in each of the following 12 situations. For each situation, interpret key concepts in terms of the environment or situation in which you most often think of yourself as assuming a leadership role. Say, for example, an item mentions subordinates. If you think that you engage in leadership behavior most often as a manager at work, then think about your staff as subordinates. If, however, you think of yourself as assuming a leadership role primarily as a parent, think about your children as your subordinates. READ each item carefully and THINK about what you would do in each circumstance. Then CIRCLE the letter of the alternative that you think would most closely describe your behavior in the situation presented. Circle only one choice. Do not change the situational frame of reference from one item to another. Select one situation as the reference for all 12 questions.

1. Your subordinates have not been responding to your friendly conversation and obvious concern for their welfare. Their performance is in a tailspin.
   A. Emphasize the use of uniform procedures and the necessity for task accomplishment.
   B. Make yourself available for discussion but do not push.
   C. Talk with subordinates and then set goals.
   D. Be careful not to intervene.

2. The observable performance of your group is increasing. You have been making sure that all members are aware of their roles and standards.
   A. Engage in friendly interaction, but continue to make sure that all members are aware of their roles and standards.
   B. Take no definite action.
   C. Do what you can to make the group feel important and involved.
   D. Emphasize the importance of deadlines and tasks.

3. Members of your group are unable to solve a problem themselves. You have normally left them alone. Group performance and interpersonal relations have been good.
   A. Involve the group and together engage in problem solving.
   B. Let the group work it out.
   C. Act quickly and firmly to correct and redirect.
   D. Encourage the group to work on the problem and be available for discussion.

4. You are considering a major change. Your subordinates have a fine record of accomplishment. They respect the need for change.
   A. Allow group involvement in developing the change, but do not push.
   B. Announce changes and then implement them with close supervision.
   C. Allow the group to formulate its own direction.
   D. Incorporate group recommendations, but direct the change.

5. The performance of your group has been dropping during the last few months. Members have been unconcerned with meeting objectives. They have continually needed reminding to do their tasks on time. Redefining roles has helped in the past.
   A. Allow the group to formulate its own direction.
   B. Incorporate group recommendations, but see that objectives are met.
   C. Redefine goals and supervise carefully.
   D. Allow group involvement in setting goals, but do not push.

6. You stepped into an efficiently run situation. The previous administrator ran a tight ship. You want to maintain a productive situation, but would like to begin humanizing the environment.

A. Do what you can to make the group feel important and involved.
B. Emphasize the importance of deadlines and tasks.
C. Be careful not to intervene.
D. Get the group involved in decision making, but see that objectives are met.

7. You are considering major changes in your organizational structure. Members of the group have made suggestions about needed change. The group has demonstrated flexibility in its day-to-day operations.

A. Define the change and supervise carefully.
B. Acquire the group's approval on the change and allow members to organize the implementation.
C. Be willing to make changes as recommended, but maintain control of implementation.
D. Avoid confrontation; leave things alone.

8. Group performance and interpersonal relations are good. You feel somewhat unsure about your lack of direction of the group.

A. Leave the group alone.
B. Discuss the situation with the group and then initiate necessary changes.
C. Take steps to direct your subordinates toward working in a well-defined manner.
D. Be careful of hurting boss-subordinate relations by being too directive.

9. Your superior has appointed you to head a taskforce that is far overdue in making requested recommendations for change. The group is not clear about its goals. Attendance at sessions has been poor; the meetings have turned into social gatherings. Potentially, the group has the skills to help.

A. Let the group work it out.
B. Incorporate group recommendations, but see that objectives are met.
C. Redefine goals and supervise carefully.
C. Allow group involvement in setting goals, but do not push.

10. Your subordinates, usually able to take responsibility, are not responding to your recent redefined of standards.

A. Allow group involvement in redefining standards, but do not push.
B. Redefine standards and supervise carefully.
C. Avoid confrontation by not applying pressure.
D. Incorporate group recommendations, but see that new standards are met.

11. You have been promoted to a new position. The previous supervisor was uninvolved in the affairs of the group. The group has adequately handled its tasks and direction. Group inter-relations are good.

A. Take steps to direct subordinates toward working in a well-defined manner.
B. Involve subordinates in decision-making and reinforce good contributions.
C. Discuss past performance with the group and then examine the need for new practices.
D. Continue to leave the group alone.

12. Recent information indicates some internal difficulties among subordinates. The group has a remarkable record of accomplishment. Members have effectively maintained long-range goals and have worked in harmony for the past year. All are well qualified for the task.

