UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

EDUCATOR PERCEPTIONS OF PRINCIPAL TECHNOLOGY LEADERSHIP COMPETENCIES

A Dissertation

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

Degree of

Doctor of Education

By

GEORGANN SCOTT

Norman, Oklahoma

2005

EDUCATOR PERCEPTIONS OF PRINCIPAL TECHNOLOGY
LEADERSHIP COMPETENCIES

UMI Number: 3163445

UMI Microform 3163445

ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

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

BY

_____
Jeffery Maiden, Chairperson

_____
Ken B. Baden, Member

_____
James E. Gardner, Member

_____
Gregg A. Garn, Member

_____
Courtney A. Vaughn, Member

ACKNOWLEDGEMENTS

I want to express sincere appreciation to Dr. Jeffery Maiden, the chair of my committee. Thank you for your wisdom, guidance, patience, and friendship. I want to thank the members of my doctoral committee: Dr. Ken Baden, Dr. James Gardner, Dr. Gregg Garn, and Dr. Courtney Vaughn. Their wisdom and advice guided me during this study.

I want to extend appreciation to my Lawton Public School colleagues who encouraged and supported me during my doctoral studies. Special appreciation thoughts go to the principals, teachers, and staff in the schools in which I work, Hoover Elementary and Swinney Elementary. They have encouraged and supported me during this study. Special appreciation goes to my students who keep me excited about education and inspire me to become a better educator and future administrator.

I want to express appreciation to the educators of the Altus, Duncan, and Lawton, Oklahoma school districts that cooperated in this study. I thank each of them for their participation

DEDICATION

To my husband, Gene Scott, for his constant support, patience, understanding, and love during my doctoral work; to my late father, Robert Otipoby, who encouraged me to meet the challenge of a doctorate; to my mother, Mable Jean Otipoby, who instilled in me the value of education in life; to my friend of thirty-five years, Olga Ramos, who encouraged me and believed in me; and to my friend Connie Baker, who encouraged me and helped me.

.

IN MEMORY OF

Robert Louis Otipoby

My father, who inspired me to complete my doctorate and a person

who believed in dreams.

TABLE OF CONTENTS

LIST OF TABLES

TABLES

EDUCATOR PERCEPTIONS OF PRINCIPAL TECHNOLOGY LEADERSHIP COMPETENCIES

BY: GEORGANN SCOTT

MAJOR PROFESSOR: JEFFERY MAIDEN, PH. D

The populace of the twentieth century is increasingly obsessed with new communication and information technologies that potentially may impact education and raise achievement levels of students (Spencer, 1999). In an increasingly technology based society, it is crucial for all students to be technologically literate. Arguably, all educational administrators and classroom teachers should strive to prepare students for a technologically advancing world.

In order for principals to support and implement successful programs, they should possess at least a basic foundation of technology skills and competencies. A problem arises from the fact that many school administrators may not have an underlying knowledge of what specific competencies comprise the necessary requisite for effective technology leadership. No current studies provide empirical evidence about educator perceptions of principal technology competencies necessary for such leadership. The purpose of this study was to investigate educator perceptions of principal technology leadership competencies in order to address a void in the scholarly literature and to provide concomitant recommendations for current practice.

The design was quantitative, including both descriptive and inferential statistical analyses. Thirty-five assistant principals and principals and 117 teachers responded

to a survey about principal technology leadership competencies. These competencies were adapted from other survey instruments found in the literature, from theoretical manifestations of technology leadership, and from standards promulgated by the International Society for Technology in Education.

The results of the analyses indicate that the principals believe that competencies across the leadership domains are critical for effective technology leadership. The teacher respondents, however, were more varied in their ideas of requisite competencies. Principals and teachers were significantly different in their perspectives, while elementary and secondary teachers were not significantly different in their perspectives. Educators, when planning various facets of technology integration in schools, providing staff development, and providing technology support, should carefully consider these differences in perceptions between principals and teachers.

CHAPTER I

INTRODUCTION

In the last 76 years, achievements in science and technology have out performed all achieved by humanity during the previous two thousand years (Scheidlinger, 1999). Scheidlinger's view is evidenced by a long list of scientific-technical accomplishments including: theory of relativity, the quantum theory, deciphering the genetic code, the landing of the man on the moon, interplanetary probes, reaching the boundaries of our solar system, nuclear power, and mass air transportation. Improved technological instruments are now at the disposal of scientists and have better accuracy and sensitivity than 75 years ago. The measurement of all physical quantities, electric current and voltage, magnetic flux and magnetic flux density, radiation intensity, wavelength, frequency, energy, and power, have improved by several orders of magnitude.

There is every indication that scientific-technical progress will accelerate because of the employment of high caliber scientists and engineers who have improved instruments at their disposal (Scheidlinger, 1999). Another worthwhile point is that 95% of all those who are or were considered scientists in the whole history of humankind are still alive now. The populace of 20th century was obsessed with the ideas of new communication and information technologies that made an impact on education and raised achievement levels of students (Spencer, 1999). Yet education, the field highly relevant for the greatest number of people, is behind others in technological progress with little evident change (Scheidlinger, 1999).

Nichols (2000) believes there are imperatives necessary for educational change in the twenty-first century:

- Increased capacity and efficiency - through enabling institutions to cater for the learning of a relatively large number of students at once.
- Improve effectiveness - by encouraging deep learning approaches and the adaptation of knowledge to the real world.
- Easy accessibility - by removing distance barriers and catering for a variety of learners' prior educational experience, physical abilities, and time commitments/lifestyles.
- A competitive mindset - education with the potential to be offered internationally, within industry, and at a distance; providing more choice and convenience for the student.
- A resource-based emphasis - enabling more student control over what, where, when, and how they study and permitting non-linear learning.
- The personal touch - more interaction between students and between individual student tutors, enabling a degree of customization and the pursuit of individual students' learning goals in addition to the prescribed course learning outcomes (p.3).

How to realize these imperatives without compromising sound education, presents a challenge to leaders and educators.

Administrators and educators work with the goal to develop students into experts in a given subject area. Nichols derived six principles from the 21st Century

imperatives necessary for educational change, which educators should consider when working with students. The six principles for education are:

1. Individualism - adaptability to the learning needs of the individual;
2. Meaningful Interactivity - providing opportunities for students to apply what they are learning;
3. Shared Experience - enabling students (and encouraging them) to learn from one another;
4. Flexible and Clear Course Design - preparing the entire course with a view to maximizing student control while still providing clear expectations;
5. Learner Reflection - encouraging students to engage mentally with course concepts and to consider their progress;
6. Quality Information - providing actual content that is accurate and especially designed to facilitate understanding (p.3).

The six principles are identified in a universal scope and may not be appropriate in some cases because of what is being taught, restrictions in budgets or ability. In addition, there appears to be a strong sense of interdependence among the principles. A carefully constructed activity in individualism will lead to another meaningful shared experience activity. It will be possible to for a single learning opportunity to combine all six principles. The goal is to optimize the best practice that will combine all six principles (Nichols, 2001).

Recently, the push for technology use in schools has the population believing technology will be able to solve the learning problems of today. Scheidlinger (1999)

believes the most important invention of all times, the computer, brought revolutionary changes into almost all avenues of human activity and failed to make a difference in the field of education. Technology use enhanced education and helped achieve Nichols' six principles from the 21st century imperatives, but technology alone cannot achieve them. The idea of replacing teachers with computers will encounter strong opposition from those who care about students. Human interaction now, as in the past, will always be the key to quality education (Nichols, 2000).

Principals as Instructional Leaders

The literature review continues with a look at qualities of instructional leaders because a good instructional leader will be good technology leader. Effective instructional leaders are principals who are well versed in learning theory and new approaches to instruction (Shellard, 2003). In the past decade, many research and professional articles concluded that instructional leadership is the most important responsibility of a school administrator (Blasé & Blasé, 1999; Meyer & Macmillan, 2001; Hughes & Zachariah, 2001; Shellard, 2003; Marks & Printy, 2003). However in reality, managerial responsibilities often leave little time to fulfill the instructional leadership role, principals' instructional responsibilities and managerial responsibilities should complement and support each other.

An effective principal must be both a good instructional leader and an effective manager. National Association of Elementary School Principals (2001) mirrors this by noting that a careful mix of teamwork, assessment, reflection, and inspiration help the principal design the leadership of the school by management, instruction, and

motivation. Principals' managerial and instructional responsibilities should not compete, but rather complement and support each other, and an effective principal must be both a good manager and an instructional leader (Shellard, 2003). Standards and accountability mandates by legislatures for school districts are important to public education and have an effect on principals. Principals are expected to lead the design of new curriculum and meet the needs of students to align with state and local standards for good instructional practice. Principals' jobs are helping teachers, defining instructional programs, and insuring the school is safe and clean. The more tangible elements of leadership make the difference between adequate and excellent principals. Principals must now identify and solve problems while lending support and developing change in schools.

Bolman and Deal (2002) present five effective qualities of leadership. These leadership qualities are:

1. Focus - Great leaders have an internal compass and always know in what directions they want to go.
2. Passion - Outstanding leaders care deeply about their work and about making a difference.
3. Wisdom - Wise leaders have learned from their experiences, both successes and failures.
4. Courage - It is not easy to make decisions in the face of incomplete information and conflicting pressures. Courage lets you move ahead anyway.

5. Integrity - This is at the heart of qualities like honesty, depth, and moral compass that inspire trust and loyalty (p.22).

Principals need to prioritize tasks and balance the time and effort given to each task, recognize that they might not be able to do it all, and rethink tasks to find other options that need to be done and by whom. Lindsay (2001) recognizes that distribution of leadership needs to be changed to meet the complexities of the school environment. Lindsey (2001) found the following:

> Good principals work in collaborative messes knowing that they can't control everything --especially people….The principals work demands reassessing ideas, reinventing solutions, re-interpreting theories, recommitting energies, and remembering and honoring the history of a place….The wise and energized principal knows all of these things can only happen in concert with others--distributive leadership (p.6)

Complexities of school environment cause principals stress and Lindsey's advice to distribute leadership will help to alleviate some of the problem areas.

To expand leadership capacity of schools, some principals involve teachers to sustain dialogue and make decisions about matters of education in the classroom. The principal remains the central agent for change while recognizing teachers as equal collaborators in the decision making process. The process acknowledges teacher professionalism and capitalizes on collective leadership. Shared instructional leadership involves the active collaboration of principal and teacher on the areas of curriculum, instruction, and assessment. Principals should work with teachers to

obtain ideas, insights, and expertise of professionals in their schools. Principals and teachers should share responsibility for staff development, curricular development, and instructional tasks.

A study by Marks and Printy (2003) focused on school leadership relations between principals and teachers, including an examination of the potential active collaboration around instructional matters to enhance the quality of teaching and student performance. The study demonstrates how integrated leadership positively influences school performance and student achievement. In addition, shared instructional leadership encourages competence and empowers teachers. When principals elicit high levels of commitment and professionalism from teachers, students begin to learn and perform at high levels (Marks & Printy, 2003). Principals who share leadership responsibilities with others would be less subject to burnout than their counterparts who try to supervise every task.

Principals have an indirect effect on student achievement through their influence on school organizational conditions and instructional qualities. One way that principals shape school teaching practices is through actions regarding teacher professional development. Connections to sources of professional development that concentrate on instruction and student outcomes provide feedback and assistance for classroom teachers. The quality of instruction is strengthened when principals create conditions that promote teacher learning. Teachers meet in teams to plan instruction, promote collaboration, develop social trust, and align school wide professional development. School organizational conditions influence instructional quality.

Youngs and King's (2002) study indicated that effective principals sustained high levels of capacity by establishing trust, by creating structures that promote teacher learning, by connecting their facilities to external expertise, or by helping teachers generate reforms internally. Strong principal leadership influences instructional quality by redirecting professional development to strengthen school capacity. Principals as instructional leaders greatly influence the destiny of their schools by providing support, encouraging positive change and leading teachers to the best instruction for students.

Technology and Education

School districts all over the United States are pressed by legislatures, educators, and parents to integrate technology instruction for the achievement potential of students (Brook-Young, 2002). One of the most critical educational leadership challenges for administrators is the successful integration of technology into classrooms (Hall, 2001). Technology integration into the classroom can be a nightmare for both teachers and administrators. Administrative support is a key factor in the success of any kind of school reform, particularly reform dealing with technology integration (Brooks-Young, 2002). Administrators are the decision makers, role models, and the main supporters of assimilation of technology in schools (Hall, 2001). The Office of Technology Assessment (1999) found that principal leadership is one of the most important factors that affect the use of technology in the classroom. Principals who model the use of technology are instrumental in furthering computer technology use in the classroom (Kincaid & Felder, 2002). Administrators

who offer emotional and moral support to teachers have more success with technology integration in the classroom (Sandholtz, Ringstaff, & Dwyer, 1997). Support from principals is crucial in determining whether teachers integrate technology into their classrooms.

Technology use in schools evolved during the last few decades from teaching programming, utilizing drill and practice, implementing integrated learning systems, addressing computer literacy skills, to participating in web-based communities (Dias & Atkinson, 2001). Current technology integration in schools involves the practices of using technology for curriculum to meet content objectives such as communication, collaboration, and creative problem solving. Now that the transformation is taking place with technology integration, it is time to explore best practices for teaching with technology and ways to promote meaningful learning for students.

Principal Technology Standards

Principals must have basic technology skills and standards from which to work in order to support teachers and staff in school technology integration (Bailey, 1997). Bailey believes these skills are:

1. Technology skills - leaders must be able to model technology use;
2. People skills - leaders must be able to get along with other people as they learn to use the new technology;
3. Curriculum skills - leaders must understand how to integrate the technology into all disciplines;

4. Staff-development skills - leaders must understand how important training is to those using the technology;

5. Learning leadership - leaders must understand the "big picture" as they work with others to use technology to transform teaching and learning (p.61)

Principal modeling of technology behavior conveys the climate and direction of schools. A school leader must model professional growth by participating in professional learning activities, particularly in the areas like technology applications that generate fear, apathy, or resistance among staff (Paben, 2002). Costello (1997) observes that educational leaders must not become part of the problem when integrating technology; principals who do not have knowledge of basic technology skills can be a hindrance to technology integration. Principals provide leadership by becoming aware of basic technology skills including creating a vision, sharing the vision, funding, planning the process, coordination, curriculum development, training, and creating technology standards. Although little empirical research defines standards for administrators' technology competencies, The International Society for Technology in Education (ISTE) developed a list of technology standards for administrators. The National Educational Technology Standards for Administrators (NET-A) released in 2002, were defined as:

I. Leadership and Vision

II. Learning and Teaching

III. Productivity and Professional Practice

IV. Support, Management, and Operations

V. Assessment and Evaluation

VI. Social, Legal, and Ethical Issues (p.2)

These technology standards provide a basis for administrators' knowledge. What administrators know about technology is of great importance in determining whether technology integration will work in the classroom (Hughes & Zachariah, 2001). NETS-A standards provide a clear statement of what school administrators need to know and be able to do with technology. This specific information will guide administrator's efforts in attaining basic skills and a competency knowledge base for technology.

Statement of the Problem

In today's technology based society, it is crucial for all students to become technologically literate (Wright, 1999). There is pressure from difference sources (state legislatures, professional groups, and parent groups) placed on the public schools to provide increased experiences with technology and focus on technology literacy for students. It is the duty of principals and teachers in the elementary school to teach technology literacy and be the driving force behind the facilitation of technology in schools (Wright, 1999). Principals who offer their emotional and moral support to teachers have much more success with technology integration in the classroom (Sandholtz, Ringstaff, & Dwyer, 1997). Principals must have basic technology knowledge and technology skills to create and implement successful programs. Recently principals had the opportunity in educational leadership training

to become tech-savvy leaders (Holland & Moore-Steward, 2000). The study found a problem arises from the fact that most administrators do not have a basic knowledge of technology competencies to be technology leaders and no specific empirical information to consult. As a result, in some areas of the country, principals hesitate to implement technology programs and avoid responsibility for promoting technology in their elementary schools. When researching competencies for technology leadership, very little information was found that described the areas of technology that administrators need to know to be successful technology leaders. In fact, no studies directly surveyed professionals in the teaching field as to what they considered were the essential technology competencies for administrators.

It is important that the professionals who work in direct contact with students contribute their ideas regarding technology competencies for administrators because they have exclusive knowledge. The education professional knows best what technology competencies administrators need to be effective. The development of specific empirically researched competencies provides guidelines for technology leadership, and assists technology integration in schools now that technology literacy is so important for student learning.

Purpose of the Study

The challenge for principals in public schools is to become knowledgeable technology leaders and to integrate technology for the benefit of academics and student roles in the future. Principals are expected to be technology leaders and implement technology programs in their schools, but there is little information about

competencies for principals to reference. The International Society for Technology in Education's NETS-A Standards for Administrators set a standard for administrators to follow. Empirical data on principal technology leadership competencies is almost non-existent. The purpose of this study was to generate empirical findings about educator perceptions of principal technology leadership competencies. This study investigated educator perceptions of technology competencies through surveys of principals and teachers. It is important to know the perceptions of educators because they work everyday either in a leadership capacity or in a teaching capacity, which uses technology. Educators, principals, and teachers have some insight into what it takes to be an effective technology leader.

The study meets the need for empirical research about educators' perceptions of technology leadership competencies and fills this gap in the research. Results of the study provided school districts a perspective about principal technology leadership competencies gathered from educators, thus helping school districts with technology integration. The study was designed to address the following questions regarding educator perceptions of technology leadership competencies.

1. What competencies do principals in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

2. What competencies do teachers in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

3. Are there significant differences in the perceptions of competencies for technology leadership between principals and teachers in the three Southwest Oklahoma school districts?

4. Are there significant differences in the perceptions of competencies for technology leadership between elementary teachers and secondary teachers in the three Southwest Oklahoma school districts?

5. Are there significant differences in the perceptions of competencies for technology leadership between principals and assistant principals in the three Southwest Oklahoma school districts?

Significance of the Study

The study explored competencies for principal technology leadership from educator perceptions. In addition, the study provided insight into an area that has little empirical research. Few studies have been found that seek the perceptions of public school educators on principal technology leadership competencies. The study surveyed several school districts in a specific region of a state to focus upon each district's perceptions of technology leadership. This focus provided regional information for comparing district perceptions. It is noteworthy that the study examined statistically significant differences between principals and teachers, elementary and secondary teachers, and principals and assistant principals' ideas of technology leadership competencies. It is the first study to compare standards from public school educators among elementary and secondary educators regarding principal technology leadership competencies. In addition, the study will expectantly

provide information to principals on the competencies needed to become effective technology leaders as seen by education professionals working in the discipline.

