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A STUDY OF TECHNOLOGY IMPLEMENTATION
IN TWO SCHOOL DISTRICTS:
THE DYNAMICS OF LEADERSHIP AND CHANGE

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at
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ABSTRACT

This qualitative case study investigated the role administrative leadership plays in organizational change related to the infusion of technology into district programs and pedagogical practices. School districts have been engaged in a struggle to incorporate new generations of technological advancements in meaningful ways for their students. Instructional reform and measurable performance-based outcomes are frequently conflated with the pressure to implement effective technology programs that ensure the No Child Left Behind federal mandates are met while ensuring judicious use of district funds. While technology has the potential to transform the educational process, it must align with the cultural uniqueness of the local learning community.

This study investigated how educators, who are committed to technology programs in schools, dealt with differing attitudes, beliefs, interests, and aptitudes for change. The study used leadership research to examine two school districts, one rural and one suburban, that have undergone significant changes by infusing technology into their curriculum. It examined their staff development approaches and garnered insight about how to accomplish such a change in a responsible, forward-thinking way.

Qualitative research methods were used to examine how leadership, change, and staff development might be related and how individuals dealt with change. The findings suggested that: (a) educators should understand that there is more than one way to implement successful technology programs, (b) leadership can play a significant role in the change and staff development efforts, and (c) staff development programs should involve support activities among the members of the learning community. This case study provides the basis for further investigation into how supportive relationships and collaborative efforts help individuals create learning communities that can effectively embrace organizational changes.

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CHAPTER ONE

INTRODUCTION

Statement of the Problem

Since the 1970s, the use of classroom computers and other new technology has taken many different forms. It has been a true technological revolution as school districts have been engaged in a struggle to keep up with each generation of change and to assimilate those changes in meaningful ways for their students. As Jeffrey Fouts (2000) wrote, "there has been an evolution of best practices" (p. i). For many educators, the challenge is finding the most effective way to incorporate the changes, and indeed, to keep up with them.

There are numerous steps a district must go through before moving forward with a technology project. "Selecting technologies that are cost-effective and provide measurable impact on teaching and learning is a challenge, and the process doesn't stop after the technology has been placed in the hands of students, teachers and support staff" (Northeast and the Islands Regional Technology Consortium [NEIRTEC] Project, 2002, p. 28). Districts must determine how they define technology and whether or not they need it; they have to decide how to incorporate technology into their classrooms effectively; they must

train students and staff to utilize the technology; they need to deal with questions about if, how, and when to involve the community in the changes; and, districts need to determine how to maintain and support the technology they acquire. Not to be forgotten are funding issues surrounding the entire project (Texas Education Agency [TEA], 2002; Consortium for School Networking [CoSN], 2001; Rothstein and Russell, 1998).

Because technology programs can be extremely costly, school district leaders feel the pressure of ensuring they are implementing a meaningful technology program that will be used on a daily basis and reach all students. The authors of the CoSN (2001) guide to technology planning note, "America's investment in educational technology could fall short of its expected return or even produce a backlash against spending additional dollars on new technology" (p.3). This possibility has many educators looking to others who have gone before them to find a successful model that can be implemented in their local district. Some educators publish technology plans that are meant to be road maps for others to use when establishing their own programs. Other educators eschew formal plans for a more casual "know as you go" approach (TEA, 2002).

School districts' staffs usually have their own ideas and definitions about technology and how their programs should look (Fouts, 2000). Some districts are fearful to take on a significant change effort due to failed efforts

of the past and the residual suspicion and distrust that those efforts have left in their wake (Oppenheimer, 1997; Bransford, Brown, & Cocking 1999).

However, other educators acknowledge the importance and value of new technologies and are looking for unique ways to implement programs according to their own particular contexts and needs. They realize attitudes, values, interests, and aptitude for change play critical roles in a program's success or failure. In addition to limited funds, a complex and challenging environment toward significant change exists when all of the above is conflated with each district's unique political milieu and context.

Despite these complexities, computers and other technologies have the potential to transform the educational process and the people engaged together in that process. This study examined two school districts that have embarked upon efforts to bring about significant changes in the field of education through the infusion of technology into their formal curriculum. It compared their staff development programs in an attempt to garner insight about how to accomplish such a significant change in a responsible, forward-thinking way. It critically examined these efforts, similar and yet different, that intersect at the crossroads of change.