A. Try out your solution with subordinates and examine the need for new practices.
B. Allow group members to work it out themselves.
C. Act quickly and firmly to correct and redirect.
D. Make yourself available for discussion, but be careful of hur9ing boss-subordinate relations.

APPENDIX D

MANKATO SURVEY OF PROFESSIONAL TECHNOLOGY USE, ABILITY AND ACCESSIBILITY VERSION 2.0 - 2003

Buildings and districts need to determine overall staff levels of technology competence. While this does not need to be done on an annual basis, such assessment should be done as part of formulating a long range technology plan, staff development plan, or strategic plan. Such studies should also be a part of a whole school evaluation effort such as an accreditation study.

Method to determine program effectiveness

The most common and fastest method of establishing baseline data for future planning is a survey. Good surveys have:

- a specific set of questions to be answered
- descriptive indicators of numerical scales
- a rapid means of compiling and reporting data

An example of a professional technology use survey follows. It should not be used in its entirety, but parts of it selected on the basis of the kinds of questions that need to be answered:

- What skills do teachers in our district still lack?
- Is equipment available in adequate quantities for effective teacher use?
- How much is the current equipment being used?
- What training opportunities do our teachers like best?
- What are our teachers' attitudes toward technology use in the district?

The survey was developed to be accessed on-line as a networked *FileMaker Pro* database.

Please answer all the following questions to the best of your ability.

General Information

Location _____ (name of building)

Primary job function

classroom teacher
special teacher (music, art, P.E)
guidance counselor/social worker
instructional aide
media center or computer support
food service
principal/assistant principal
media specialist
special education teacher
office secretary or clerk
technical support
custodial/maintenance
district level administrator/supervisor

Primary level of instructional responsibility

elementary school
middle school
high school
district

Gender
Female Male

School computer platform (primary use)
Windows DOS Apple II Macintosh Other None

Home computer platform (primary use)
Windows DOS Apple II Macintosh Other None

I have home Internet access
Yes No

Applications
Please rate each of the following from 5 (High) to 1 (Low) for you as a staff member of the school.

Applications	Availability (5-1)	Proficiency (5-1)	Importance (5-1)	Frequency (5-1)
Word processing				
E-mail				
Internet (web, newsgroups, gophers, telnet, etc.)				
Database				
Spreadsheet				
Research technologies (card catalog, CD-ROM encyclopedia, magazine indexes)				
Presentation software				
Electronic calendar / scheduler				
Graphics (painting, drawing, Printshop etc)				
Assessment (grade books, progress reports, portfolios)				
Multimedia (HyperStudio)				
Instructional software				
Electronic Individualized Education Plans				
Inventory database				
Finance and ordering database				
Curriculum database				
Teacher utilities (test generators, crossword puzzle makers, etc.)				
Integration of technology into the curriculum				
Software evaluation				

Frequency
5 = at least once a day
4 = at least once a week
3 = at least once a month
2 = at least once a year
1 = very rarely or never

Availability
5 = Available 100% of the time it's needed.
4 = Generally available when needed.
3 =Often delays caused by a shortage at my site.
2 =The building does not have this.
1 = The district does not own this.

Importance
5 = I would not be able to effectively do my job without this.
4 = This makes my job easier and me much more effective.
3 = On occasion, this is important.
2 = Rarely helpful. I can do my job just fine without it.
1 = This is completely unneeded.

Proficiency
5 = I am good enough to teach this to others.
4 = I need little additional help or additional training.
3 = I need to improve my skills or learn more features.
2 = I need more training just to learn the basics.
1 = I've never used this.

Frequency of Use

Item (5-1)	**Frequency** 5 = at least once a day 4 = at least once a week 3 = at least once a month 2 = at least once a year 1 = very rarely or never
Computer	
CD-ROM drive	
Laserdisc player	
Fax	
Video teleconference	
Voice mail	
Camcorder	
VCR/Cable TV	
Digital camera	
Laser printer	
LCD panel or projector	

Location	**School lab**	**Classroom**	**Home**	**Other**
How frequently do you use a computer in each of these locations (1-5)				
How frequently do your students use a computer in each of these locations? (1-5)				

Attitudes
3 = Strongly agree

2 = Agree
1= Disagree
0= Strongly disagree

Using technology makes me more effective.	
Technology helps me organize my work.	
I find the use of technology to be motivating.	
I am comfortable learning about and using technology	
I would like to integrate more technology into my work.	
I would like to integrate more technology into my classroom.	
The building administration encourages the use of technology.	
The district administration encourages the use of technology.	
I feel comfortable helping others in the school with technology.	
I feel comfortable asking others in the school for help with technology.	
I take personal time to learn and practice technology skills.	