Assumptions

1. The International Society of Technology in Education (ISTE) Standards for Administrators (NETS-A) provides legitimate standards for principal technology leadership.

Limitations of the Study

This proposed study is limited by the following:

1. The generalizability of this proposed study might be limited because the research is from three school districts in Southwest Oklahoma.

2. The study depends on the educators' honest responses to the on-line survey to determine their views of technology leadership competencies.

Definitions

Technology

Technology used this study refers to the use of computers, peripheral equipment, software, and other electronic equipment to enhance student achievement (Czubaj, 2002).

Technology Competencies

A knowledge base of theory and current research, which can form a foundation for principals to use when integrating technology into the public schools (Hughes & Zachariah, 2001).

Organization of the Study

The study was organized using the five-chapter approach to research. Chapter I contains the introduction to the study, purpose of the study, statement of the problem, significance of the study, research questions, organization of the study, limitations of the study, and the summary of the chapter. Chapter II contains a review of related literature and research of the study. Chapter III contains descriptions of the methodology and procedures to design and conduct the study. Chapter IV describes the findings and analyses of data from the perspective of the research questions. Chapter V reports discussion, conclusions from the study, and suggests recommendations for future research.

Overview of Methodology

The study was designed to utilize quantitative methods to obtain educator perceptions of principal technology leadership competencies. Participants in the study were identified from three school districts in Southwest Oklahoma. All principals and assistant principals were surveyed, and teachers were selected by stratified random sampling.

The instrument developed used a four point Likert scale to answer whether the educators believe the competencies are not necessary, somewhat necessary, necessary, and very necessary for principal technology leadership. Validation of the instrument included a search of literature for competencies, professional review for content validity, a pilot study. Cronbach's Coefficient Alpha was used to assess internal consistency and reliability by analysis of test items.

Data collected from the surveys were analyzed by using the statistical procedure the Independent Samples t-samples. The Independent Samples t-test is used when comparing the mean scores of two different groups of people to find if a significant difference exists between the groups. The results are presented in Chapter IV.

Summary

Chapter I presented an overview of technology and its importance in education today. The role of principal as instructional leaders was briefly reviewed. Technology and education were briefly reviewed along with principal technology competencies. The purpose of the study was to provide empirical data regarding educator perceptions of principal technology leadership competencies in public schools. The study presented the following questions:

1. What competencies do principals in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

2. What competencies do teachers in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

3. Are there significant differences in the perceptions of competencies for technology leadership between principals and teachers in the three Southwest Oklahoma school districts?

4. Are there significant differences in the perceptions of competencies for technology leadership between elementary teachers and the secondary teachers in three Southwest Oklahoma school districts?

5. Are there significant differences in the perceptions of competencies for technology leadership between principals and assistant principals in the three Southwest Oklahoma school districts?

Chapter I also included organization of the proposed study, limitations of the proposed study, and a summary of the chapter. The following chapter, Chapter II, provides a review of literature related to the study.

CHAPTER II

LITERATURE REVIEW

Introduction

Empirical studies about educator perceptions of technology leadership competencies are virtually non-existent. The author found no empirical studies at the time of this writing that directly asked educators in public schools their perceptions of principal technology leadership competencies. The purpose of this study was to fill this research void. The study investigated competencies principals believe were necessary for technology leadership, competencies teachers believe were necessary for technology leadership, significant differences between principal and teacher responses, significant differences between elementary and secondary teacher responses, and significant differences between principal and assistant principal responses.

Literature directly related to educator perceptions of principal technology leadership competencies limited the review of literature; therefore, the following six related areas were addressed: history of technology in public schools; school technology programs; impact of technology on education; principal instructional leadership competencies; principal competencies for technology leadership; and perceptions of technology competencies. These informational areas provided a background for the study and developed the concept of principal technology leadership competencies importance to education.

Principals are instructional leaders in schools and the role of principal reaches a new height of demand and complexity with legislative mandates on standards and accountability (Shellard, 2003). One of the most critical educational leadership challenges is the successful integration of technology in public schools. Principals are the decision makers, role models, and the main supporters of assimilation of technology in schools (Hall, 2001). Empirically based technology leadership competencies are not available for principals to reference. Nevertheless, the fact remains that principals must increase their knowledge base regarding leadership for technology integration (Kincaid & Feldner, 2002). Basic technology knowledge and skills are necessary for principals to provide technology integration in schools.

History of Technology in Schools

A brief history of technology in schools begins the literature review and provides the background of how important technology is to education. Long ago, learning consisted of students who gathered in small groups around a scholar for sessions of educational dialogue. In the 18th century, this type of learning all but disappeared because another form of learning replaced dialogue. A new form of classroom instruction brought about by the invention of the printing press increased the availability of books to schools and libraries (Withrow, 1997). In the 1860s, a big controversy over the use of photographs and illustration in textbooks developed because scholars felt pictures would dilute the meaning of education and "dumb down" the lessons children needed to learn (Withrow, 1997). In 1901, the first year of the twentieth century, people's lives were quite different from ours. People on the

brink of the 20th century thought they were on the cutting edge of technology. We, in turn, feel we live in a time of unprecedented technological change. Actually, then as now, we are in an ever-evolving history of technology (Gorman, 2001). The period 25 years before 1901 had many notable technological inventions: electric bicycle, underground electric railway, diesel engine, motorcycle, outboard engine, motor bus, speedometer, taxi, and rigid airship (Gorman, 2001). These inventions changed the people's world in the 1900s as drastically as the technology of today changed our world. In the 1920s and 1930s, there were technological advances in sound and radio broadcasting as well as motion pictures with sound (Reiser & Ely, 1997).

The first operational computer, the MARK 1, made a debut fifty years ago. Early use of these computers was mostly as a problem-solving tool, replacing the slide rule for mathematics, science, and engineering students at university level (Molnar, 1997). As technology advanced in the early 1950s, an audiovisual instruction movement became interested in communication theories that played a part in instructional technology (Reiser & Ely, 1997). For the first time, instructional technology had the learning process as a focus. In the 1960s and 1970s, instructional technology gained momentum in computer instruction ((Molnar, 1997). There were other forms of technology used in the classroom, but none as popular as the computer. Within the past several years, distance learning and virtual degree programs offered Online by universities make education a flexitime and a flexiplace activity (Molnar, 1997). In the 21st century, we envision some of the changes that will be made, but

we do not have the wisdom to predict how far technologies will expand and improve education over the next century (Withrow, 1997).

School Technology Programs

This section provides an overview of school technology programs that illustrate how diverse and unique programs are from one another, and why principals must be knowledgeable to be technology leaders. The technology infusion of the 20th century made it necessary for schools to create technology programs for student achievement. Public school districts and universities throughout the nation developed programs to integrate technology with the school culture and school teaching methods. Technology requires integration into schools, rather than being segregated as in the early years of computer technology (Eib & Mehlinger, 1998). Segregation occurred when schools hired special teachers to teach computer courses in schools, but restricted computer access to a few teachers and limited student access to an hour or so a week. Today mainstreamed computer technology provides access to teachers and students so they may use computers any time and not have another scheduled class (Eb & Mehlinger). Technology integration is impossible when teachers or students lack adequate access to available technology.

Scoolis (1999) gave advice on infusing curriculum with technology. The first important step to infusing curriculum is to establish an effective shared vision for the school. Included in shared vision are goals for technology integration, which capture the staff's imagination and efforts. Second, principals must attend staff development and lead fellow learners to technology competency. Finally, principals must look for

appropriate technology based staff development for school personnel because it saves valuable time to learn from the successes and mistakes of others. An important point to remember is that technology infusion into the school curriculum is an ongoing painstaking process.

Fulton and Honey (2002) reaffirmed the points in the above articles. They believed that any technology must be secured by a series of key themes:

1. The environment students enter after school influences the purposes and goals of education;

2. Local differences must be taken into consideration when tailoring technology solutions to needs and priorities;

3. Technology education must address the concerns of multiple audiences from parent to policies;

4. Real change in the classroom is by the teachers supported by principals, who must be supported by superintendents and school boards or change will never take place;

5. Groups, practitioners, researchers, developers, instructional designers, and individuals can no longer work in isolation, but collective expertise must be drawn from them to design new learning environments;

6. Finally, technology is a means to an end, not a goal in and of itself (Honey & Fulton, 2002, p.7).

Honey and Fulton (2002) believed the development of a technology plan, a shared vision, investment of stakeholders, administrative support, teamwork and ongoing technology planning were key themes to securing technology in schools.

Wright (1999) investigated how technology helps the educators teach specialized areas of the curriculum. Teachers in five Missouri school districts used the computer program Elementary School Technology Education (ESTE) a method for teaching activity based applied science. Approximately 300 second and fourth grade students used the program and exhibited enthusiasm and leadership when provided materials in a production setting. Children using the ESTE program were unobtrusively observed by two researchers during a weeklong session. Students appeared to be motivated using instruction through ESTE during every session and in subsequent sessions. Technological processes and knowledge processes were learned along with the curriculum based subject area (Wright, 1999). The data gathered through various observations of students using ESTE suggested that most students respond positively to technology content and related activities.

The Willow Bend School in Rolling Meadows, Illinois found that the belief "technology can transform a school" is true. Conyers, Kappel, and Rooney (1999) reviewed a laptop computer program that became internationally known. The program at Willow Bend School has received visitors from as far away as Germany, England, and Ireland. The Rolling Meadows, Illinois school district wanted to start a pilot program to explore technology's impact on student learning and performance. In April 1994, the administration and staff of Willow Bend School decided that this

catalyst would bring a new focus to their school where the population did not meet the stereotypical suburban schools. The school's population was racially and socioeconomically diverse. Early strategy focused on best practices and emphasized specialized staff development. Technology became the tool, not the driving force, of the project. The transformation of Willow Bend School was clear when testing scores rose dramatically and students continued to make progress. Willow Bend School received numerous awards and recognition because of its efforts in the use of educational technology to promote learning. It is clear that technology use in some schools can lead to students' success in schools. Well-trained, innovative principals who have the competencies to develop technology use, as in Willow Bend School, lead successful technology programs.

Impact of Technology on School Learning

Technology affects students, influences principals, and expands the curriculum infrastructure, which makes the impact of technology on schools an important topic to add to the literature review. Fulton and Honey (2002) discussed how emerging technology affected education. What is the future of technology? This question is answered easily with a piece of equipment for the computer that is faster, cheaper, and more powerful than technology from last week (Fulton & Honey, 2002). The dynamic expansion of technology is far more complicated than implied. Rapid advances in technology have made it nearly impossible to predict the things to come for education. Fulton and Honey (2002) see the following as the impact of technology on education and opportunities for change:

1. Technologies make it possible to collect more information on students in real time, on a continuing basis. In today's political environment, with its heavy emphasis on frequent testing and monitoring of student achievement these tools can be leveraged to build greater support for diagnostic testing by applying such tools to collect usable information about student growth on an individual basis, and enhance the results by developing strategies for teachers for continuing growth for the learner.

2. Today's virtual communities of practice extend the opportunities of face-to-face learning and support. The opportunity can be leveraged by studying the contributions of these communities of practice to the learning culture, and by using what is learn to develop alternative models of professional development or social learning.

3. Powerful lessons, modules, or units of curriculum are being created and tested in schools to use the power of technology to help students apply and better understand complex scientific concepts or other intellectual obstacles in various curricular areas. This opportunity can be leveraged by identifying schools willing to make changes in their curriculum and focus on a few new things in the curriculum.

4. Children are using technologies to create new cultures of communication and learning that are developing entirely outside of school. This opportunity can be leveraged by thinking about learning styles, and using it to build on the learning we are trying to create in school.

5. The most universal agreement in this country that education should be at the top of the political agenda provides an opportunity for leveraging new resources for technology. By suing technology as a lever for change, we have seen how, in planning for technology access, communities come together to organize around what they think their educational goals should be use this focus as a means for community empowerment.

6. The current teacher quality crisis is defined as an issue of quantity as quality. Tradition approaches to teacher recruitment, preparation, induction, professional development, and career incentives have not begun to address the need for teachers.

7. Technology while not a total answer offers new ways of attracting, training, and supporting a varied teaching force, with new models of skills, training, and support for those new in the field (p.8).

These opportunities for change are difficult to attain, but technology is powerful and can bring about change in schools (Fulton & Honey, 2002). Technology use in education provides access to information, opportunities for communication, possibilities for collaboration, and powerful means of expression.

Technology affects teacher socialization and interaction with other teachers. Teaching is a solo endeavor with adult contact in the school lounge while other teachers are grading papers, phoning parents, or preparing for upcoming classes (Best, 2002). The latest technology trends enable teachers to collaborate, to team-teach, to commonly plan, and to develop interdisciplinary curriculum, which renders

the solitary teacher outdated. The large-scale infusion of technology into classrooms in American causes teachers to rely on many other people to maintain the technology infrastructure (Best, 2002). A new school culture has evolved that changes cultural norms and values once rooted firmly in schools. Cultural skirmishes are inevitable when making the transition to a new culture. New common cultural norms need to be developed to make the transition successful for everyone (Best, 2002). The addition of technology in schools provides the opportunity to review and change existing practices that bring about technology based culture.

Technology creates a cultural change in schools, affecting the teaching of procedural, conceptual, and structural knowledge, and expanding the variety of educational applications for technology (Grotzer, 2002). Early technology applications focused on procedural knowledge, which refers to basic skills including understanding rules and symbols (Grotzer, 2002). The computer provides immediate feedback, reinforcement, and programs the students' progress. For example, reading passages followed by multiple-choice questions on computer programs instructed reading comprehension and showed immediate student results. Before long, the concept of procedural knowledge expanded to include conceptual knowledge. The shift from procedural to conceptual knowledge began to appear between 1980 and 1990 (Grotzer, 2002). The new conceptually focused programs enabled students to examine data patterns, control variables, and deal with ambiguity in all parts of scientific inquiry. Recent advanced programs emphasize structural knowledge and reinforce the literature on scientific misconceptions or alternative conceptions by

explaining difficult areas and providing ways for students to understand the concepts. These advances provide a promise for teaching and helping students generate procedural, conceptual, and structural knowledge through interaction with technology.

The computer is probably the facet of technology that has affected the classroom in all academic areas. Tiene and Luft (2002) reported a long-term impact from a one-semester technology rich classroom experience of ten middle-school teachers. The teachers were able to bring their classes to an Ameritech Electronic Classroom for one semester. Ameritech was a Kent State sponsored electronic rich classroom setting that enabled teachers and students to be immersed in the latest classroom technology. The follow up study began two years after the classes left the technology rich setting. Ten teachers were surveyed, and in addition, half were interviewed over the phone. One issue that emerged was how the availability of hardware and software might affect technology opportunities in regular classrooms. If there was little hardware for these teachers to use, there might be minimal increases in technology use over the two-year period. Instead, most of the teachers reported a shift in their teaching style toward a student centered approach with pupils working in small groups using technology. There was a general agreement among the teachers that they were able to offer the same kinds of activities they tried in the AEC Classrooms. Not only had they used what they learned but were able to adapt lessons to daily teaching. The teachers could use the knowledge from the AEC Classrooms and surpass the technology integration found in the AEC Classrooms. Every

participant thought the experience valuable and half of the teachers consider themselves to have created a technology-rich learning environment.

Many schools nation wide have committed to a laptop computer initiative, and made adaptations for classroom use. Windschitl and Sahl (2002) thought that in contrast to a more conventional desktop technology, laptop technology created novel circumstances within classrooms and produced special features in school environments. Windschitl and Sahl (2002) investigated three teachers in a middle school that recently initiated a laptop program where each student was required to purchase a laptop computer. In addition, the school district furnished laptop computers to all teachers in the middle school. The three teacher participants were followed for two years using five elements to describe changes in instruction and technology use. The elements were: having students engage in collaborative group projects in which skills are taught and practiced in context; designing activities around teachers and student interests rather than in response to an externally mandated curriculum; focusing instruction on students' understandings of complex ideas rather than definitions and facts; teaching students to assess their own understandings; and engaging in learning in front of students rather than presenting oneself as fully knowledgeable.

The study provided a view into the working lives of three teachers who struggled to learn and make decisions about technology integration into their instruction. The findings of Windschitl and Sahl's (2002) study implied that technology integration was mediated substantially by teachers' belief system about

learners. Collaboration with colleagues who share interest in technology also helped to advance the use of technology, but the impact of technology is dramatically shaped by teachers' situational beliefs about learners and learning activities in class (Windschitl & Sahl, 2002). Ubiquitous personal computing in classrooms is becoming a wide spread reality in many schools, but the trends affects the lives of teachers, students, and the character of the institution.

Lowther, Ross, and Morrison (2003) examined the educational effects of providing fifth, sixth, and seventh grade students with 24-hour access to laptop computers. Specifically, the study examined the impact of laptops on classroom activities and on the student use of technology when writing and problem solving. The teachers who participated received computer integration training using the Integrating Technology for Inquiry (NTeQ) model that engaged students in critically examining issues and strengthening research and writing skills. A treatment-control group was used and classes were taught at the same grade levels with one laptop per student and the control group had five computers per class. Observations revealed few differences in teaching methods between classrooms, but laptop students used computers more frequently, extensively, and independently. Writing assessment results showed substantial and significant advantages for laptop users over control students. Results on the problem solving assessment showed significant advantages for the laptop group on five of the seven components assessed. Not surprisingly, there was also a higher confidence level for laptop students as compared to control students when using all the basic software applications. Laptop computer use in these

schools proved to be advantageous for laptop students who had 24-hour access to computers.

Computer use is not only for older children, because computer programs appear in younger students' classrooms. Rankin-Erickson, Wood, Beukelman, and Beukelman (2003) studied a computer equipped 1st grade classroom with a talking word processor, which helped the students read words they did not know. Students received training on how to use the computer program to get their words read. The students enjoyed the voice on the computer and showed enthusiasm for the project. A daily record traced student use on the computer and a list of the words each student entered. Anecdotally recorded observations were made on students' behavior while using the computer. The study concluded that first grade students could successfully use the computer for literacy support. This technology enabled students to read words independently beyond their reading ability and stay engaged in reading.