The investigator compared the different approaches of incorporating technology into classrooms. The comparison

focused specifically on how leadership and change might be related and how individuals interpret change. Leadership, as used by the investigator, is defined as, "an influence relationship among leaders and collaborators who intend real changes that reflect their mutual purposes" (Rost, 1991, p. 102). Ideas about change were drawn from Fullan (2001a and 2001b) and others (Kotter, 1996; Kotter, 1995/1998; Duck, 1993/1998; Schaffer and Thomson, 1992/1998; Strebel, 1996/1998). The consistent theme is that successful change involves the development of relationships among all those involved in the change effort and not simply the imposition of a top-down edict.

Each setting was observed from several different vantage points and individuals from all levels of their district's project were interviewed. The study resulted in several possible approaches for others to modify and use within their own context. The results could provide an opportunity for growth for all the learning community's members.

Background of the Problem

Most people would agree that students of the twenty-first century should be familiar with computers and other similar technology and be fairly competent in their use and utility Secretary's Commission on Achieving Necessary Skills [SCANS] Report, 1991). In addition, teachers and administrators are facing pressing demands to know how to access, analyze, and utilize student performance data using

computers and other technology. Table 1 shows some of the issues educators face when considering embarking on a technology project.

Sample Technology Implementation Worksheet

Cost Item	Initial Costs Per School	Ongoing Costs Per School	Initial Costs Per Student	Ongoing Costs Per Student	Funding Resources	Staffing/ Support
Lab Computers						
Classroom Computers						
Laptops						
Handhelds						
Scanners						
Printers						
Digital Recording Devices						
Projectors						
Furniture						
Television monitors						
Other support materials/ equipment						
Software						
Professional Development						
Infrastructure						
Security						
Total Costs						

Table 1. Sample of issues to consider when embarking on a technology implementation project (TEA, 2002; CoSN 2001, NEIRTEC, 2002; Technology Information Center for Administrative Leadership [TICAL], 2003).

These issues were developed following a review of research related to effective technology planning (CoSN, 2001; NEIRTEC 2002; TEA, 2002; TICAL, 2003). While many individuals agree that technology use can be a vital tool for education, from that point of common ground grows a tree with many branches.

The facilitation of computer implementation projects is a difficult task. Many implementation efforts have failed to reach expectations in school districts that seemed to have all the logical components in place: appropriate budget for the necessary hardware, ongoing staff development, technical assistance to help with the implementation, support teams of teachers, student experts, and perhaps even outside consultants. Why do many efforts fail, or more accurately, how can we implement a technology program that will significantly and responsibly create a difference for our teachers, students, and school communities?

The reasons technology implementation efforts fail are numerous and are similar to the reasons many other organizational changes do not succeed. Kotter (1996) found that powerful forces are at play to frustrate and disrupt change efforts. He identified issues of allowing too much complacency, failing to create a powerful coalition, moving forward without a vision, undercommunicating the vision, permitting obstacles to block the new vision, failing to create short-term wins, declaring victory too soon, and

neglecting to anchor changes firmly to the culture as the most common mistakes made in transformation efforts.

Others (Bolman and Deal, 1997; Strebler, 1996; Fullan and Stiegelbauer, 1991), have identified the importance of group commitment and the enlistment of the individual as critical aspects of creating successful change.

The study examined current efforts to counteract the powerful forces of failure with the goal of creating effective technology programs. A postmodern critique provided the intellectual backdrop for the study and potentially leads to provocative insights regarding how communities learn (Senge, 1990; Starratt, 1996), and how critical a part communication plays in respect to organizational growth and survival (Bergquist, 1993). Postmodern thought encourages us to believe that there is more than one way to "do technology" and offers ideas that help us look beyond the obvious need to prepare students for the future toward ways to encourage unity among the members of the learning community now. Postmodern thought helps us see that technology can enable students to discover meaning in their world, teachers to extend themselves and continue their own personal growth, and the community to be involved in the learning opportunity and to develop a sense of unity with their local school.