In-service Times
Please indicate how likely you would be to participate in a technology inservice if offered at these times:
3 = Very likely
2 = Likely
1 = Unlikely
0 = Very unlikely

During the school day	
After school	
In the evening	
On the weekend	
During the summer	

Support
Please indicate how important the following support is to you:
3 = Very Important
2 = Important
1 = Unimportant
0 = Would not use

School-based technology support personnel	
Release time to observe other teachers using technology	
Technology conferences	
On-site technology workshops	
Classroom computer for teacher use	
Stipend for staff development time	
Computer to take home	
College credit	
Video training tapes	
Staffed technology labs open during non-school hours	
Release time for exploring	

Please indicate your level of commitment to technology training over the next year: (3 = Very high, 2 = High, 1 = Low, 0 = Very Low)	

APPENDIX E

INFORMED CONSENT: PERMISSION TO USE PREMISES, AND SUBJECTS

University of Phoenix

INFORMED CONSENT: PERMISSION TO USE PREMISES, NAME, AND/OR SUBJECTS

[redacted]**School District, Colorado**

I, hereby authorize Barclie Gallogray, student of the University of Phoenix, to use the premises, ~~name,~~ and or/subjects requested to conduct a study entitled **Exploring a link between School Leadership Effectiveness and Teacher Technology Integration.**

While your research is approved at the district level, the final decision for study participation at any [redacted] school lies with that school's principal.

12/10/2014

Signature Date

Research and Evaluation Analyst

Title

Name of Facility: Middle school Campuses as required for information sessions

APPENDIX F

COVER LETTER TO SCHOOL DISTRICT FOR PERMISSION TO CONDUCT STUDY

Investigating the relationship between principal leadership and the level of teacher technology integration

Barclie Gallogray, Doctoral Student,
University of Phoenix

Participation:

30+ teachers from each of 3 middle schools in the district.

Description of Study:

This study is intended to explore the existence of a relationship between principal leadership effectiveness and the level of technology integration in schools. The study will utilize two accepted measures, the LEAD-other leadership effectiveness instrument, and a modified Mankato technology survey. The results from these instruments will then be analyzed to establish the existence of any correlation between these two factors. Both instruments would be completed by teaching staff and so in effect what would be explored would be the teachers perceptions of the leadership effectiveness of the principal in question. This will allow for differences in interactions and experiences that staff may have with their principal. The use of a variety of schools will allow for a broader range of experiences and responses and allow for the creation of sample of significant size such that generalization can occur.

Description of Results:

Three sets of results will occur from the study. The first two consist of the individual instruments that measure teacher perceptions of leadership effectiveness and teacher levels of technology comfort and integration. The third is the combination of these two samples, and demographic factors, which will allow the exploration of a relationship between these factors with a view to establishing that a relationship exists or is not present.

Implication of Results:

The purpose of the quantitative correlational study is to determine if there is a relationship between the leadership effectiveness of three principals in the [redacted] School District in Colorado, and the level of technology integration of a sample of 30 teachers from each principal's school as measured by the Mankato technology survey (Szafranski, 2009). The existence of such a relationship may indicate a need to hold principals more accountable for the success of school technology integration and suggest leadership effectiveness training for principals as a method of increasing technology integration. The existence of no relationship

may indicate that principal leadership has little or no impact on technology integration and that other factors need exploration.

Implications for the District:

While each individual instrument will provide the district with valuable information about the leadership and technology integration levels of teachers in schools, the long-term implications of the existence of a relationship between these two is of more significance. The existence of a relationship, while not proving causality, will allow the school district to focus on the effectiveness of the principal's leadership as perceived by the staff as a potential factor in the level of technology integration. The lack of such a relationship will mean that other factors will need to be explored by the district in order to increase the levels of technology integration in classrooms and that relying on principal leadership is not enough.

Additional Information

Please note, the Center for Leadership studies, the owner of the LEAD other instrument, views it as proprietary material and will not allow the instrument or the grading scale to be published. The attached instrument is the LEAD self instrument that is allowed to be published and is substantively the same as the LEAD other instrument that I intend to use in the study.

The Mankato technology survey is public domain and so no such issues exist.

Szafranski, S. L. (2009). *The relationship between technology use of administrators and technology use of teachers: A quantitative study* (Doctoral Dissertation). University of Phoenix. Available from ProQuest Dissertations and Theses.