Computers made an impact on mathematics lessons in schools. A study by Ross, Hogaboam-Gray, McDougall, & Bruce (2002) investigated technology literate teachers' integration of computers into their math teaching. The main mathematics teaching software used was Math and More. The program was designed to engage students as active learners, provide meaningful problems, encourage collaboration with other students, stimulate reflection, and offer a variety of resources. Three teachers were followed through the process by interviews, site visits, individual case reports, student interviews, and analyses of case study data. The three teachers showed the following assertions: first, technology had a great impact by expanding

the scope of the teachers programs and promoting positive attitudes toward mathematics; second, the computer promoted equity of access to all forms of mathematics available in the classroom; third, technology contributed to teachers' implementation of math education reform and suggested ways the impact could be strengthened.

Computer use made an impact on English as a Second Language (ESL) Programs. Williams and Williams (2000) study determined the integration of reading with the computer improved the ESL students' reading skills. A special program was created using computer applications for ESL students at one of the urban schools in the Northwest United States. At the regular class sessions for ESL students, the teacher selected a list of words from the textbook. The teacher introduced the words and instructed the students to type the words using simple sentences. The teacher gradually increased the number of words and the level of difficulty for the students when the students improved on verbalization and recognition of the words. Observers noted the students' ability to pronounced words with ease, the readiness to engage in the activity, the clarity of sentence structure while typing on the computer, and the way students read their written sentences. This exercise continued until the end of the semester while the observers compared observation notes after each session. At the end of the study, 75% of the ESL students were reading and writing correct 10 word sentences (Williams & Williams, 2000). The observations indicated that the integration of technology for learning was effective with students whose English skills are limited.

Technology has made an impact and influenced almost every aspect of school organization and teaching (Windschitl & Kurt, 2002). Results of the studies produced positive outcomes when computer technology was integrated into school classrooms with students of different ages and ethnic backgrounds. Technology integration depends on principals who lead the schools and teachers in the classrooms. Educators need to be aware of technology competencies they must develop for the ability to make sound decisions about educational technology use in schools.

Principal Instructional Leadership Competencies

Principals require broad-spectrum instructional leadership ability to become skilled technology leaders. The following information was included to provide a background for what studies define as skilled instructional leadership. Instructional leadership refers to "actions undertaken with the intention of developing a productive and satisfying working environment for teachers and desirable learning conditions and outcomes for children" (Meyer, 2001, p.2). Principals who are effective instructional leaders are well versed in learning theory, instructional planning, aligning curriculum standards, assessment, and are good resources for teachers needing assistance (Shellard, 2003). Instructional leaders must continue to learn new instructional information that affects the teaching and learning standards of schools.

Meyer (2001) studied the administrator roles and priorities of instructional leadership by conducting a series of interviews over a four-month period with 13 administrators. Interview questions were open-ended and probes were used to encourage expanded thoughts. The interviews were transcribed and were coded using

qualitative methods. The principals' interviews revealed eight categories of tasks ranging from administrative duties to working with parents. The categories were: instructional leadership task involving curriculum and new program development, supervision of faculty and staff, professional development for faculty and staff, problems of externally mandated curriculum change, and evaluation systems change. The principals in the study saw the role of instructional leader as one of indirect involvement in classrooms. The position of principal was one-step removed from classroom instruction while keeping informed of situations.

Peterson (1999) investigated instructional leadership qualities in a study, which focused on five highly effective California schools superintendents. Superintendents at the core of this study were sure that their districts could make a bigger difference in their students' learning than other districts within the state (Peterson, 1999). While superintendents in this study credited personal vision as the explanation for success, it was only one of the critical themes identified. These critical themes of instructional leadership success were: creating a vision, being highly visible, modeling of academic expectations, developing rapport with the school board, and managing instructionally oriented programs (Peterson, 1999).

Conversely, Creighton (1999) explained how effective leadership was more than a set of skills, and depended on a relationship to a leader's character, beliefs, morals and values, emotions and spirit. Creighton (1999) believed, "to lead our schools and their . . . communities into the millennium, principals must strengthen the correlation between organizational success and their spiritual development" (p.1).

Leadership behaviors affect students and the success of schools, therefore the realization that leaders' personal beliefs guide leadership behavior was especially important to Creighton. Principals need common goals to lead organizations to a higher level by, increasing test scores, providing safe and productive learning environments, enhancing the ability of teachers, and supporting the needs of the community (Jacobs & Langley, 2002).

Effective instructional leadership brings about successful educational reform. Youngs and King (2002) conducted a study on urban districts throughout the United States investigating principal leadership capacity. Youngs and King found that effective principals sustained high levels of capacity by establishing trust, creating structures that promote teacher learning, connecting their faculties to external expertise, and helping teachers generate internal reforms. One important implication of the research was principals must be cognizant of shared norms and values before trying to initiate new practices in curriculum, instruction, or school organization (Youngs & King, 2002).

Molinaro and Drake (1998) conducted a three-year case study that examined a new high school's successful implementation of educational reform. The case study approach was used to understand the principal's experiences when implementing educational reform. Findings revealed three important interdependent strategies critical to the success of educational reform, which were: principals must create a culture of change, value collaboration, and share leadership. Molinaro and Drake (1998) also found that teachers are at the crux of reculturing, collaborating, and

sharing leadership for educational reform. Effective instructional leadership, stakeholders' strong commitment, and stakeholders' perseverance bring about successful educational reform movements.

Few studies have directly examined teachers' perspectives on principals' instructional leadership characteristics and the impact of those characteristics on teachers. Teachers are in a position to have a unique perspective of instructional leadership, which is the reason this section is included in the literature review. Blasé and Blasé (1999) conducted a study where 800 teachers answered a questionnaire identifying leadership characteristics that enhanced and affected instruction. A model of effective instructional leadership reported by the teachers had two major themes: principals talking with teachers to promote reflection and principals promoting professional growth (Blasé & Blasé, 1999). Instructional leadership strategies have strong affects emotionally, cognitively, and behaviorally on teachers (Blasé & Blasé, 1999). Effective instructional leaders can strongly influence the curriculum instruction of teachers in schools.

Quinn (2002) identified the relationship between leadership behaviors and teachers' instructional practices. Data were gathered from elementary, middle, and high schools across the country by a survey given to teachers regarding principals' instructional leadership abilities and their effects on the teachers. After statistical analysis, Quinn (2002) found that higher levels of active learning/active teaching occurred in schools where principals were strong instructional leaders. Second, in schools where principals rated high as a resource provider, there was a higher level of

student engagement. Third, an indicator of higher levels of active learning/active teaching was a principal who promoted communication by modeling school goals, articulated the vision toward instructional goals, and provided for integrated instructional planning and goal attainment (Quinn, 2002). Effective instructional leadership occurs when principals create an atmosphere of trust and patience, build relationships, model the value of continual learning, and promote teachers' participation and leadership in staff development.

Principal Technology Leadership Competencies

Principal technology leadership competencies are critical to principals' knowledge for integrating technology in schools. The following section of the literature review presents the research and articles found by the author. It is necessary for the following articles to be included, even those without empirical evidence, because the articles outline basic technology competencies. The body of literature covering principal technology leadership competencies is vague and imprecise. It outlines some competencies and leaves other out that might be considered important by some researchers.

The body of knowledge about principal technology competencies is thought by some researchers (Holland, 2000; Hall, 2001; Jones, 2001; Bowman, Newman, & Masterson, 2001) to be an important factor in technology integration success. Principals who promote technology integration for collaboration and stimulation for learning experiences will notice far greater student achievement (Hughes & Zachariah, 2001). Technology in education had many educational critics who now

support technology as an instructional tool necessary to increase student gains and apply information to complex tasks (Hughes & Zachariah, 2001). An opposite viewpoint from Cuban (2001) is that schools need to take a "broader vision of the social and civic role that schools perform in a democratic society, our current excessive focus on technology use in schools runs the danger of trivializing our nation's core ideals" (p.197). Despite opposing positions, studies indicate that the proper and appropriate use of technology to support instruction has improved student academic gains across the curriculum (Hughes & Zachariah, 2001).

Many principals make an effort to be good technology leaders, but commitments and time-consuming work leave little time for reflection on strategies and new techniques. Despite this time factor, administrators have to understand where technology is going and what the ramifications are for education (Hall, 2001). The leadership principals provide for teachers is one of the most important factors that influence the effectiveness of technology programs (Jones, 2001).

However, principals must have sufficient knowledge of technology to guide them in their decision-making (Holland & Moore-Steward, 2000). Principals should understand the power of planning, and the need to create a technology plan to support instructional goals and objectives of the school (Holland & Moore-Steward, 2000). Principals should be strong visionaries with a good knowledge of technology and an understanding of the pedagogy that brings innovation to the classroom and to student learning (Hughes & Zachariah, 2001). Technology can be either a major catalyst for change or a waste of valuable resources. It is the choice of principals and their duty

to make the right decisions. Unfortunately, few studies and articles have been written regarding principal's roles and competencies in technology.

Bowman, Newman, and Masterson (2001) published an in-depth case study that tracked the development of a district's technology plan over a three-year period. The plan was incorporated into a recently passed district initiative to integrate technology. Data were collected through field notes, focus groups, interviews, group discussion, and observations. Data were analysis through documented qualitative methods. District's procedures and key administrative activities were identified which included: technology planning, professional development training, development of technology supported curriculum, and technology implementation in the classroom. One important finding by Bowman, Newman & Masterson (2001) was that principals should have the knowledge and skills to develop technology that supports and trains teachers for successful technology integration.

Planning is the foundation of technology integration according to Cooley (1999), who identified technology plans as a blueprint for success. The blueprint required the involvement of teachers, administrators, students, parents, and community members in the development of the plan. Each of the stakeholders focused on investing in technology and sharing the vision of the school or district. Principals helped assure purposes, goals, and objectives were a common vision. Objectives provided program developers, constructs for personnel and program evaluation, staff development, instructional leadership, and accountability. Czubaj's (2002) idea to implement technology into classrooms successfully was, planning

should precede purchasing, and training should precede implementation. Technology plans for schools are in the hands of the technology leader who makes decisions wisely and prudently for students, staff, and community. The ability to develop a technology plan is a skill that principals must have to implement technology in schools.

In the fall of 2001, The International Society for Technology in Education (ISTE) released technology standards for administrators. ISTE organized and sponsored a collaborative that researched and established a set of technology standards for school administrators. McCampbell (2001) discussed the organization and sponsorship of The Collaborative for Technology Standards for School Administrators (TSSA Collaborative). The project established a national consensus on what school administrators should know and be able to do with technology (McCampbell, 2001). The TSSA Collaborative identified knowledge and skills that constitute core technology requirements for preK-12 administrators.

The core technology knowledge extended to specific needs of administrators in three job roles: superintendents and cabinet-level leaders; district-level leaders for content specific or district programs; and campus level leaders, principals and assistant principals. The ISTE National Educational Technology Standards and Performance Indicators for Administrators (2001) were identified as:

I. Leadership and Vision: Educational leaders inspire the development of a shared vision for comprehension integration of technology and foster an environment and culture conducive to the realization of that vision.

II. Learning and Teaching: Educational leaders ensure that curricular design, instructional strategies, and learning environments integrate appropriate technologies to maximize learning and teaching.

III. Productivity and Professional Practice: Educational leaders apply technology to enhance their professional practice and to increase their own productivity and that of others.

IV. Support, Management, and Operations: Educational leaders provide direction to integrate technology tools into productive learning and administrative systems.

V. Assessment and Evaluation: Educational leaders use technology to facilitate a comprehensive system of effective assessment and evaluation.

VI. Social, Legal, and Ethical Issues: Educational leaders understand the social, legal, and ethical issues related to technology and apply that understanding in practice (p.69).

The performance of these standards alone is not enough to ensure that technology will improve education. Technology integration depends on how schools use the standards.

The standards should to be part of a system that "involves reflective practice, capacity building, accountability, and continuing revision of the standards" (McCampbell, 2001, p.69). The standards are accompanied by guidelines for their effective adoption, implementation, and a strategy for coordination among participating organizations to embody the standards for preservice and in-service

professional development of administrators (McCampbell, 2001). Administrators are responsible for technology implementation in the schools and these leaders depend more and more on teachers to utilize technology and model its use. Technology innovation in our schools requires collaboration and team building. Administrators need to allow others to contribute to innovative instructional practices and to demonstrate the value they place in members of the organization to integrate technology (Hughes & Zachariah, 2001).

Perceptions of Technology Competencies

Teachers are key integrators of school technology by providing student access to technology and by providing meaningful learning experiences in the classroom; they also have perceptions about what knowledge and skills principals need to implement technology programs. The articles in this section of the literature review present teachers' ideas on principal technology leadership competencies. Chin and Hortin (1994) examined teachers changing roles in a study about teachers' perceptions of instructional technology. The researchers found that most teachers base their beliefs and actions on conformance to the structure, policies, and traditions of the school in which they worked. Teachers expected principals to work with them, to envision and implement new programs, and to facilitate and empower them with technical knowledge to meet common educational goals (Chin & Hortin, 1994). One of the most important areas of administrative leadership is the positive relationship between principals and teachers. Elementary principals tend to be supportive of

teachers' self-reliance and self-direction, which shows that principals promote teachers' professional growth in areas such as technology.

Zhao, Pugh, Sheldon, and Byers (2002) investigated why teachers have trouble using innovative technology in classrooms. More than 100 recipients of technology grants were surveyed and interviewed. Ten recipients were written up in a case study form, and analyzed for common themes. The results reiterated Chin and Hortin's (2002) findings on the process of classroom technology integration. The statewide study of K-12 teacher-recipients found 11 salient factors that influenced the degree of success in classroom technology. Foremost, a supportive administrative school environment was vital for successful technology integration.

Windschitl and Sahl (2002) investigated the complexities of technology integration into the classroom. The study considered the integration of laptop technology into a school using case studies of teachers. Data collection through field notes and interviews was over a two-year period. The results were technology integration was more complex than simple accumulation of computer-related knowledge by teachers in workshops and in-services. Two ways teachers found help with technology integration were through administrative leadership and consistent planning time with colleagues who shared a desire to advance their teaching through technology.

Young (2001) researched the need to look closely at the patterns of computer use among educators. The study examined the background characteristics and computer use of 1,300 educators from 32 states. The people in the sample received

"Outstanding Educator" awards from a private foundation that had a particular interest in fostering the use of technology in schools. Data for the study were collected over a period of years and each time a group received their awards an extensive survey was given along with yearly updated surveys. Expectations were that the outstanding educators would provide new perspectives on technology integration. Instead, the groups' data looked like most groups of teachers studied in the past. Current educators' information, as in the past, found difficulty with funding a computer infrastructure, which included hardware, software, Internet access, and technical support. The teachers who participated in training efforts noted increased skill levels yearly. Information gathered from the educators informed principals of skills they should have for effective technology leadership. The technology leadership skills were the ability to find funding for needed equipment and the knowledge to assess their teachers' professional technology training.

Reiser (2002) researched the relationship between in-service education and the integration of technology into the curriculum with the same findings as Young (2001). Data for the research were collected by online questionnaires and surveys. Results of the questionnaires and surveys yielded several concerns for teachers. Access to technology was a concern for many teachers. Many teachers thought the students needed more time with technology, which meant more hardware, software, and Internet access. Issues focused on overcrowding and scheduling problems in computer labs. Without access to computers, practice time, and funding for new software, teachers would have a difficult time integrating technology. Teachers

thought the single most important factor in integrating technology into the curriculum was professional development. Many teachers had the desire to become knowledgeable about computers, but felt the coursework should be relevant and useful. Teachers in this study also wanted access to technology, software, and professional development relevant to individual schools. This meant a principal must have the skills and competencies to raise funds for needed technology equipment and to assess teachers' needs in staff development.

The present study investigated public school educator perceptions of technology leadership competencies, and investigated significant differences between educator groups. The review of literature for the proposed study addressed six related areas because no studies were found that directly addressed the topic. The six areas in the review of literature were: history of technology in public schools, school technology programs, impact of technology on education, principal instructional leadership competencies, principal competencies for technology leadership, and perceptions of technology competencies. These related areas provided a background for the study and developed the dissertation topic of educator perceptions of principal technology leadership competencies.

The role of an administrator as an instructional leader is a classic one of a decision maker, role model and proponent of new instructional ideas to meet the demands of a changing curriculum. Technology in schools is one of those recent instructional idea added to the curriculum and deemed a necessary part of today's classrooms. It is a critical educational leadership challenge to integrate technology in

public school classrooms. Technology integration into public school classrooms requires administrators to have certain competencies. Little empirical data exists regarding principal competencies related to educator perceptions of technology leadership competencies. The International Society of Technology in Education's Administrator Standards are the National Educational Technology Standards and Performance Indicators for Administrators (NETS-A) and encompass many characteristics and competencies of a technology leader. NETS-A appears to be a definitive list of characteristics and competencies for administrators to reach toward to become knowledgeable technology leaders. NETS-A was developed by a collaborative organized and sponsored by ISTE. Without a doubt, administrators are the main role models of technology in schools and should make every effort to attain competencies in technology. School districts and universities strive to meet this need for principals by offering staff development and higher education classes.

Empirical research regarding educator perceptions of competencies for technology leadership was not found by the author. No studies have questioned teacher opinions on what competencies are necessary for principal technology leadership. Teachers are a very important reason for the success of technology programs. Principals cannot implement technology programs without technology literate teachers who work in the classrooms. Teachers who use technology in classrooms have definite perceptions of what competencies are necessary for principals to be effective technology leaders. This study not only intended to look at principal perceptions, but also teacher perceptions of principal competencies for

technology leadership. The research results of the study will enable principals to become knowledgeable technology leaders who will implement successful programs for the students, faculties, and staff, of public schools.

Summary

The chapter provided an overview of literature relevant to the study. Previous research is limited and no empirical studies were found that investigated technology leadership competencies from the perception of educators from public schools. The literature review encompassed six related areas because no studies were found that addressed the topic directly. The six areas in the review of literature were: history of technology in public schools; school technology programs; impact of technology on education; principal instructional leadership competencies; principal competencies for technology leadership; and perceptions of technology competencies. The literature review provided the background for this study. Each area of the literature review explained how technology influenced education and emphasized the importance of technology to education. In addition, the literature review highlighted the importance of the role of principals as technology leaders. Chapter III provides the design and methodology of the study.