Importance of the Study

Educators are looking for ways to help teachers implement computer technology into their classrooms

effectively (Dwyer, 2000; Fouts, 2000). The types of technology have changed and will continue to change, but keeping educators informed about those changes and how and when to incorporate the changes remains a troublesome dilemma. Because this study has examined two different technology implementation projects, it allows educators to compare and analyze the potential benefits of similar approaches to their own staff development programs. Many effective efforts to incorporate computers in schools have led educators to believe that there is one correct way in which to successfully use computers and other technologies in their classrooms. By looking at this situation through the lens of postmodern thought, this study provides a way to uncover a multi-dimensional approach to staff development and training with respect to computers and their effect on the learning community as a whole.

Purpose of the Study

The purpose of the study was to examine the dynamics of leadership and change as they are applied to the task of training teachers to utilize computer technology in their classrooms. The investigator learned from teachers and administrators about their involvement in the implementation of a technology program. The research questions which have guided the study are:

1. What role did leadership play in the implementation of a school district's technology program?

2. What role did leadership play in the school's change process?
3. What role did leadership play in the school district's staff development program?

Assumptions Related to the Study

In preparing for this case study, the researcher, following a thorough review the literature, assumed the following were true in the majority of schools:

1. Most respondents will agree that students of today should be familiar with computers and fairly competent in their use.
2. Most respondents will feel positively toward technology in general but would express an initial level of concern or anxiety about it.
3. Most educators will express a frustration with the lack of time and a sense of overload in terms of new skills to learn.
4. Most respondents will enjoy working with others when dealing with a significant change.
5. Effective technology programs have more postmodern leadership involved than ineffective technology programs.
6. Relationships are important to individuals going through the change process.

Limitations of the Study

The study focused on the qualitative aspects of implementing computer technology in the two school districts as opposed to a quantification of data relating to staff utilization. The study's primary thrust was to explore the impact of human interaction and support rather than on degree of mastery by either individuals or groups of individuals.

Summary

Educators are engaged in a struggle to implement technology programs effectively. The challenge is a significant one given the pace of technology change, constraints of limited funding, time demands, training challenges, and other issues found within the local context. Infusing technology into the curriculum in a meaningful way usually involves changing teachers' attitudes, instructional methodologies, and planning strategies. Educators in many school districts have been frustrated by these challenges and want to make the most of their educational technology investment.

This investigation explored the technology implementation efforts of two school districts and examined the approaches they took to meet the staff development needs they encountered. The role of leadership was investigated in an effort to garner insight into how, if at all, leadership played a part in the successful staff development efforts of the two districts.

Explanation of Terms

To help focus the design and perceptions developed throughout this study, the researcher used the following definitions to ground key concepts:

Learning Community - a group of inquirers who accept that knowledge is always partial and fallible and who support the enrichment of knowledge through sharing of meanings, interpretations, and learnings among all members (Starratt, 1996).

Leadership - an influence relationship among leaders and collaborators who intend real changes that reflect their mutual purposes (Rost, 1991).

Postmodernism - a body of thought that explores divergent ways of understanding the old and new and attempts to create a different, more inclusive way of interacting with the diverse and chaotic world (Gillespie, 1997).

Staff Development - professional development that is designed to be an integral, ongoing part of teachers' lives, focused on improving student learning outcomes, based on inquiry into teaching and learning, and built on interactions within professional learning communities (NEIRTEC, 2000).

CHAPTER TWO
REVIEW OF LITERATURE

Introduction

Education is a unique profession in that many non-educators can be heard offering opinions about the field based only on their own experiences in school. Professional educators, however, realize the answers to myriad educational dilemmas are not so easily possessed. On the other hand, the field of education is similar to many other professions that have also been afflicted with the postindustrial blues. It seems nothing is as clear or simple as it once was. Change is flying at us at the speed of light and its scope is exponential. Both in and out of education, we are in a constant state of flux and transition (Bolman & Deal, 1997; Fullan, 2001a, 2001b; Goss, Pascale, & Athos 1993/1998; James, 1996).

The good news is that there has been a renewed level of intellectual discourse about the interplay of change and the current human condition. This study examined some of the literature pertaining to several key concepts: leadership, relationship, and change in hopes of discovering a useful connection that would allow educators and others to develop new thoughts about the challenges they are encountering. A review of the literature helped

discover opportunities to view our colleagues and ourselves in a different, more auspicious light.

Computer Use in Schools

Educators have experienced many evolutionary stages while attempting to keep pace with technological innovations (Gibson, 2000). At times, school district personnel have been haphazard in their search for the best way to incorporate technology into the curriculum. Their struggles are apparent in the many technological trends schools have embraced. Fouts (2000) wrote:

Over the past several decades technology has been used in a variety of ways for a variety of purposes.

Researchers have employed varying research methods in an attempt to understand the role that technology can and does play in the education of children. (p. 5)

Past Computer Trends in Schools

During the 1970s and 1980s, some educators agreed with the public that students should be computer literate, and they began learning about the inner workings of computers and delving into the understanding of programming languages (Fouts, 2000). They sought to teach students these concepts, believing that the only way to utilize this valuable tool was to know how to build one from scratch.

During the next phase, networked labs, computer-aided instruction (CAI), and Integrated Learning Systems (ILS) with their prepackaged curriculum became the preferred way to bring technology into schools. Computers became tutors

and surrogate teachers (Fouts, 2000). Students were placed in front of computers to teach basic skills, practice new learning, or to reinforce concepts.

School district administrators and technology committees typically decided upon the hardware and software packages that would best fit their districts' identified technology needs. Major purchases of equipment and software were placed in classrooms and labs, and teachers were provided limited training at best on how to make the most of their new computers. Very often, school boards and district office administrators clearly delineated expectations of how and when these computers were to be used, and monitoring systems were established for ensuring that the taxpayers' investment was being put to good use.

The next phase began when educators started searching for ways to more closely tie what the children were doing on the computer during their limited time to real world learning situations (Hawkins, Panush, & Spielvogel, 1996). Many educators tentatively broke free from the prepackaged curriculum offerings and began exploring programs where students could apply their skills to meet a compelling learning need or outcome; for example, presenting an in-depth report, analyzing and writing conclusions about a mathematics problem, or engaging in an interactive debate about a social dilemma. Teachers who believed that computers were more than electronic textbooks began to push for something more (McCain & Jukes, 2001).

In many classrooms, there has been a shift from a teacher-centered instructional delivery approach to one in which the teacher is the facilitator of instruction; one who establishes a new learning environment that uses technology to help students access, analyze and use information (ISTE, 2000). Students in these technology-rich environments actively participate in acquiring learning, rather than serve as passive recipients of facts and information. ISTE provided the following comparison of the student's traditional learning environment brought about through the provision of a technology-enriched learning environment (p.5):

<u>Traditional Learning Environment</u>	<u>New Learning Environment</u>
Teacher-centered instruction	Student-centered instruction
Single-sense stimulation	Multisensory stimulation
Single-path progression	Multi-path progression
Single media	Multimedia
Isolated work	Collaborative work
Information delivery	Information exchange
Passive learning	Active/exploratory/inquiry-based
Factual, knowledge-based	Critical thinking/decision-making
Reactive response	Proactive/planned action
Isolated, artificial context	Authentic, real-world context

Unfortunately, some educators have experienced failed efforts to bring technology into schools and witnessed the sporadic use of this technology (Bransford, Brown, & Cocking, 1999; Fouts, 2000). In these districts, limited

teacher participation has taken place prior to having computers placed in their classrooms. It is often assumed that because computers are generally perceived as good for students, teachers will eagerly embrace these machines. This has not always been the case. Computers have been used intermittently after the regular business of teaching is done. At best, some teachers use the computer to reinforce what is being taught in the textbooks, and at worst, teachers do not use them at all, turning them on only when administrators are due for a visit (Honey, 2001; Means, 1998; Valdez, et al, 2000).

Current Computer Trends in Schools

Some educators have begun to incorporate computers and other technologies as part of the strategic teaching process taking place in their classrooms (Dwyer, 1995). According to Fouts (2000), "In the past decade the use of the computer and related technologies has expanded from use primarily as an instructional delivery medium to technology as a transformational tool and integral part of the learning environment" (p. 9). Teachers can use technology to facilitate critical thinking, problem solving, and reasoning - some of the skills identified by the SCANS Report (1991) as necessary for workplace competency.