CHAPTER III

DESIGN

Introduction

The invention of the printing press in the 18th century marked a big leap forward in the involvement of technology in education. In the early 1860's photography in textbooks created a controversy over technology use because scholars felt pictures would dilute the meaning of education (Withrow, 1997). Today, technology use in education is one of the most critical educational leadership challenges because there are pressures from legislatures, pressures from government agencies, and pressures from public school patrons to make technology a priority for student achievement. Computer technology in the 1950's was utilized primarily for problem solving by university students and now is a permanent fixture in public schools for everyday student use. Today's educational technology programs assist classroom teachers with everything from curriculum development to basic skills instruction. For long-term vision and success, technology integration must be led by principals who are well informed in the field of technology, who promote technology, and who have a basic knowledge of technology source, use, and potential (Hughes & Zachariah, 2001).

Supervising in a technology rich environment requires principals to prepare for their role as technology leaders by acquiring sufficient knowledge to guide them in decision-making (Holland, 2000). The literature review in Chapter II explicated common themes in assumptions about technology competencies; however, the author

found no empirical evidence from researchers that give principals an idea of the competencies necessary for technology leadership. For example, Flanagan and Jacobsen (2003) identify the common elements that can be translated into aims for technology leaders such as: student engagement, shared vision, equity of access, professional development, and ubiquitous networks. Flanagan and Jacobsen provide a study of opinion with no empirical data identifying technology leadership competencies. Such aims are representative of the technology competencies found in reviewed articles. All are good in concept, but none have empirical foundations.

The lack of tested guidelines for technology leadership competencies lead to the current study, which provided educator perceptions of principal technology leadership competencies for public school districts. The study results constitute empirical information for educators to consider when deciding what principal technology leadership competencies are necessary for technology integration. The information moreover helps school districts plan technology staff development for principals.

The following chapter focused on the research design. This included five components: description of the Southwest Oklahoma school districts' population used in the study, sampling procedures, instrumentation of the Principal Leadership Competencies Survey, data collection from the public school educators in the Southwest Oklahoma school districts, and data analysis by the Independent Samples t-test, the statistical method used to address the research questions.

Research Questions

In order to assess public school educators' thoughts about principal technology leadership competencies, the study examined the following questions:

1. What competencies do principals in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

2. What competencies do teachers in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

3. Are there significant differences in the perceptions of competencies for technology leadership between principals and teachers in the three Southwest Oklahoma school districts?

4. Are there significant differences in the perceptions of competencies for technology leadership between elementary and secondary educators in the three Southwest Oklahoma school districts?

5. Are there significant differences in the perceptions of competencies for technology leadership between principals and assistant principals in the three Southwest Oklahoma school districts?

These five questions were worthy of study because they examine areas of research on principal technology competencies that were never empirically explored. The questions were addressed using the design of the study.

Description of the Population

The participants for the study were educators from three city school districts in Southwest Oklahoma. A demographic description of each city is in Appendix A.

The participants included certified principals, assistant principals, and certified elementary and secondary teachers from the three districts. The school districts were chosen based on location and willingness to participate in a study that empirically investigated the perceptions of educators in public schools regarding principal technology leadership competencies. Though cities and their concomitant school districts are demographically comparable, they do possess unique attributes. Two of the cities have adjacent military installations, one with the largest United States Army artillery base in the world and the other next to a United Air Force base. The bases add to the communities a cosmopolitan atmosphere due to their diverse national and international military population. Military families live in the neighboring two cities, military-affiliated adults are employed in the school districts, and military-affiliated students attend the local schools. The third city has several industries that make it a center for many people to live and work. All three school districts serve a multi-cultural student population.

The area was a good location for data collection for the study because a socially and ethnically diverse populace populated the cities. Each district was chosen because of its location and willingness to participate in the study. Similarities exist among the school districts used in the study, but each district has differences that make it exceptional. The participants from the Southwest Oklahoma school districts have individual differences and at the same time provide a look at regional information from the state.

City A has an approximate land area of 33.77 sq. kilometers. The attractions in this city are an Air Force base, a museum about western prairies, and a mountain resort park. Higher education opportunities are a state college established in 1926. The land-surrounding City A is used primarily for farming. The city maintains a hospital, churches, and is large enough to provide an extensive range of employment for its citizens.

City A has a school district with six elementary schools, two middle schools, and one high school. The district covers 244 square miles with 17.5 students per square mile. The average enrollment for 2001/2002 was 4,264.2 students and the average enrollment for 2002/2003 was 4,259.7 students. City A's school district has in addition to many others two special student programs, one for gifted and talented students (12.1%) and the other for special education students (10.4%). Student eligibility for Free/Reduced Lunch Program in 2003 was 50.0%.

City B has emphasized new business growth in the last five years. The city has a major oil production company and several factories that provide employment for its citizens. The city is encouraging economic expansion through development, restructuring and encouraging small businesses to come to the city. Higher education opportunities and training are available through a regional technology center. City B has lakes, parks, golf courses, and a museum about the Chisholm Trail to provide recreation for the area. The city has a hospital, churches, and a number of community organizations.

City B has a school district comprised of seven elementary schools, two middle schools, and one high school. The district covers 67 square miles with 55.2 students per square mile. The average enrollment for 2001/2002 was 3,706.4 and the average enrollment for 2002/2003 was 3,699.3. City B's district has in addition to many others two special student programs, one for gifted and talented (10.4%) and the other for special education students (11.1%). Student eligibility for Free/Reduced Lunch Program in 2003 was 49.6%.

City C was established in 1901 using a lottery system to distribute captured American Indian lands. The town site was located south of a fort used by the U.S. Army, which later became a large field artillery installation. The city now has the U.S. Army base, large manufacturing companies, and small businesses to provide employment for citizens. Attractions in the area are a wildlife reserve, numerous museums, city cultural events, and golf courses.

City C has a school district with thirty elementary schools, four junior high schools, and three high schools. The average enrollment for 2001/2002 was 16,842.1 and the average enrollment for 2002/2003 was 16,700.6. The district covers 185 square miles with 90.3 students per square mile. City C's district has in addition to many others two special student programs, one for gifted and talented (9.9%) and the other for special education students (14.8%). Student eligibility for Free/Reduced Lunch Program in 2003 is 51.9%.

Appendix A includes demographic data about the three cities involved in the proposed study. Cities A and B have approximately the same population, while City

C is four times the size of City A and B. City B's median age is 40.3 years, and Cities A and C have median ages of approximately 30 years old. The younger median age in Cities A and C maybe explained by the existence of the military installations. Similarly, male to female population numbers in Cities A and C are equivalent. City B has larger population of females than males by approximately six percentage points. The 65 years and older population category in Cities A and C is smaller than City B. The age statistics could mean that Cities A and C have more adults with children who are school age. City B with its older median age of 40.3 could be more of an older, adult-oriented community than Cities A and C.

Race information from each city is included in Appendix A. The White/Caucasian race predominates in all three cities while the second largest race as a percentage in Cities A and B is Hispanic. In City C Black/African American is the second largest race. Asian and American Indian/Alaska Native races are a small percentage of the population in all three cities. Percentage of student populations' ethnicity varies demonstratively in each district (Appendix A).

In Cities A and C a little over 50% of the total school population is White/Caucasian. City C has the largest school population of Black/African Americans, with 32%. Cities A and B have about 10% Black/African Americans in their school populations. City A has the largest percentage of Hispanic students at 23%, while Cities B and C have Hispanic student populations of about 10%. As with the city race percentages, the school ethnic composition has a very small percentage of Asian and American Indian/Alaska Native students. Cities A, B, and C's ethnic

composition of students are about the same and vary within a few percentage points of each other.

Cities A, B, and C school personnel numbers (Appendix A) show the districts are about he same in administration and teacher representation. School districts A, B, and C administrators make nearly the same average salary and the average administrators per teacher for each school district is about the same. The numbers of regular classroom teachers in each school district varies because of student population. The number of students per regular classroom teacher is approximately the same in each district around 18 students per teacher. The highly structured state mandated teachers' salary schedules keep the average teachers salaries in the districts approximately the same. City C with a larger population has the most teachers with advanced degrees, while Cities A and B have approximately 27% of teachers with advanced degrees. In all school districts the average years of teaching experience is about 14 years. In all school districts, Free/Reduced Lunch Program percentages remain consistent at about 50% (State of Oklahoma Profiles District Report, 2003). Each district will contribute distinctive administrator and teacher perspectives for the proposed study by possessing unique attributes.

Sampling Procedures

Educators from the three school districts were sampled according to the same procedures. All 82 principals and assistant principals in the 3 school districts were surveyed anticipating the limited number of administrators in the districts. Teachers in the three districts were selected by a stratified random sampling of three teachers to

one principal or assistant principal, totaling 328. The educators were surveyed on-line via SurveySuite a website available for creating online surveys. SurveySuite provides online services, which automate the entire process of running an online survey. This process provides the educators convenience and ease for obtaining survey information.

The educators received an announcement from assistant superintendents of the school districts that encouraged participation in the study and outlined the benefits for the district. Participants chosen for the study received several documents by email: Informed Consent Letter for Research advising educators of their rights in the study, the email address of SurveySuite to logon to the study, and instructions on how to participate on-line or if they prefer instructions to receive a paper survey. In order to explain the study, enhance the honesty, and ensure an acceptable rate of return, steps were fully outlined in an Informed Consent Letter to guarantee the participants anonymity.

Each participant was assured that neither the participants name nor individual results would be reported; but that only a summary form of the report published. Participants were further assured that they may choose not to take the survey or may stop at anytime. If they had any questions about the research project, participants were informed of telephone numbers and e-mail addresses of people that may be contacted for clarification about the study. Participants were informed that going to the website and completing the survey would be agreeing to participate in the study.

Finally, participants were thanked for their participation and consideration in the study.

When participants logged on the SurveySuite website, there was a survey site link available for all of the educators. The participants self-coded professional information by school district and participant status (for example, District A and assistant principal). If the participant chose, a paper/pencil survey was mailed upon request to the participants' address. This option gave the participant who was not comfortable with computer surveys a chance to complete the survey and be a part of the study.

Instrumentation

Design of the instrument for the study was crucial to gathering reliable and valid data for the study. The instrumentation for the study was a researcher-designed survey, for both principals and teachers. The instruments reviewed for arrangement, content, and survey questions came from the Profiler website sponsored by the High Plains Regional Technology in Education Consortium (HPR*TEC). The website was established by HPR*TEC several years ago for school district personnel to design and post technology evaluation surveys for administrators and teachers on the website.

The survey entitled, "Principal Technology Leadership Competencies Survey" was specifically designed to investigate teachers and principals' perspectives regarding competencies that principals need to be knowledgeable about to be technology leaders. The version of the principal technology leadership competencies survey was specifically designed for public school educators. The participants rated

competencies on principal technology leadership using a four-point Likert scale: 1 - not necessary; 2 - somewhat necessary; 3 - necessary; 4 - very necessary. At the end of each section of the survey, there were areas for additional participant comments regarding principal technology leadership competencies.

Validation of the instrument included a search of literature for competencies needed by principals to implement technology programs, professional review for content validity, and a pilot study. Unsatisfactory items were revised according to comments and suggestions of professional reviewers. Following this initial inspection, the survey was administered to a pilot group.

A pilot study was conducted to assess instrument reliability and to elicit item feedback from pilot respondents. The pilot study group was not considered as respondents of the principals or teachers used for the major study. The online survey "Principal Technology Leadership Competencies Survey" was sent to a group of 33 educators in one public school district. The email contained a cover letter and a link to the online survey. The cover letter contained the following: directions to the participant for completing the survey; how the participant was chosen; a guarantee of anonymity; and an invitation to complete the survey with the freedom to criticize the contents and design of the survey. Based on suggestions by the educators the survey was reviewed and used for the major study. Responses of the educators were statistically measured for reliability and analysis of weak items considered for removal.

Cronbach's Coefficient Alpha was used to assess internal consistency and reliability. Cronbach's alpha, a coefficient of reliability, measures how well a set of items or variables measure a single one-dimensional latent construct will be used to assess instrument reliability. This method measures the internal consistency of the test instrument through an analysis of test items. If the inter-item correlation of the test is low then alpha will be low showing evidence of low internal consistency. Conversely, if the inter-item correlation is high there is evidence that the items are measuring the underlying construct. Results of the Cronbach's alpha were to modify the instrument.

Data Collection

Data for the proposed study was gathered systematically and carefully so the procedures will be the same for every city's school district. Any variation in the data gathering procedures could potentially bias the results of study. Permission was sought and obtained from the Institutional Review Board (IRB) of The University of Oklahoma to collect data from the subjects. No data was collected until permission was granted. This board must approve all studies undertaken by The University of Oklahoma's students and professors. The pilot study was conducted immediately after securing IRB approval. When the pilot study was completed, the survey was made available to the participants in the study on SurveySuite. After a two-week waiting period, the data from the online survey was retrieved in computer print out form. The data was statistically analyzed to determine the findings for the study and reported in the next chapter, Chapter IV, research findings.

Data Analysis

The purpose of this study was to provide empirical data regarding public school educator perceptions of principal technology leadership competencies. In order to assess public school educator thoughts on principal technology leadership competencies, the study examined the following questions:

1. What competencies do principals in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

2. What competencies do teachers in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

3. Are there significant differences in the perceptions of competencies for technology leadership between principals and teachers in the three Southwest Oklahoma school districts?

4. Are there significant differences in the perceptions of competencies for technology leadership between elementary and the secondary educators in the three Southwest Oklahoma school districts?

5. Are there significant differences in the perceptions of competencies for technology leadership between principals and assistant principals in the three Southwest Oklahoma school districts?

Data collected from the online surveys were analyzed by using The Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics was used to answer questions one and two, and the Independent-samples t-test was used to answer questions 3, 4, and 5. The Independent Samples t-test is a parametric statistical test

for analyzing data from two independent samples, comparing the means. The mean analysis by the t-test helps the researcher decide whether the observed difference between two sample means is by chance or represents a true difference between populations (Shavelson, 1996). The results computed for the study on SPSS, are presented and discussed in the following chapters, Chapters IV, and V. Answering the research questions provides an overview of the study and an indication of educator viewpoints on principal leadership competencies from Southwest Oklahoma.

Summary

Chapter III was an overview of the design of the study. The chapter focused on the research design, which included five components: description of the Southwest Oklahoma school districts' population used in the study, sampling procedures for the study, instrumentation of the Principal Leadership Competencies Survey, data collection from the public school educators in the Southwest Oklahoma school districts, and data analysis by the statistical method used to address the study. Details about design and methods are essential factors when analyzing data for the study. Chapter III prepares the reader for the next chapter, Chapter IV, Research Findings.

CHAPTER IV

ANALYSIS OF THE DATA

Introduction

The purpose of this study was to investigate educator perceptions of principal technology leadership competencies in three Southwest Oklahoma school districts. Few studies have directly investigated principal and teacher perspectives of principal technology leadership competencies. The study adds empirical findings to virtually non-existent research regarding educator perceptions of principal technology leadership competencies and provides school districts across the nation educational information for technology integration. Five questions associated with the study were:

1. What competencies do principals in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

2. What competencies do teachers in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

3. Are there significant differences in the perceptions of competencies for technology leadership between principals and teachers in the three Southwest Oklahoma school districts?

4. Are there significant differences in the perceptions of competencies for technology leadership between elementary and secondary teachers in the three Southwest Oklahoma school districts?

5. Are there significant differences in the perceptions of competencies for technology leadership between principals and assistant principals in the three Southwest Oklahoma school districts?

The instrument "Principal Technology Leadership Competencies Survey" designed for the study contained 26 questions that were compiled from various instruments. The surveys were sent by email to a stratified sample of participants in the three school districts. Data from the online survey were summarized, and then statistically analyzed to generate the findings of the study. The current chapter presents these findings.

Summary of Pilot Study

A pilot study was conducted to assess the validity of the survey instrument and to ensure instrument reliability. The electronically generated survey was e-mailed to 33 certified educators in one of the three school districts chosen for the major study. Of the 33 educators surveyed, 15 returned completed usable surveys. Many respondents skipped individual items. The educator responses to the items were measured for statistical reliability using Cronbach's Coefficient Alpha.

The questions on the pilot study survey were developed from research of the literature and from surveys created on HPR-TEC (High Plains Regional Technology in Education Consortium) by school districts across the nation. The pilot study survey, comprised of 30 questions, included a four-point Likert scale (not necessary, somewhat necessary, necessary, and very necessary) set of choices. The survey was divided into eight sections. The first of this included demographic information,

including the subjects' districts, educator positions, years of principal/teacher experience, and gender. The other seven sections were leadership and vision; learning and teaching; productivity and professional practice; support, management, and operations; assessment and evaluation; social, legal and ethical issues; and presentation and multimedia. These latter seven areas are related to principal technology leadership competencies.

The instrument was validated by a search of literature for competencies needed by principals to implement technology programs and professional review for content validity. Overall, the professional reviewers suggested only minor wording and format changes, with little change in the content of the instrument. The instrument was reviewed and modified for use in the major study.

The pilot study surveyed 33 educators who were not part of the major study. The electronically generated survey was sent by email message to pilot study participants for their completion on the SurveySuite Website. The pilot study was intended to accomplish two goals. First, the reliability of the instrument was examined based on statistical analysis of the educator responses. Second, the instrument was content validated through item feedback from the pilot respondents. The items were statistically analyzed by using Cronbach's Alpha, a common measure of internal consistency, to assess reliability (Table 1). Cronbach's Coefficient Alpha is. The statistic provides an indication of the average correlation among all items that make up the instrument. Alpha values range from 0 to 1, with higher values indicating greater reliability (Shavelson, 1996).

Table 1
Pilot Study Results

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Lead 1	87.4667	57.2667	.4358	.9223
Lead 2	87.5333	56.5524	.6878	.9178
Lead 3	87.2000	57.8857	.5002	.9207
Lead 4	87.3333	56.3810	.6693	.9180
Learn 1	87.2667	57.6381	.5121	.9205
Learn 2	87.4000	56.4000	.6667	.9180
Learn 3	87.4000	55.5429	.7832	.9161
Learn 4	87.3333	57.8095	.4791	.9210
Learn 5	87.3333	54.9524	.8645	.9148
Produc 1	87.6667	59.9524	.1810	.9262
Produc 2	87.4667	58.5524	.3903	.9224
Produc 3	87.5333	57.6952	.5268	.9203
Produc 4	87.6000	56.5429	.5537	.9199
Support 1	87.3333	59.9524	.2025	.9253
Support 2	87.2000	57.1714	.6002	.9192
Support 3	87.1333	57.2667	.6296	.9188
Support 4	87.1333	58.1238	.5022	.9207
Support 5	87.1333	57.2667	.6296	.9188
Assess 1	87.5333	56.5524	.6878	.9178
Assess 2	87.4667	56.9810	.6009	.9191
Assess 3	87.8000	57.4571	.3642	.9244
Sle 1	87.3333	55.3810	.8054	.9157
Sle 2	87.2667	56.0667	.7261	.9171
Sle 3	87.0667	58.6381	.4776	.9210
Sle 4	87.2667	58.3524	.4167	.9220
Sle 5	87.4667	58.6952	.3714	.9227

Reliability Coefficients
n of cases = 15 n of items 26
Alpha = .9229

Four items (Support 1, Assess 4, Multi 1, and Multi 2) were removed from the pilot survey because they were negatively correlated to the remainder of the items. The original Cronbach alpha was calculated at .8595 (see appendix). Two weak items (6.04 and 8.02) were eliminated to increase the Cronbach alpha. Results of the alpha statistics on the second analysis was calculated at .8996 (see appendix). Two additional weak items (4.01 and 8.01) were eliminated to increase Cronbach's Alpha. The final reliability analysis resulted in an alpha of .9229.

Respondents

Three hundred twenty eight educators from three Southwest Oklahoma school districts were sent requests to complete the online survey via email. Due to lack of response, a second sampling was emailed to 240 additional subjects. The same group of principals and assistant principals were contacted and a new sample of teachers was contacted. The new sample of teachers was randomly selected. The total number of online surveys sent via email was 584, of which 152 educators (35 principals and 117 teachers) responded. Regardless of the educator's position, they shared one common characteristic; the Oklahoma State Department of Education certified them all for their positions. The respondents averaged 17.1 years of experience in the education field. Forty-one males (26%) and one hundred eleven females (73%) answered the survey. The total number of responses from the three districts in Southwest Oklahoma was one 152, a 20% response rate.

Results by Question

Question 1

Research Question 1 intended to isolate the beliefs of the principals in the three Southwest Oklahoma school districts regarding principal technology leadership competencies.

Research Question 1: What competencies do principals in the three Southwest Oklahoma school districts believe are necessary for technology leadership? Descriptive statistics were calculated for each item. Table 2 includes descriptive statistics (mean, standard deviation, and n) from the principal respondents. Additionally, the frequency of principal responses per item was calculated. Table 3 includes individual item frequency and percent of the various selections by principal respondents.

Table 2
Descriptive Statistics for Principals

	Mean	SD	n
Lead 1	3.45	.564	33
Lead 2	3.55	.564	33
Lead 3	3.52	.566	33
Lead 4	3.64	.489	33
Learn 1	3.61	.496	33
Learn 2	3.53	.507	32
Learn 3	3.79	.415	33
Learn 4	3.64	.489	33
Learn 5	3.64	.489	33
Produc 1	3.48	.566	33
Produc 2	3.42	.561	33
Produc 3	3.21	.740	33
Produc 4	3.30	.770	33
Support 1	3.48	.566	33
Support 2	3.79	.415	33
Support 3	3.61	.556	33
Support 4	3.82	.392	33
Support 5	3.79	.415	33
Assess 1	3.36	.653	33
Assess 2	3.45	.564	33
Assess 3	3.18	.727	33
Sle 1	3.58	.614	33
Sle 2	3.59	.499	32
Sle 3	3.76	.435	33
Sle 4	3.42	.751	33
Sle 5	3.45	.711	33

Table 3
Frequencies for Principal

	not necessary		somewhat necessary		necessary		very necessary	
	n	%	n	%	n	%	n	%
Lead 1	0	0.0	1	3.0	16	48.5	16	48.5
Lead 2	0	0.0	1	3.0	13	39.4	19	57.6
Lead 3	0	0.0	1	3.0	14	42.4	18	54.5
Lead 4	0	0.0	0	0.0	12	36.4	21	63.3
Learn 1	0	0.0	0	0.0	13	39.4	20	60.6
Learn 2	0	0.0	0	0.0	15	46.9	17	53.1
Learn 3	0	0.0	0	0.0	7	21.2	26	78.8
Learn 4	0	0.0	0	0.0	12	36.4	21	63.6
Learn 5	0	0.0	0	0.0	12	36.4	21	63.6
Produc 1	0	0.0	1	3.0	15	45.5	17	51.5
Produc 2	0	0.0	1	3.0	17	51.5	15	45.5
Produc 3	0	0.0	6	18.2	14	42.4	13	39.4
Produc 4	0	0.0	6	18.2	11	33.3	16	48.5
Support 1	0	0.0	1	3.0	15	45.5	17	51.5
Support 2	0	0.0	0	0.0	7	21.2	26	78.8
Support 3	0	0.0	1	3.0	11	33.3	21	63.3
Support 4	0	0.0	0	0.0	6	18.2	27	81.8
Support 5	0	0.0	0	0.0	7	21.2	26	78.8
Assess 1	1	3.0	0	0.0	18	54.5	14	42.2
Assess 2	0	0.0	1	3.0	16	48.5	16	48.5
Assess 3	0	0.0	6	18.2	15	45.5	12	36.4
Sle 1	0	0.0	2	6.1	10	30.3	21	63.3
Sle 2	0	0.0	0	0.0	13	40.6	19	59.4
Sle 3	0	0.0	8	24.2	25	75.8	33	75.8
Sle 4	1	3.0	2	6.1	12	36.4	18	54.5
Sle 5	1	3.0	1	3.0	13	39.4	18	54.5

The item means from Table 2 ranged from 3.18 to 3.82, which reveals that on the average the principals believed these leadership competencies to be necessary for principal technology leadership. Standard deviation scores ranged from .392 to .653, indicating relatively little variability in these beliefs. Descriptive statistical results suggest that principals perceived principal competencies on the instrument as necessary for principal technology leadership.

Frequency statistics from Table 3 suggest principals perceived competencies as necessary and very necessary to principal technology leadership. The majority of number and percentage statistics are included in the necessary and very necessary areas of the Likert scale. Only 2 principals answered that the items were not necessary, while 39 principals answered that the items were somewhat necessary. The frequency statistics confirm that principals perceived leadership competencies as necessary to principal technology leadership.

Though the study did not employ qualitative analytic procedures, open-ended questions were included at the end of each section of the survey to supplement the descriptive results. A few principals thought that both principals and teachers needed to work together to plan for technology vision, and that staff needed to buy into the technology vision or it would not work. A leadership statement by one principal was that technology leaders needed to model the expectation of the vision. One of the principal respondents thought that technology professional practice was a great tool for teachers as long as there was not a total dependence on the computer to teach. One other principal commented that technical support

regarding innovative technology was worse than useless if it did not work. All of the comments by principal respondents are presented in the appendix.

Question 2

Research Question 2 intended to isolate the beliefs of the teachers in the three Southwest Oklahoma school districts sample regarding principal technology leadership competencies:

Research Question 2: What competencies do teachers in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

Descriptive statistics were calculated for each item. Table 4 includes descriptive statistics (mean, standard deviation, and n) from the teacher respondents. Additionally, the frequency of teacher responses per item was calculated. Table 5 includes individual item frequency and percent of the various selections by teacher respondents.

Table 4
Descriptive Statistics for Teachers

	Mean	SD	n
Lead 1	2.99	.628	115
Lead 2	3.05	.605	115
Lead 3	3.25	.544	115
Lead 4	3.24	.586	115
Learn 1	3.30	.621	115
Learn 2	3.22	.618	115
Learn 3	3.33	.603	115
Learn 4	3.25	.702	114
Learn 5	3.42	.623	114
Produc 1	3.07	.769	115
Produc 2	3.09	.708	115
Produc 3	2.97	.734	114
Produc 4	2.81	.763	114
Support 1	3.15	.665	115
Support 2	3.36	.703	115
Support 3	3.27	.717	115
Support 4	3.41	.687	115
Support 5	3.45	.680	114
Assess 1	3.06	.656	114
Assess 2	3.06	.729	115
Assess 3	2.75	.948	114
Sle 1	3.28	.682	115
Sle 2	3.42	.623	114
Sle 3	3.40	.618	115
Sle 4	3.08	.822	114
Sle 5	3.10	.798	114

Table 5
Frequencies for Teachers

	not necessary		somewhat necessary		necessary		very necessary	
	n	%	n	%	n	%	n	%
Lead 1	2	1.7	17	14.8	76	66.1	20	17.4
Lead 2	1	.9	15	13.0	76	66.1	23	20.0
Lead 3	0	0.0	6	5.2	74	64.3	35	30.4
Lead 4	0	0.0	9	7.8	69	60.0	37	32.2
Learn 1	0	0.0	10	8.7	61	53.0	44	38.3
Learn 2	1	.9	9	7.8	69	60.0	36	31.3
Learn 3	0	0.0	8	7.0	61	53.0	46	40.0
Learn 4	2	1.8	11	9.6	57	50.0	44	38.6
Learn 5	1	.9	5	4.4	53	46.5	55	48.2
Produc 1	4	3.5	18	15.7	59	51.3	34	29.6
Produc 2	2	1.7	18	15.7	63	54.8	32	27.8
Produc 3	1	.9	29	25.4	56	49.1	28	24.6
Produc 4	5	4.4	31	27.7	59	51.8	19	16.7
Support 1	1	.9	15	13.0	65	56.5	34	29.6
Support 2	1	.9	12	10.4	47	40.9	55	47.8
Support 3	2	1.7	12	10.4	54	47.0	47	40.9
Support 4	1	.9	10	8.7	45	39.1	59	51.3
Support 5	1	.9	9	7.9	42	36.8	62	54.4
Assess 1	1	.9	18	15.8	68	59.6	27	23.7
Assess 2	4	3.5	15	13.0	66	57.4	30	26.1
Assess 3	13	11.4	30	26.3	44	38.6	27	23.7
Sle 1	2	1.7	9	7.8	59	51.3	45	39.1
Sle 2	1	.9	5	4.4	53	46.5	55	48.2
Sle 3	0	0.0	8	7.0	53	46.1	54	47.0
Sle 4	6	5.3	16	14.0	55	48.2	37	32.5
Sle 5	5	4.4	16	14.0	56	49.1	37	32.5

The item means from Table 4 ranged from 2.75 to 3.45, which reveals a much broader array of selections than with the principals. Standard deviation scores ranged from .544 to .948, again demonstrating greater variability overall as compared to principals. Descriptive statistics confirm that teacher perceptions were variable across the four areas of the instrument. Teachers believe differently than the principals as demonstrated by the results. They believe that some competencies for principal technology leadership were not necessary or somewhat necessary.

Frequency statistics from Table 5 suggest teachers perceived competencies in a much broader sense than do principals. The majority of number and percentage statistics are included in all the areas of the Likert scale. The frequency statistics confirm that teachers perceived leadership competencies in a much broader sense than do principals.

Though the study did not employ qualitative analytic procedures, open-ended questions were included at the end of each section of the survey to supplement the descriptive results. One teacher wanted more input into the district policy for technology improvement. Another teacher thought that ownership and sharing pertaining to formulation of the vision was necessary. In the learning and teaching section, one teacher thought that if teachers were not willing to learn new technology, they should not expect their students to learn technology. Another teacher was concerned by the lack of technical support, indicating that technology in schools without support services was a disaster. Finally, a comment by one teacher was that technology should be made available to all teachers, but that technology was not a big

concern for educators. All the comments by teachers in the survey are presented in the appendix.

Question 3

Research Question 3 was intended to compare differences in the perceptions of principals and teachers about principal technology leadership competencies from the Southwest Oklahoma school districts:

Research Question 3: Are there significant differences in the perceptions of competencies for technology leadership between principals and teachers in the three Southwest Oklahoma school districts? In response to Research Question 3, group descriptive statistics and Independent Samples t-tests were calculated for each item to determine if responses from the principals and teachers were significantly different. Table 6 provides group descriptive statistics including n, mean, standard deviation, and standard error of the mean for each item. Table 7 lists each item on the instrument followed by the t statistic, degrees of freedom, and the significance level. The results were generated by comparing the mean responses per item by principals to the mean responses per item by teachers. A t statistic large enough to generate a significance level of .05 or less is considered significant, indicating that the principals and teachers believe differently. Conversely, significance level greater than .05 indicates that principals and teachers beliefs are effectively the same.

Table 6
Principal vs. Teacher Group Statistics

	Position	n	Mean	Std. Dev.	Std. Error Mean
Lead 1	princpl	33	3.45	.564	.098
	teacher	115	2.99	.628	.059
Lead 2	princpl	33	3.55	.564	.098
	teacher	115	3.05	.605	.056
Lead 3	princpl	33	3.52	.566	.098
	teacher	115	3.25	.544	.051
Lead 4	princpl	33	3.64	.489	.085
	teacher	115	3.24	.586	.055
Learn 1	princpl	33	3.61	.496	.086
	teacher	115	3.30	.621	.058
Learn 2	princpl	32	3.53	.507	.090
	teacher	115	3.22	.618	.058
Learn 3	princpl	33	3.79	.415	.072
	teacher	115	3.33	.603	.056
Learn 4	princpl	33	3.64	.489	.085
	teacher	114	3.25	.702	.066
Learn 5	princp	33	3.64	.489	.085
	teacher	114	3.42	.623	.058
Produc 1	princpl	33	3.48	.566	.098
	teacher	115	3.07	.769	.072
Produc 2	princpl	33	3.42	.561	.098
	teacher	115	3.09	.708	.066
Produc 3	princpl	33	3.21	.740	.129
	teacher	114	2.97	.734	.069
Produc 4	princpl	33	3.30	.770	.134
	teacher	114	2.81	.763	.071
Support 1	principl	33	3.48	.566	.098
	teacher	115	3.15	.665	.062
Support 2	principl	33	3.79	.415	.072
	teacher	115	3.36	.703	.066
Support 3	principl	33	3.61	.556	.097
	teacher	115	3.27	.717	.067
Support 4	principl	33	3.82	.392	.068
	teacher	115	3.41	.687	.064
Support 5	principl	33	3.79	.415	.072
	teacher	114	3.45	.680	.064
Assess 1	principl	33	3.36	.653	.114
	teacher	114	3.06	.656	.061
Assess 2	principl	33	3.45	.564	.098
	teacher	115	3.06	.729	.068
Assess 3	principl	33	3.18	.727	.127
	teacher	114	2.75	.948	.089
Sle 1	principl	33	3.58	.614	.107
	teacher	115	3.28	.682	.064
Sle 2	principl	32	3.59	.499	.088
	teacher	114	3.42	.623	.058
Sle 3	principl	33	3.76	.435	.076
	teacher	115	3.40	.618	.058
Sle 4	principl	33	3.42	.751	.131
	teacher	114	3.08	.822	.077
Sle 5	principl	33	3.45	.711	.124
	teacher	114	3.10	.798	.075

Table 7
Principal vs. Teacher t-tests

	t stat	df	sig
Lead 1	3.816	146	.000*
Lead 2	4.191	146	.000*
Lead 3	2.428	146	.016*
Lead 4	3.513	146	.001*
Learn 1	2.638	146	.009*
Learn 2	2.634	145	.009*
Learn 3	4.996	146	.000*
Learn 4	2.926	145	.004*
Learn 5	1.829	145	.069
Produc 1	2.883	146	.005*
Produc 2	2.518	146	.013*
Produc 3	1.640	145	.103
Produc 4	3.283	145	.001*
Support 1	2.646	146	.009*
Support 2	4.420	146	.000*
Support 3	2.487	146	.014*
Support 4	4.377	146	.000*
Support 5	3.536	145	.001*
Assess 1	2.334	145	.021*
Assess 2	2.864	146	.005*
Assess 3	2.822	145	.006*
Sle 1	2.255	146	.026*
Sle 2	1.443	144	.151
Sle 3	3.756	146	.000*
Sle 4	2.165	145	.032*
Sle 5	2.324	145	.022*

* statistically significant at the .05 level

For each of the statistically significant items, principal means are at least ½ point higher than teacher means. Given the relatively modest standard deviations, the differences appear to be practical as well as statistical. Statistically significant differences exist for each item except 3 (Learn 5, Produc 3, Sle 2). Overall, principals and teachers perceive principal technology leadership competencies differently. All of the t-tests were positive, indicating that the principals believed that each of the competencies were more necessary, generally than did the teachers.

Question 4

Research Question 4 intended to compare differences in the perceptions of elementary and secondary teachers about principal technology leadership competencies from the Southwest Oklahoma school districts:

Research Question 4: Are there significant differences in the perceptions of competencies for technology leadership between elementary and secondary teachers in the three Southwest Oklahoma school districts? In response to Research Question 3, group descriptive statistics and Independent Samples t-tests were calculated for each item to determine if responses from the elementary and secondary teachers were significantly different. Table 8 provides group descriptive statistics including n, mean, standard deviation, and standard error of the mean for each item. Independent Samples t-tests were calculated for each item to determine if responses from the elementary and secondary teachers were significantly different. Table 9 lists each item on the instrument followed by the t statistic, degrees of freedom, and the significance level. The results were generated by comparing the mean responses per

item by elementary teachers to the mean responses per item by secondary teachers. A t statistic large enough to generate a significance level of .05 or less is considered significant, indicating that the elementary and secondary teachers believe differently. Conversely, significance level greater than .05 indicates that elementary and secondary teacher beliefs are effectively the same.

Table 8
Elementary vs. Secondary Teacher Group Statistics

	Level	n	Mean	Std. Dev.	Std. Error Mean
Lead 1	elemntry	69	2.97	.542	.065
	secondry	46	3.02	.745	.110
Lead 2	elemntry	69	3.03	.618	.074
	secondry	46	3.09	.590	.087
Lead 3	elemntry	69	3.26	.504	.061
	secondry	46	3.24	.603	.089
Lead 4	elemntry	69	3.29	.597	.072
	secondry	46	3.17	.570	.084
Learn 1	elemntry	69	3.26	.610	.073
	secondry	46	3.35	.640	.094
Learn 2	elemntry	69	3.26	.610	.073
	secondry	46	3.15	.631	.093
Learn 3	elemntry	69	3.43	.555	.067
	secondry	46	3.17	.643	.095
Learn 4	elemntry	68	3.31	.605	.073
	secondry	46	3.17	.825	.122
Learn 5	elemntry	68	3.44	.529	.064
	secondry	46	3.39	.745	.110
Produc 1	elemntry	69	3.04	.716	.086
	secondry	46	3.11	.849	.125
Produc 2	elemntry	69	3.03	.664	.080
	secondry	46	3.17	.769	.113
Produc 3	elemntry	68	2.97	.646	.078
	secondry	46	2.98	.856	.126
Produc 4	elemntry	68	2.76	.715	.087
	secondry	46	2.87	.833	.123
Support 1	elemntry	69	3.13	.616	.074
	secondry	46	3.17	.739	.109
Support 2	elemntry	69	3.29	.709	.085
	secondry	46	3.46	.690	.102
Support 3	elemntry	69	3.17	.685	.082
	secondry	46	3.41	.748	.110
Support 4	elemntry	69	3.36	.685	.083
	secondry	46	3.48	.691	.102
Support 5	elemntry	69	3.41	.714	.086
	secondry	45	3.51	.626	.093
Assess 1	elemntry	68	3.06	.570	.069
	secondry	46	3.07	.772	.114
Assess 2	elemntry	69	3.10	.689	.083
	secondry	46	3.00	.789	.116
Assess 3	elemntry	68	2.69	.868	.105
	secondry	46	2.83	1.060	.156
Sle 1	elemntry	69	3.33	.610	.073
	secondry	46	3.20	.778	.115
Sle 2	elemntry	68	3.43	.581	.070
	secondry	46	3.41	.686	.101
Sle 3	elemntry	69	3.46	.584	.070
	secondry	46	3.30	.662	.098
Sle 4	elemntry	68	3.15	.797	.097
	secondry	46	2.98	.856	.126
Sle 5	elemntry	68	3.15	.758	.092
	secondry	46	3.02	.856	.126

Table 9
Elementary vs. Secondary Teacher t-tests

	t stat	df	sig
Lead 1	-.423	113	.673
Lead 2	-.502	113	.617
Lead 3	.209	113	.835
Lead 4	1.039	113	.301
Learn 1	-.735	113	.464
Learn 2	.923	113	.358
Learn 3	2.316	113	.022*
Learn 4	1.007	112	.316
Learn 5	.392	112	.696
Produc 1	-.444	113	.658
Produc 2	-1.076	113	.284
Produc 3	.052	112	.959
Produc 4	-.719	112	.467
Support 1	-.330	113	.742
Support 2	-1.248	113	.215
Support 3	-1.768	113	.080
Support 4	-.886	113	.378
Support 5	-.808	112	.421
Assess 1	-.048	112	.962
Assess 2	.730	113	.467
Assess 3	-.744	112	.459
Sle 1	1.060	113	.291
Sle 2	.112	112	.911
Sle 3	1.359	112	.177
Sle 4	1.077	112	.284
Sle 5	.822	112	.413

* statistically significant at the .05 level

For the one statistically significant item, the elementary teacher mean is at least 1/4 point higher than the secondary teacher mean. Given the relatively modest standard deviation, the difference appears to be practical as well as statistical. This item (3.3) asked if principals should assist teachers in using technology to access student performance data, interpret student performance data, and modify instruction as needed. Elementary teachers believe that principals should help them with technology to access to student performance data, with interpretation of student data, and with modification of instruction, while most secondary teachers believed conversely. No statistically significant differences existed on each of the other items, revealing that elementary and secondary teachers perceive principal technology leadership competencies approximately the same.

Question 5

Research Question 5 intended to compare differences in the perceptions of principals and assistant principals about perceptions of principal technology leadership competencies from the three Southwest Oklahoma school districts: Research Question 5: Are there significant differences in the perceptions of competencies for technology leadership between principals and assistant principals in the three Southwest Oklahoma school districts? In response to Research Question 5, Independent Samples t-tests were unable to be calculated to determine if responses from principals and assistant principals were significantly different in their perceptions. The researcher was unable to address the research question because of the lack of responses by assistant principals (n= 8).

Summary

Chapter IV provided statistical results of the study. Three hundred twenty eight educators received a request by email to answer the "Principal Technology Leadership Competencies Survey." Thirty-five principals and one hundred seventeen teachers responded to the survey for an overall response rate of 20%. Descriptive statistics and Independent Samples t-test were used to respond to the following questions:

1. What competencies do principals in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

2. What competencies do teachers in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

3. Are there significant differences in the perceptions of competencies for technology leadership between principals and teachers in the three Southwest Oklahoma school districts?

4. Are there significant differences in the perceptions of competencies for technology leadership between elementary and secondary teachers in the three Southwest Oklahoma school districts?

5. Are there significant differences in the perceptions of competencies for technology leadership between principals and assistant principals in the three Southwest Oklahoma school districts?

Descriptive statistics were used to address the first 2 questions. These included individual item mean, SD, and frequency for principals and teachers, respectively.

Questions 3 and 4 were addressed through the utilization of group descriptive statistics including n, mean, standard deviation, and standard error of the mean and an Independent Samples t-test for each item. Question 5 could not be answered due to lack of data from assistant principals. Chapter V includes the summary, conclusions, and recommendations based on these findings.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The previous chapter presents the findings of the study. The current chapter includes a summary of these findings, conclusions that place the findings in the context of current scholarly literature, and recommendations for both research and practice.

Introduction

One of the most critical challenges for educational administrators is the successful integration of technology in classrooms (Hall, 2001). School districts across the United States are compelled by legislatures, educators, and parents to integrate technology instruction for student achievement (Brooks-Young, 2002). Administrative support is a key factor in the success of any kind of school reform, particularly reform dealing with technology integration (Brooks-Young, 2002). Principals who model the use of technology are instrumental in furthering computer technology use in classrooms (Kincaid &Felder, 2002). Support from principals is a crucial element in determining whether teachers integrate technology in their instruction.

Technology use in schools evolved during the last few decades from teaching programming, utilizing drill and practice, implementing integrated learning systems, addressing computer literacy skills, to participating in web-based communities (Dias & Atkinson, 2001). Current technology integration in schools involves the practices of using technology for curriculum to meet content objectives such as

communication, collaboration, and creative problem solving. Now that technology integration transformation is taking place, it is time to explore best practices for leading and teaching with technology and to find ways to promote meaningful learning for students.

Principals must have basic technology skills and competencies from which to work in order to support teachers and staff in school technology integration (Bailey, 1997). Principal modeling of technology behavior may influence the climate and direction of schools. A school leader must model professional growth by participating in professional learning activities, particularly involving technology applications that generate fear, apathy, or resistance among staff (Paben, 2002). Educational leaders must not become part of the problem when integrating technology. Principals who do not have knowledge of basic technology skills may be a hindrance to technology integration (Costello, 1997).

Principals provide technology leadership through fostering a vision, sharing the vision, funding, planning the process, coordination of the program, curriculum development, training, and creating technology standards. What administrators know about technology is of great importance in determining whether technology integration will affect the classroom (Hughes & Zachariah, 2001). Principals are expected both to possess both credible knowledgeable of technology and to implement technology programs in their schools, yet there is little information about technology competencies for principals to reference. The purpose of this study was to

generate empirical findings about perceptions of educators regarding technology leadership competencies.

It is important to appreciate the perceptions of educators because they work everyday either in a leadership capacity or in a teaching capacity, in arguably an increasingly technology-rich environment. Educators, including both principals and teachers, have some insight into what it takes to be an effective technology leader. The study intends to meet the need for empirical research about educator perceptions of principal technology leadership competencies and to provide school districts with a perspective about technology standards gathered from educators, thereby assisting school districts with technology integration.

Summary

Chapter IV provided statistical results of both principal and teacher perceptions regarding principal technology leadership competencies, statistical comparisons of principal and teacher perceptions of principal technology leadership competencies, and statistical comparisons of elementary and secondary teacher perceptions of principal technology leadership competencies. The total number of responses to the electronic survey used to generate the data was 152 out of 584, a 20% response rate. The response rate may have had some limitation to the context of the study.

The purpose of this study was to use quantitative methods to investigate educator perceptions of principal technology leadership competencies. The following five research questions were addressed:

1. What competencies do principals in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

2. What competencies do teachers in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

3. Are there significant differences in the perceptions of competencies for technology leadership between principals and teachers in the three Southwest Oklahoma school districts?

4. Are there significant differences in the perceptions of competencies for technology leadership between elementary and secondary educators in the three Southwest Oklahoma school districts?

5. Are there significant differences in the perceptions of competencies for technology leadership between principals and assistant principals in the three Southwest Oklahoma school districts?

Statistical analysis of the data included both descriptive statistics and Independent Samples t-tests. Descriptive statistics addressed Research Question 1 and Research Question 2, while The Independent Samples t-test addressed Research Questions 3, 4, and 5. Descriptive statistics for Research Question 1 indicated that principals perceived nearly all of the competency areas as being either necessary or very necessary for principal technology leadership. Teacher descriptive statistics for Research Question 2 demonstrated scattered results about principal technology competencies, ranging across the spectrum from not necessary to very necessary. Statistical results for Research Question 3 demonstrated significant differences

between principals and teachers on all but three items. The results for Research Question 4 demonstrated a significant difference between elementary and secondary teachers on only one item. Question 5 was deleted due to a lack of responses from assistant principals.

Best (2002) provides an excellent description of the differences in the involvement among subgroups regarding principal technology leadership competencies. He describes these differences as cultural skirmishes among groups that occur in most school districts. In order to make the educational technology transition successful for everyone, new common cultural norms must be developed. Principals must have sufficient knowledge of technology to provide the leadership necessary for technology integration success and for guidance in their decision-making in many critical areas (Holland & Moore-Steward, 2000).

Conclusions

This section presents conclusions based on the findings of the current study. The section begins by presenting conclusions for each of the research questions addressed in the study. Following are overall conclusions that relate these findings to the scholarly literature.

1. What competencies do principals in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

Principals perceived that almost all competencies on the instrument are necessary or very necessary to principal technology leadership. Necessary or very necessary answers ranged from 21.1% to 78.8 % across the items. Only three competencies

were recorded as not necessary on the frequency table. It would appear that principals in Southwest Oklahoma are knowledgeable and understand how positive technology leadership affects the integration of technology into school districts.

2. What competencies do teachers in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

Teachers perceived many of the technology competencies as necessary or very necessary, ranging in frequency from 17.4% to 66.1% across the items. Many perceived competencies on the survey as not necessary and somewhat necessary, with percentages ranging from .9% to 27.7%. Teacher perceptions demonstrated variability across the four possible choices of items and did not limit answers to necessary and very necessary. Teachers perceived the competencies as not necessary to very necessary across the entire spectrum of the survey.

3. Are there significant differences in the perceptions of competencies for technology leadership between principals and teachers in the three Southwest Oklahoma school districts?

Group descriptive statistics and Individual samples t-tests were calculated for each item to determine if responses from the principals and teachers were significantly different. Individual samples t-tests used to examine differences between means of principals and teachers across the items resulted in all but three items significant at the .05 level or below. Group descriptive statistics on the significant items resulted in the principal means 1/2 point or more above the teacher means, while the standard deviations between the groups were small. These results indicate that almost all the

items are both statistically significant and practically significant. Group statistics substantiate the t-test findings that statistically significant differences exist between all items except three. Principals and teachers held significantly different beliefs about principal competencies on almost every item. It can be concluded from the results of the group descriptive statistics and t-tests that principals and teachers from the Southwest Oklahoma school districts have different perceptions about competencies necessary for technology leadership.

4. Are there significant differences in the perceptions of competencies for technology leadership between elementary and secondary teacher in the three Southwest Oklahoma school districts?

Group descriptive statistics and Individual samples t-tests were calculated for each item to determine if responses from the elementary and secondary teachers were significantly different. Individual samples t-tests used to examine differences between means of elementary and secondary teachers across the items resulted in only one significant item at the .05 level or below. The item that elementary and secondary teachers perceived differently involved principals helping with accessing student performance data, interpreting student performance, and helping modify instruction as needed. Elementary teachers perceived this competency as necessary for technology leadership, while secondary teachers perceived it as not necessary. Group descriptive statistics on the significant items resulted in the elementary teacher mean 1/2 point or more above the secondary teacher mean, while the standard deviation between the groups were small. These results indicate that only the one

item is both statistically significant and practically significant. Group statistics substantiate the t-test findings that a statistically significant difference exists on only one item. It can be concluded from the results of the group descriptive statistics and t-tests that elementary and secondary teachers from the Southwest Oklahoma school districts have the same perceptions about competencies necessary for technology leadership. Elementary and secondary teachers view principal technology leadership the same because they may have the same experiences and views of principal leadership.

5. Are there significant differences in the perceptions of competencies for technology leadership between principals and assistant principals in the three Southwest Oklahoma school districts?

Question 5 had to be deleted due to lack of data. There were an insufficient number of responses from assistant principals. Assistant principals may have been more responsive with a more aggressive reminder schedule.

The results of the statistical analyses are informative. The study's findings demonstrate that principals and teachers perceive principal technology leadership competencies differently. Elementary and secondary teachers consider principal technology leadership competencies virtually the same. Chin and Horton (1994) found that teachers expect principals to work with them, to envision and implement new programs, and to facilitate and empower them with technical knowledge to meet common goals. This goal would appear to be difficult with teachers and principals being somewhat diverse in their respective thoughts about principal technology

leadership. One of the most important areas of technology leadership is the positive working relationship between principals and teachers. Principals are responsible for technology implementation in schools and these leaders depend more and more on teachers to utilize technology and model its use. Technology innovations in schools require collaboration and team building. Principals need to allow others to contribute to innovative instructional practices and to demonstrate the value they place in members of the organization to integrate technology (Hughes & Zachariah, 2001).

Zhao, Pugh, Sheldon, and Byers (2002) interviewed 100 teachers from across the nation and found 11 factors that influenced the success of classroom technology integration. Foremost, successful technology integration required the presence of a knowledgeable supportive administrator. Windschitl and Sahl (2002) investigated the complexities of technology into the classroom. Data collected through field notes and interviews over a two-year period resulted in the same conclusion as Zhao, Pugh, Sheldon, and Byers. Teachers found that the primary source for help with technology integration was through a supportive technology leader.

The Leadership and Vision section of the survey posed questions that dealt with vision and planning for technology. This section was one of the few sections in which principals and teachers thought similarly. Items 2.1, 2.2, and 2.3 presented competencies about shared vision, planning and implementation of the plans. Both groups believed that a shared vision, a technology rich school improvement plan, and a cohesive momentum toward the vision are necessary to achieve technology integration. These findings are consistent with Cooley (1999), who identified

planning as the blueprint for success. The blueprint required involvement of teachers and other stakeholders. Each of the stakeholders in the plan focused on investing in technology and sharing the vision for the school and district. The ability to develop a technology plan is a competency that principals must possess to implement technology in schools (Czubaj, 2002).

Section 3, Learning and Teaching was another section in which principals and teachers thought similarly. Items 3.4 and 3.5 present competencies about professional development for instructional staff and for improved student learning. Both principals and teachers found these competencies important to principal technology leadership. Items in Section 3 are consistent with previous research by Bowman, Newman, and Masterson (2001) who found that principals should possess the knowledge and skills to provide staff development that trains teachers for successful technology integration.

Young (2001) examined the background characteristics and computer use of 1,300 educators from 32 states. Data for the study that were collected over a period of years informed principals of skills they should have for effective technology leadership. An important identified technology skill was the knowledge to assess teacher professional technology training. Reiser (2002) investigated the relationship between in-service and the integration of technology into the curriculum, which resulted in with the same findings as Young (2001). Teachers thought the most important factor for technology integration was providing technology professional

development. This meant a principal must have the competencies to assess teacher needs for technology staff development.

Quinn (2002) identified the relationship between leadership behaviors and teachers' instructional practices. The study found that effective instructional leadership occurred when principals created an atmosphere of trust and patience, built relationships, modeled the value of continual learning, and promoted teacher participation in staff development. The literature relates to the results of the current study by confirming that both teacher and principal perceptions of shared vision, technology rich school improvement plan, and cohesive momentum though staff development are necessary to reach a shared technology vision.

Section 5, Support, Management, and Operations was the third section in which principals and teachers thought similarly. Both principals and teachers considered principals as advocates for attaining high quality technology support services and making them available in a timely manner. Young (2001) researched the patterns of computer use among educators. Information gathered from the research found two essential technology competencies for principals were obtaining funding of computer infrastructure and obtaining ongoing technical support.

The leadership that principals provide for teachers is one of the most important factors that influence the effectiveness of technology programs (Jones, 2001). Administrators must understand where technology is going and what the ramifications are for education (Hall, 2001). Bowman, Newman, and Masterson (2001) published an in-depth case study that tracked the development of a district's

technology plan over a three-year period. Key administrative activities included: technology planning, professional development, develop of technical support, and technology implementation in the classroom curriculum. Technology integration is in the hands of the knowledgeable technology leader who makes wise and prudent decisions for students, staff, and community.

Recommendations for Practice

Technology leadership is one of the most important factors that influence the effectiveness of school technology programs. Principals must have sufficient knowledge of technology to guide them in making decisions about their school technology programs. Successful integration of technology depends on principal technology leadership competencies and the day-to-day decisions made based on that knowledge.

Educators from three school districts in Southwest Oklahoma were sampled to generate empirical research regarding educator perceptions of principal technology leadership competencies. Based on the results of this study the following recommendations are offered:

1. School officials should integrate technology in school districts guided by the leadership of principals who are knowledgeable technology leaders. Administrative support is a key factor in the success of any kind of school reform, particularly reform dealing with technology integration (Brooks-Young, 2002). Knowledgeable support from principals is a crucial element in determining technology integration success in teachers' classrooms.

2. School officials should assess the current technology knowledge needs of school principals by on site evaluations, surveys, and interviews.
3. School officials should realize the technology needs of school principals from the assessment and provide technology staff development programs to meet the assessed needs.
4. School officials should assess the current technology knowledge of teachers in the district. The open-ended responses indicated that teachers think themselves to be inadequate when faced with technology integration. Assessment of teacher technology needs will assist the district with technology integration.
5. School officials should provide technology staff development programs to meet the assessed needs. Teachers are key integrators of educational technology, as they decide whether to provide student access to technology and meaningful learning experiences in the classroom.
6. School officials should be aware that technology plans are vital to the success of technology integration in schools. The plan should be grounded in the scholarly literature. The development of a technology plan, a shared vision, investment of stakeholders, administrative support, teamwork and ongoing technology planning are key themes in successful technology integration in schools (Honey & Fulton, 2002).
7. School officials should be aware that although technology plans may be in place and knowledgeable technology leaders may be following the plans, technology integration in school districts is an ongoing process. Technology plan revisions,

staff development, and technical support must be a continuing process.

8. School officials should be aware that Southwest Oklahoma principals are both knowledgeable and concerned about technology leadership in their individual districts, and are prepared to act accordingly.

Recommendations for Future Research

The study focused on educator perceptions of principal technology leadership competencies in an effort to add to an almost non-existent area of research. The studies findings raised several issues that might be considered for further research:

1. Further research into the area of educator perceptions of principal technology leadership competencies could focus on different populations. Teachers could be investigated on a larger statewide or national scale comparing perceptions of principal technology leadership competencies for regional differences.
2. Qualitative research could focus on interviews of principals or teachers to investigate educator concern about principal technology leadership. The comments of the principals and teachers in the study opened many possible research areas.
3. Research could isolate specific principal technology leadership competencies creating a list of empirically examined technology leadership competencies.
4. Research could focus on the International Society of Technology in Education (ISTE) specific National Educational Technology Standards and Performance Indicators for Administrators (NETS-A) technology standards and empirically research the competencies.

The list of recommendations for further research of principal technology leadership competencies is broad in perspective. There could be many individual approaches to the topic. Researchers must continue to focus on the importance of technology use in schools. Technology provides access to information, opportunities for communication, possibilities for collaboration, and powerful means of expression. Principals who promote technology integration for collaboration and stimulation to enhance learning experiences may witness increased student achievement. First, principals must have sufficient knowledge of technology to guide them in their decision-making. It is the duty of principals to make the right decision for technology integration.

Summary

Chapter V included the study procedures, purpose, research questions, conclusions, and recommendations for future study. Principals are expected to have credible knowledge of technology to implement technology programs. There is very little empirical research about educator perceptions of technology leadership competencies for principals to reference. The purpose of the study was to meet the need for empirical evidence in this scant body of literature. An electronic survey was made available to a sample of principals and teachers in Southwest Oklahoma school districts. Response rate after a second mailing was 46%. The following five questions were developed and answered by the study results:

1. What competencies do principals in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

2. What competencies do teachers in the three Southwest Oklahoma school districts believe are necessary for technology leadership?

3. Are there significant differences in the perceptions of competencies for technology leadership between principals and teachers in the three Southwest Oklahoma school districts?

4. Are there significant differences in the perceptions of competencies for technology leadership between elementary and secondary educators in the three Southwest Oklahoma school districts?

5. Are there significant differences in the perceptions of competencies for technology leadership between principals and assistant principals in the three Southwest Oklahoma school districts?

Data were analyzed through descriptive statistics for Questions 1 and 2, while Questions 3 and 4 were addressed through the use of group descriptive statistics and Independent Samples t-tests. Principals perceived all of the technology competencies on the survey as necessary and very necessary for principal technology leadership. Teachers perceived technology competencies from the entire spectrum of necessity. Teachers perceived many competencies as not necessary and somewhat necessary for principal technology leadership. Question 3 analyzed by group descriptive statistics and Independent Samples t-tests found statistically significant differences in the item responses of principals and teachers. Question 4 analyzed by group descriptive statistics and Independent Samples t-tests found only one item with a statistically

significant difference. Question 5 was not addressed due to lack of a reasonable response rate by assistant principals.

Principals and teachers perceived principal technology competencies differently, while elementary and secondary teachers perceived the competencies similarly. This difference should be taken into consideration when school districts implement technology competencies for principals. Furthermore, this difference in perception should be considered when integrating technology programs into public school districts.

References

Altus Oklahoma Resource Guide. (2004). Retrieved 7-28-2004, from http://www.pe.net/~rksnow/okcountyaltus.htm

A New View of Statistics. (2004). Retrieved 10-30-2004, from http://www.sportsci.org/resource/ststs/ttest.html

AreaConnect. (2004). *Altus City, Oklahoma Statistics and Demographics (US Census 2000)*. Retrieved 8-29-2004, from http://altus,areaconnect.com/statistics.htm

AreaConnect. (2004). *Duncan City, Oklahoma Statistics and Demographics (US Census 2000)*. Retrieved 8-29-2004, from http://duncan.areaconnect.com/statistics.htm

AreaConnect. (2004). *Lawton City, Oklahoma Statistics and Demographics (US Census 2000)*. Retrieved 8-29-2004, from http://lawton.areaconnect.com/statistics.htm

Bailey, G. D. (1997). What technology leaders need to know: The essential top 10 concepts for technology integration in the 21st century. *Learning and Leading with Technology*, *25*(1), 57-62.

Best, T. (2002). When worlds collide: introducing information technology culture to public education. *Educational Technology, 42*(4), 19-20.

Blase, J., & Blase, J. (2000). Effective instructional leadership: Teachers' perspectives on how principals promote teaching and learning in schools. *Journal of Educational Administration, 38*(2), 130-141.

Bolman, L. G., & Deal, T. E. (2002). Leading with soul and spirit. *The School Administrator, February*, 21-26.

Bowman, J., Newman, D. L., & Masterson, J. (2001). Adopting educational technology: implications for designing interventions. *Journal of Educational Computing Research, 25*(1), 81-94.

Brooks-Young, S. (2000). Taking the Lead. *Technology & Learning, 21*(5), 26-34.

Chin, S. S., & Hortin, J. A. (1994). Teachers' perceptions of instructional technology and staff development. *Journal of Educational Technology Systems, 22*(2), 83-98.

Conyers, J. G., Kappel, T., & Rooney, J. (1999). How technology can transform a school. *Educational Leadership, 56*(5), 82-85.

Cooley, V. E. (1999). Maximizing Technology: The Critical Questions. *School Business Affairs, 65*(2), 20-24.

Costello, R. W. (1997). The leadership role in making the technology connection. *T.H.E. Journal, 25*(4), 58-62.

Creighton, T. (1999). Spirituality and the principalship: leadership for the new millennium. *International Electronic Journal For Leadership in Learning*, 3. Retrieved February 9, 2003, from http://www.ucalgary.ca/~iejll/volume3/creighton.html

Cuban, L. (2001). *Oversold and Underused*. Cambridge: Harvard University Press.

Czubaj, C. A. (2002). Planning for Technology. *Journal of Instructional Psychology, 29*(1), 15-22.

Dias, L. B., & Atkinson, S. (2001). Technology integration: best practices-where to teachers stand?. *International Electronic Journal for Leadership in Learning*, Retrieved March 15, 2004, from http://www.ucalgary.ca/~iejll/volume5/dias.html

Eib, B. J., & Mehlinger, H.D. (1998). Technology in education: from segregation to integration. *High School Magazine, 6*(1), 10-15.

Flanagan, L., & Jacobsen, M. (2003). Technology leadership for the twenty-first century principal. *Journal of Educational Administration, 41*(2), 124-142.

Fulton, K., & Honey, M. (2002). Emerging technologies in education. *Educational Technology, 42*(4), 6-8.

Grotzer, T. A. (2002). Expanding our vision for educational technology: procedural, conceptual, and structural knowledge. *Educational Technology, 42*(2), 52-59.

Hall, G. (2001). Leading the charge. *Principal Leadership, 1*(9), 40-42.

Harlin-Fischer, G. C. (1998). *Perceptions of knowledge and skills necessary for elementary principals to implement inclusive special education programs.* University of Oklahoma, Norman.

Hodas, S. (1993). Technology Refusal and the Organizational Culture of Schools. *Education Policy Analysis Archives, 1.* Retrieved March 15, 2004, from http://epaa.asu.edu/epaa/v1n10.html

Holland, L., Moore-Steward, T. (2000). A different divide: preparing tech-savvy leaders. *Leadership, 30*(1), 8-10, 37-38.

Hughes, M., & Zachariah, S. (2001). An investigation into the relationship between effective administrative leadership styles and the use of technology. *International Electronic Journal For Leadership in Learning*, 5. Retrieved June 2, 2003, from Http://www.ucalgary.ca/~iejll/volume5/hughes.html

ISTE. (2002). *National educational technology standards for administrators*, from http://www.iste.org

Jacobs, M. M., & Langley, N. (2002). Profiles in Leadership. *American School Board Journal, 189*(9), 64-66.

Jones, C. A. (2001). Tech support: preparing teachers to use technology. *Principal Leadership, 30*(1), 35-39.

Kincaid, T., & Feldner, L. (2002). Leadership for technology integration: the role of principals and mentors. *Educational Technology & Society*, 5. Retrieved February 8, 2003, from http://ifets.ieee.org/periodical/vol-1-2002/kincaid.html

Lindsay, D. (2001). The principalship even more stressful, even more rewarding. *The Principal Advisor, May*, 4-8.

Lowther, D. L., Ross, S. M., & Morrison, G. M. (2003). When each one has one: the influences on teaching strategies and student achievement of using laptops in the classroom. *Educational Technology Research and Development, 51*(3), 23-44.

Marks, H. M., & Printy, S.M. (2003). Principal Leadership and School Performance. *Educational Administration Quarterly, 39*(3), 370-397.

Meyer, M. J. (2001). The principal's role in transition: instructional leadership ain't what it used to be. *International Electronic Journal for Leadership in Learning*, Retrieved June 2, 2003, from http://www.ucalgary.ca/~iejll/volume5/meyer.html

Molinaro, V., & Drake, S. (1998). Successful educational reform: Lessons for leaders. *International Electronic Journal For Leadership in Learning*, 2. Retrieved February 9, 2003, from http://www.ucalgary.ca/~iejll/volume2/Molinaro2_9.html

Nichols, M. (2002). Principals and practices of 21st century education. *Educational Technology & Society, 5*(2), 1-5.

Paben, S. (2002). What's in it for the busy leader?-help school leaders see how technology supports their school vision and they'll be more likely to commit the resources. *The Journal of Staff Development, 23* (1), 24-29.

Pallant, J. (2003). *SPSS Survival Manual*. Philadelphia: Open University Press.

Petersen, G. J. (1999). Demonstrated Actions of Instructional Leaders: An Examinations of Five California Superintendents. *Education Policy Analysis Archives*, 7. Retrieved February 9, 2003, from Http://epaa.asu.edu/epaa/v7nl8.html

Profiler. *Albany Diocesan Principals Technology Survey*. Retrieved 6-11, 2004, from http://profiler.hprtec.org/smf/survey.jsp?survey_id=1832

Profiler. *Plymouth public schools administrative self-evaluation of technology standards*. Retrieved 6-11, 2004, from http://profiler.hprtec.org/smf/survey.jsp?survey_id=1470

Profiler. *Principal's technology skills survey*. Retrieved 6-11, 2004, from http://profiler.hprtec.org/smf/survey.jsp?survey_id=243

Profiler. *TSSA survey for school principals*. Retrieved 6-11, 2004, from http://profiler.hprtec.org/smf/survey.jsp?survey_id=1263

Quinn, D. M. (2002). The impact of principal leadership behaviors on instructional practice and student engagement. *Journal of Educational Administration, 40*(5), 447-467.

Rankin-Erickson, J. L., Wood, L. A., Beukelman, D. R., & Beukelman, H. M. (2003). Early computer literacy: first graders use the "talking" computer. *Reading Improvement, 40*(3), 132-144.

Reiser, L. J. (2002). Professional development and other factors that contribute to the ability to integrate technology into curriculum. *Journal of Educational Technology Systems, 30*(4), 437-460.

Ross, J. A., Hogaboam-Gray, A., McDougall, D., & Bruce, C. (2002). The contribution of technology to the implementation of mathematics education reform: case studies of grade 1-3 teaching. *Journal of Educational Computing Research, 26*(1), 87-104.

Sandholtz, J., Ringstaff, C., & Dwyer, D. (1997). *Teaching with technology: Creating student centered classrooms*. New York: Teacher's College Press.

Scheidlinger, Z. (1999). Education calls for a new philosophy. *Educational Technology & Society,* 2. Retrieved February 8, 2003, from http://ifets.ieee.org/periodical/vol-3-99/zygmunt-scheidlinger-article.html

Scoolis, J. (1999). Infusing your curriculum with technology. *Thrust for Educational Leadership, 28*(4), 14-16.

Sellars, P. L. (1984). *A comparative study of school climate and the leadership style of school principals.* University of Oklahoma, Norman.

Shavelson, R. J. (1996). *Statistical Reasoning for the Behavioral Sciences*. Needham Heights: Allyn & Bacon.

Shellard, E. (2003). Defining the Principalship. *Principal, 82*(4), 56-60.

Spencer, K. (1999). Education technology - an unstoppable force: a selective review of research into the effectiveness of educational media. *Educational Technology & Society, 2*(4), 1-16.

State of Oklahoma Profiles 2003 District Report. (2003). Retrieved 8-29-2004, from http://www.SchoolReportCard.org

Tiene, D., & Luft, P. (2002). Examining the long-term impact of one-semester technology-rich classroom experience. *Educational Technology, 42*(5), 41-47.

UCLA Academic Technology Services. (2004). Retrieved 9/30/2004, from http://www.ats.ucla.edu/stat/spss/whatstat/whatstat.htm

United States Census. (2000). Retrieved August 29,2004, from http://areaconnect.com/statistics.htm

Williams, H. S., & Williams, P. N. (2000). Integrating reading and computers: an approach to improve ESL students reading skills. *Reading Improvement, 37*(3), 98-100.

Windschitl, M., & Sahl, K. (2002). Tracing teachers' use of technology in a laptop computer school: the interplay of teachers beliefs, social dynamics, and institutional culture. *American Educational Research Journal, 39*(1), 165-205.

WINKS Statistics Tutorial. (2004). Retrieved 10-30-2004, from http://www.texasoft.com/2groups.html

Wright, M. D. (1999). Technology education in the american school. *The Journal of Technology Studies, 25*(1), 1-13.

Young, B. J. (2001). Computer use profiles of 1,300 award-winning educators. *The Journal of Technology Studies*, 27. Retrieved March 15, 2004, from http://scholar.lib.vt.edu/ejournals/JTS/Summer-Fall-2001/young.html

Youngs, P., and King, M. B. (2002). Principal leadership for professional development to build school capacity. *Educational Administration Quarterly, 38*(5), 643-670.

Zhao, Y., Pugh, K., Sheldon, S., & Byers, J. L. (2002). Conditions for classroom technology innovations. *Teachers College Record, 104*(3), 482-515.

APPENDICES

APPENDIX A

	City A Number	Percentage	City B Number	Percentage	City C Number	Percentage
Population	21447	100%	22505	100%	92757	100%
Median Age (years)	31.6		40.3		28.9	
18 years and over	15058	70.21%	17081	75.90%	66943	72.17%
Male	7302	34.05%	7862	34.93%	35176	37.92%
Female	7756	36.16%	9219	40.96%	31767	34.25%
21 years and over	13997	65.21%	16245	72.18%	60484	65.21%
65 years and over	2462	11.49%	4541	20.18%	8609	9.28%
Race						
One Race	20626	96.41%	21913	97.37%	88186	95.07%
White	15574	72.62%	19426	86.84%	56897	61.34%
Black or African American	2233	10.41%	915	4.07%	21388	23.06%
American Indian and Alaskan Native	318	1.48%	889	3.95%	3534	3.81%
Asian	295	1.38%	106	0.47%	2285	2.46%
Hispanic or Latino	3699	17.25%	1349	5.99%	8719	9.40%
Households by Type						
Total households	7896	100.00%	9406	94.06%	31778	100.00%
Family household (families)	5627	71.26%	6420	68.25%	22521	70.87%
With children under 18 years	3070	38.88%	2706	28.77%	12599	39.65%
Married-couple family	4392	55.62%	5138	54.62%	16434	51.72%
With children under 18 years	2212	28.01%	1974	20.99%	8528	26.84%
Female householder with individuals under 18 years	920	11.65%	981	10.43%	4851	15.27%
With own children under 18 years	651	8.24%	576	6.12%	3323	10.46%
Households with individuals under 18 years	3326	42.12%	3005	31.95%	13760	43.30%
Average household size	2.62		2.35		2.61	
Average family size	3.14		2.88		3.12	
City School Ethnic Makeup (2002-2003)						
Caucasian		59%		74%		51%
Black		13%		8%		32%
Asian		2%		1%		2%
Hispanic		23%		11%		9%
Native American		2%		6%		7%
SCHOOL and DISTRICT ADMINISTRATION FULL TIME EQUIVALENT (2003-2004)						
School and District Administrators	20.2		20		82.9	
Average Salary of Administrators	$56,285		$62,511		$59,932	
Teachers per Administrator	14.5		10.8		12.4	
Classroom Teachers and Professional Support Full-time						
Regular Classroom Teachers	275.1		200.9		895.8	
Students per Regular Classroom Teacher	15.4		18.4		18.5	
Average Salary of Regular Classroom Teacher	$36,157		$34,669		$37,964	
Regular Classroom Teacher with Advanced Degree(s)		28.30%		26.20%		32.40%
Average Years of Experience-Reg.. Classroom Teachers	14.4		15.3		14.6	
Special Education Teachers	18		16		135.5	
Other Professional Staff	23		19.3		78.7	
Teacher Assistants	12.8		21.5		94.3	

United *States Census*. (2000). Retrieved August 29,2004,

APPENDIX B

Informed Consent Letter for Research being Conducted under the Auspices of
The University of Oklahoma-Norman Campus

September 22, 2004

Dear Educator,

I am a doctoral candidate under the direction of Dr. Jeffery Maiden in the Educational Leadership and Policy Studies Department at The University of Oklahoma-Norman Campus. I invite you to participate in a research study being conducted under the auspices of the University of Oklahoma-Norman Campus entitled, Educator Perceptions of Principal Technology Leadership Competencies, IRB# Fy2005-136, investigating the perceptions of Southwest Oklahoma educators regarding technology leadership competencies.

The study will investigate educators' perceptions of principal technology leadership competencies through the survey of principals and teachers in three Southwest Oklahoma school districts. Research, with your survey participation, will identify technology leadership competencies through the perceptions of professionals in public schools who know the expertise of technology leaders. The information gathered will help school districts nationally with staff development and technology integration. Technology integration is especially important in today's society since students must be technologically literate to enter into the job market or higher education studies.

Your participation will involve going online to take a survey on The SurveySuite website (http://intercom.virginia.edu/SurveySuite) or you may request a paper survey to be mailed to you by simply pressing the "mail survey" button on this email. It should only take 10-15 minutes of your time. Your involvement in the study is voluntary, and you may choose not to participate or to stop at any time. This survey is anonymous with school district and elementary educator, secondary educator, assistant principal, or principal as the only identifying information. The survey will be coded by you on-line at The SurveySuite website or by you if you are mailed the paper survey. You will be asked to self-code your district and position as instructed either on-line or on the paper survey. The identification is necessary for the statistical evaluation of the data. The results of the research study will be published, but your name will not be linked to responses in publications that are released from the project. In fact, the published results will be presented in summary form only. All information you provide will remain anonymous.

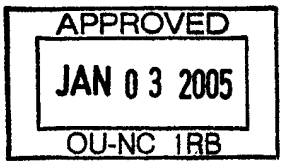
The data gathered will be maintained in a locked file cabinet at the investigators home, and on the hard drives of the investigator and doctoral committee chairperson. Only the investigator and the chair of the doctoral committee will be allowed to view the data. After the study is completed, the information on the SurveySuite website will be destroyed, the information on the investigator and doctoral committee chairperson's hard drive will be destroyed, and the paper information will be shredded for security.

The findings from this project will provide empirical information about technology leadership competencies from the perceptions of Southwest Oklahoma educators who work in public schools. The study will present information to districts across the state and beyond for principals to use when perfecting their technology competencies to use in their quest for effective technology integration. There will be no cost to you other than the time it takes to complete the survey. There are no foreseeable risks associated with this study beyond those present in routine everyday life.

By going to the website and completing the survey provided or by requesting and completing a mailed paper survey, you will be agreeing to participate in the above-described project. Please keep a copy of the Informed Consent Form
e-mailed to you or a copy of the Informed Consent Form mailed with the paper survey.

If you have any questions about this research project, please feel free to call me, Georgann Scott, at 580-429-3231 or email at escott@sirinet.net and Dr. Maiden at 405-325-1524 or email at maiden@ou.edu. Questions about your rights as a research participant or concerns about the project should be directed to the Institutional Review Board at The University of Oklahoma-Norman Campus at 405-325-8110 or irb@ou.edu.

Thank you for your participation and consideration.



Sincerely,
Georgann Scott
Doctoral Candidate
The University of Oklahoma

APPENDIX C

Table C
Pilot Study Results
First Analysis

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Lead 1	93.0909	45.0909	.4337	.8539
Lead 2	93.1818	44.9636	.6850	.8479
Lead 3	92.9091	45.8909	.4677	.8530
Lead 4	93.0000	45.0000	.5994	.8493
Learn 1	93.0000	46.0000	.4517	.8534
Learn 2	93.0909	45.8909	.4868	.8526
Learn 3	93.0909	44.0909	.7652	.8450
Learn 4	93.0909	46.8909	.3368	.8565
Learn 5	93.0000	43.0000	.9052	.8406
Produc 1	93.2727	49.0182	.0108	.8666
Produc 2	93.0000	45.6000	.5104	.8518
Produc 3	93.1818	47.1636	.3259	.8567
Produc 4	93.2727	45.8182	.4031	8547
Support 1	92.9091	48.0909	.1531	.8614
Support 2	92.9091	44.8909	.6158	.8489
Support 3	92.7273	45.0182	.6759	.8481
Support 4	92.8182	46.3636	.4155	.8544
Support 5	928182	44.5636	.6910	.8471
Assess 1	93.2727	46.6182	.4871	.8534
Assess 2	93.2727	46.6182	.4871	.8534
Assess 3	93.4545	49.4727	.0000	.8606
Assess 4	93.5455	52.8727	-.4706*	.8776
Sle 1	93.0909	43.8909	.7969	.8441
Sle 2	93.0000	44.6000	.6595	.8476
Sle 3	92.7273	46.6182	.4133	.8546
Sle 4	92.9091	45.6909	.4970	.8522
Sle 5	93.1818	47.5636	.2624	.8583
Multi 1	94.0000	47.0000	.1249	.8705
Multi 2	93.9091	49.8909	-.0942*	.8760

Reliability Coefficients
n of cases = 11 n of items 29
Alpha = .8595

*negative correlation item removed

APPENDIX D

Table D
Pilot Study Results
Second Analysis

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Lead 1	89.0769	52.9103	.3807	.8986
Lead 2	89.1538	52.4744	.6079	.8936
Lead 3	88.8462	52.8077	.5261	.8951
Lead 4	88.9231	51.5769	.6829	.8919
Learn 1	88.9231	52.5769	.5435	.8947
Learn 2	89.0000	52.0000	.6236	.8931
Learn 3	89.0000	50.6667	.8123	.8892
Learn 4	89.0000	53.3333	.4398	.8967
Learn 5	88.9231	49.9103	.9216	.8869
Produc 1	89.3077	56.7308	-.0123*	.9060
Produc 2	89.0769	54.7436	.2584	.9002
Produc 3	89.1538	54.3077	.3386	.8986
Produc 4	89.2308	52.8590	.4268	.8972
Support 1	88.9231	56.0769	.0759	.9038
Support 2	88.8462	52.1410	.6206	.8932
Support 3	88.6923	52.5641	.6573	.8931
Support 4	88.7692	53.1923	.5013	.8956
Support 4	88.7692	51.8590	.7004	.8919
Assess 1	89.1538	52.3077	.6328	.8932
Assess 2	89.1538	52.3077	.6328	.8932
Assess 3	89.3077	54.3974	.4328	.8971
Sle 1	89.0000	50.3333	.8602	.8882
Sle 2	88.9231	51.2436	.7300	.8909
Sle 3	88.6923	53.3974	.5221	.8954
Sle 4	88.9231	53.5769	.4068	.8974
Sle 5	89.1538	54.3077	.3386	.8986
Multi 1	90.0769	56.4103	-.0275*	.9166

Reliability Coefficients
n of cases = 13 n of items 27
Alpha = .8996
*negative correlation item removed

APPENDIX E

Principal Technology Leadership Competencies Survey

Section I. Professional Information

Mark the appropriate choice:

1.1. School district - Altus _____ Duncan _____ Lawton _____

1.2. Educator position - Principal_____ Assistant Principals _____

Elementary Teacher_____ Secondary Teacher _____

1.3. Years in educator position _____

1.4. Male/Female _____

Section II. Principal Technology Leadership Competencies

Please circle the extent 1 to 4 you think the competencies below are necessary for principals to be technology leaders in your school.

2. Leadership and Vision
How necessary is it that a principal:

2.1. Participate in an inclusive district process through which stakeholders formulate a shared vision that clearly defines expectations for technology use.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

2.2. Develop a collaborative, technology-rich school improvement plan, grounded in research.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

2.3. Maintain cohesion and momentum within the school community to reach the shared vision.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

2.4. Promote highly effective practices in technology integration among faculty and other staff.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary
2.5. Additional comments on the area of Leadership and Vision: _____
_____
_____
_____

3. Learning and Teaching
How necessary is it that a principal:

3.1. Identify, use and evaluate appropriate technologies to enhance and support curriculum and instruction that lead to high levels of student achievement.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

3.2. Facilitate and support collaborative technology-enriched learning environments conducive to innovation for improved learning.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

3.3. Assist teachers in using technology to access student performance data, interpret student performance data and modify instruction as needed.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

3.4. Collaboratively design, implement, support, and participate in professional development for all instructional staff.

3.5. Provide professional development that establishes the effective integration of technology for improved student learning.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

3.6. Additional comments on the area of Learning and Teaching: _____
_____
_____
_____

4. Productivity and Professional Practice
How necessary is it that a principal:

4.1. Create and participate in learning communities that stimulate, nurture and support faculty and staff in using technology for improved productivity.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

4.2. Use a variety of media and formats, including telecommunications and the school Website, to communicate with peers for collaboration and interaction.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

4.3. Use a variety of media and formats, including telecommunications and the school Website, to communicate with experts, and other education stakeholders.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

4.5. Additional comments on the area of Productivity and Professional Practice: ___
_____
_____
_____

5. Support, Management, and Operations
How necessary is it that a principal:

5.1. Maintain awareness of emerging technologies and their potential uses in education.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

5.2. Allocate financial and human resources to ensure full implementation of the technology plan.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

5.3. Provide school wide staff development for sharing work and resources across commonly used formats and platforms.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

5.4. Advocate for and attain high quality technology support services.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

5.5. Advocate for and attain high quality technology support services in a timely manner.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

5.6. Additional comments on the area of Support, Management, and Operations: ___
_____
_____
_____

6. Assessment and Evaluation
How necessary is it that a principal:

6.1. Use multiple methods to assess and evaluate appropriate uses of technology resources for learning, communication, and productivity.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

6.2. Assess staff knowledge, skills, and performance in using technology and use results to facilitate quality professional development.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

6.3. Implement evaluation procedures for teachers that assess individual growth toward established technology standards.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

6.4. Additional comments on the area of Assessment and Evaluation: _____
_____
_____
_____

7. Social, Legal, and Ethical Issues
How necessary is it that a principal:

7.1. Ensure equity of access to technology resources that enable and empower all learners and educators.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

7.2. Secure technology resources that will enable teachers to better meet the needs of all learners and educators.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

7.3. Adhere to and enforce among staff and students the district's acceptable use of policy and procedures related to security, copyright, and technology use.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

7.4. Participate in the development of school plans that support safe practices related to health and the use of technology.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

7.5. Participate in the development of schools plans that support safe practices related to the environment and the use of technology.

1-not necessary 2-somewhat necessary 3-necessary 4-very necessary

7.6. Additional comments on the area of Social, Legal, and Ethical Issues: _____
_____
_____
_____

APPENDIX F

Table F
Qualitative Comments by Principals

Leadership and Vision

- Unless everyone works together to use technology as a tool for increased student achievement the vision will only be on paper. The children will go to school living in the 20th century while living at home in the 21st century!
- In order to promote effect instruction the plan must be collaborative. Without buy-in buy the staff the plan will remain simply a plan.
- A principal having a vision for their school is the first prerequisite for being successful.
- Leadership needs to model the expectation of the vision.

Learning and Teaching

- Inclusion of the use of technology must be evident in all training and departmental strategies. Technology must be the basis of all plans in order to be effective.
- We must remember that technology is very important but research shows that the number one indicator of student success is the TEACHER!!!!!

Productivity and Professional Practice

- Any form of technology that improves job performance is important.
- I think technology is a great extra tool for teachers, as long is they do not become dependent on the computer to teach.

Support, Management, and Operations

- Cutting edge technology is worse than useless if it doesn't work. Technological support must be timely and comprehensive if new technology is to be embraced.

Assessment and Evaluation

- You must remember that not all of the experienced teachers have a technology background, but are very effective teachers. When you start using technology skills as a standard for teachers on an evaluation tool, some older teachers will not score well, however they are quality teachers in the classroom. Some are technology challenged.

Social, Legal, and Ethical Issues

- What is the question? Yes, we want our students to be safe and healthy. Can we monitor what they eat and how much exercise they get daily. Yes, we could, but will they help our schools pass the required testing and other state mandates. No, but maybe I reading the question wrong, but we have a lot to cover in a short period of time. Technology is so important, but what you learn from technology is the answer, because we can have all the studies and information, but forming that information into what the student needs is the true task along with all the other required subject material. Technology is a teaching tool, but I would take a good teacher over all the technology, because that computer cannot hug my students when they need one.

APPENDIX G

Table G
Qualitative Comments by Teachers

Leadership and Vision

- Professional days should be allowed, so that teachers do not have to use the little free time we have during the school year.
- Consistency is vital.
- Very definitely needed at all grade levels both elementary and secondary.
- Without more input into the district policy there will not be much improvement
- The key is communicating the vision in such a way that it is shared by all involved.
- Why does this district have enough people to write grants? I talk to other districts, and they receive tremendous amounts of grants to improve technology. I believe that this district is behind in that column.
- Ownership in the beginning is vital; thus, I think everyone sharing in the formulation of the vision is very necessary. After that beginning stage, a little "chaos," a few "problems," are very valuable to the process; an expectation that there be cohesion and momentum seem somewhat unimportant.
- Just because I think it is necessary, does not mean we do.
- I think it is very important for the Principal to support technology use in a building for it to be strongly emphasized.
- I believe you have to have an effective leader in order for any vision to be fulfilled.
- to be able to compete in the world market, technology is the key
- Unless the principal is involved in all areas, the foregoing is moot. teachers will follow his/her lead.
- I do not see technology in each classroom as a positive thing when our technology dept. cannot keep with the demand for help or repairs. The computers cannot be kept up to date due to the expense involved.
- Know your field of education.
- The more money for computers and fees for educational web sites (brainpop and the like) is needed before district wide plans can be made. Techno teaching doesn't work if the hardware isn't available.

APPENDIX H

Table H
Qualitative Comments by Teachers

Learning and Teaching

- Relevant professional development seminars are worth the investment.
- If teachers are not willing to learn new technology they should not expect their students to be willing to learn ...
- Not only have professional development for this but needs to have follow up 30 minute sessions for several sessions to answer any questions the teachers have or to assure understanding of programs and uses.
- My two children, ages 13 and 9, pick up on all things technological like I used to pick up a basketball after school: effortlessly and eagerly. Their generation takes to it so easily. My generation doesn't. Therefore, training teachers is vital.
- Our computers are old and are just word processors.
- Professional Development is essential!!!!
- The professional development needs to meet the needs of each teacher. Sometimes this may mean that the teacher goes out of district for this.
- We first must train the administrators and teachers in the effective use of available technology and grow beyond the use of games in our "teaching" of technology. Our students are very well versed in game playing, we must teach them how to effectively use technology to help them reach their academic goals.
- I believe all teachers need to have an open mind and willing to teach to all students.
- The tools are of no use to us if we, as teachers, are unable to use them efficiently
- Students on any level in education are more skilled than teachers who graduated High School in the 80's and before.

APPENDIX I

Table I
Qualitative Comments by Teachers

Productivity and Practice

- Funding must be adequate to support a technology-rich learning environment. I have not seen this in Oklahoma.

- Be careful, in many cases, the vision becomes the technology rather than the method to articulate it.

- We should not be required to reinvent the wheel and through sharing you learn what works and what doesn't work for others so everyone benefits

- Our district has improved in this area.

- We need to move into the directions that encourage effective teaching.

- When is there time to communicate with anyone? Classroom teachers are so overloaded with NCLB testing that there is no time for much of anything else.

- There are many ways to communicate. Some are more effective than others are and some may never reach into the homes of children who do not have a computer in the home. Other children who have computers in the home, may benefit greatly from the technology based communication

APPENDIX J

Table J
Qualitative Comments by Teachers

Support, Management, and Operations

- Support currently is limited. Finding a knowledgeable peer is often difficult.
- I have seen technology in place in the schools without tech support services... It is a disaster.
- The mission is instruction of students, not how attractive the web page is.
- This past year the district attempted to implement the Chancery grade book because of lack of support on Chancery side we have not been able to fully implement it ... the district should have support in place before requesting teachers to learn a new recording system
- In Altus Jr. High, at any given time, about one-third of the computers in the 8th grade computer lab don't work. This is very frustrating to students and to me as a teacher who sends my students to the lab expecting them to work. Maintaining equipment and resources is vitally important.
- Support services are essential!
- Our technicians must understand the importance of using and maintaining the resources we have available and be willing to train "on-site" personnel to aid in the maintenance of these resources instead of requiring complete control of everything from a remote site. What good is technology if you are required to put in a work order, wait for a technician to come and evaluate the "problem", then the technician does not have the proper tools or "permission" to fix the problem on that visit, so they must go back to the remote site, obtain whatever is needed to complete the request (sometimes that being only "permission" by the coordinator) and another trip is made when it can be rescheduled. At the rate technology changes today, waiting for the above process to work might find the technology "out of date" by that time.
- We need to encourage high quality teaching in all matters.
- Technologies are wonderful when they work properly. Available techs are the key to keeping things going smoothly.
- High quality technology also calls for "high dollar input". The community needs to be aware of the need for these resources.
- Once again, our districts are so strapped for money to educate the students there is no extra money for the support staff for a good technology system.

APPENDIX K

Table K
Qualitative Comments by Teachers

Assessment and Evaluation

- Most teachers will answers honestly about what their need are in areas of training.
- It is time for Oklahoma to come into the twenty-first century. Our students will be behind the technology curve if we do not become technology-minded in our education of our young people.
- Give the staff freedom to experiment and use the technologies that best fit the student's needs and the staffs comfort level. In the past the latest technology has been forced on the staff at the expense of individual creativity.
- Some teachers will not even try to learn new technologies unless it is "required" others will ... teachers should be shown the benefits of the new technologies
- I believe that the leader of the school need to make sure that all teachers are implementing new ideas with technology.
- There is enough stress in the school system today regarding accountability.
- Workshops and other means of informing teachers of the "how to" of using these methods of evaluation is vital.
- Teachers don't any time to spend on this kind of stuff. Many times technology ends up taking more time than the "old fashion" way of doing things because the system does not work the way it is supposed to.
- Use multiple methods to assess and evaluate appropriate uses of technology resources in regards to the effectiveness of subject mastery.
- This must be done in a nurturing way, not a job threatening way. Some avoid the use of certain web-based instructional options due to implied actions that threaten the instructor's career.

APPENDIX L

Table L
Qualitative Comments by Teachers

Assessment and Evaluation

- Most teachers will answers honestly about what their need are in areas of training.
- It is time for Oklahoma to come into the twenty-first century. Our students will be behind the technology curve if we do not become technology-minded in our education of our young people.
- Give the staff freedom to experiment and use the technologies that best fit the student's needs and the staffs comfort level. In the past the latest technology has been forced on the staff at the expense of individual creativity.
- Some teachers will not even try to learn new technologies unless it is "required" others will ... teachers should be shown the benefits of the new technologies
- I believe that the leaders of the school need to make sure that all teachers are implementing new ideas with technology.
- There is enough stress in the school system today regarding accountability.
- Workshops and other means of informing teachers of the "how to" of using these methods of evaluation is vital.
- Teachers don't any time to spend on this kind of stuff. Many times technology ends up taking more time than the "old fashion" way of doing things because the system does not work the way it is supposed to.
- Use multiple methods to assess and evaluate appropriate uses of technology resources in regards to the effectiveness of subject mastery.
- This must be done in a nurturing way, not a job threatening way. Some avoid the use of certain web-based instructional options due to implied actions that threaten the instructor's career.

Social, Legal, and Ethical Issues

- We do not need to mandate that teachers be in more committees/groups/etc. to be more involved in technology. We need to make helpful technology available to all teachers and teach them how to use it effectively. Technology is not the biggest concern of educators. It can be an effective teaching tool.