Teachers now can make instructional delivery decisions based on technology-generated assessments and analyses. Educators can look for the proper technology tool to incorporate higher-order thinking skills into their lessons

(NEIRTEC, 2002; Dwyer, 1995). When these educators gather to discuss the emerging classroom, they are challenged by the variety of technologies available to enhance what they can offer their students. They are beginning to rethink their very role due to the changing way information is accessed, organized, analyzed, and presented. According to Dwyer (1995):

Instead of talking about computers . . . we talk about learning. We describe what happens when students use technology as a tool for building their own knowledge - and examine the impact on the kinds of skills they develop. We discuss how teachers can use technology to create more challenging learning environments - and suggest a staff development process that can facilitate that. And we explore ways to deepen our understanding of how technology can be used as a tool for learning. (p. 7)

According to several researchers, there has been insufficient investigation conducted into the effectiveness of technology to improve student achievement (Means, 1998; Fouts, 2000; Shaw & PCAST, 1998, Valdez, et al, 2000). However, Fouts made the following observation:

An emerging body of evaluation research in the last three years gives support for the contention that computers and technology can be important for reforming education and that it has the potential to alter or transform classrooms, changing what and how

teachers teach and the types of activities in which students engage. Most, if not all, of this research is qualitative in nature, usually program evaluations conducted in technologically rich environments and in a variety of educational settings. (p. 14)

Valdez et al (2000) concluded:

Technology innovations are increasing the demand for reforms in teaching and learning approaches that, in turn, are having a significant impact on technology use expectations. In addition, the linkage between teachers' professional development in appropriate uses of technology and increased student achievement is very strong (p. 1).

The NEIRTEC (2002) report states, "It is clear that technology tools and resources must become an integral part of both the teaching and learning process if they are to have an impact on student achievement" (p. 1). The task of working with teachers to make this significant change in a responsible way has become the challenge of leadership. The task involves educators engaging in a mutually-agreed upon relationship that is supportive and beneficial.

Currently, several resources exist that can assist educators as they pursue effective ways to incorporate technology into their schools. Collaborative projects of interested stakeholders have been formed to help pool ideas, creativity, resources, and information. Among the collaboratives are: the Collaborative for Technology

Standards for School Administrators (TSSA), the International Society for Technology in Education (ISTE), the Technology Information Center for School Administrative Leadership (TICAL), and the Consortium for School Networking (CoSN).

Taking a lead in identifying the learning/teaching linkage between technology and pedagogy, the International Society for Technology in Education (ISTE, 2000), has published technology standards for students, which parallels the change effort to establish academic standards for students throughout the field of education. The standards are an effort to connect curriculum and pedagogy with technology use. According to ISTE:

Curriculum integration with the use of technology involves the infusion of technology as a tool to enhance the learning in a content area or multidisciplinary setting. Technology enables students to learn in ways not previously possible. Effective integration of technology is achieved when students are able to select technology tools to help them obtain information in a timely manner, analyze and synthesize the information, and present it professionally. The technology should become an integral part of how the classroom functions—as accessible as all other classroom tools. (ISTE, 2000, p. 6)

The TSSA Collaborative (2001) has established and published technology standards for administrators. "The Collaborative's standards. . .focus on the role of leadership in enhancing learning and school operations through the use of technology" (p. 3). In a related effort, ISTE (2000), working with the U.S. Department of Education, has published national technology standards for students. These collaborative efforts seek to contribute to the significant change technology can bring to the classroom.

The current phase of technology implementation represents the greatest challenge to date: the connection and interplay of leadership, relationship, and change within the educational community. What follows is an examination of each of these ideas through the lens of traditional thought and the lens of postmodern thought.

Ideas About Leadership

Popular thought about leadership - how it is defined, who leaders are, and how leadership is performed - is evolving in the postmodern world (Christie & Lingard, 2001). In the educational setting, the collaborative approach has moved beyond a new or unusual way of making decisions to an expected method of establishing processes and procedures (Fullan, 2001b; Gordon, 2001; Huffman & Hipp, 2000; Krueger, 2002). Collective bargaining units have a strong foothold in the way the educational business is conducted. Collaboration and cooperative decision-making can be seen throughout the school environment:

School Site Councils, parent advisory groups, representative task force groups, leadership teams, and various committees. These endeavors, now established in the educational culture, have created a need for new thinking about the idea of leadership (Fullan 2001a).

Traditional Ideas About Leadership

Educational leaders have often been involved in a "search for the one best way, method, process, or system" to accomplish their outcomes (English, 1994, p. 117). Many leaders embrace Frederick Taylor's "scientific management" method as good leadership because this systematic approach encourages the production of a definable, consistent product (Klempen, 2003).

One writer described his leadership philosophy as "The Rational Approach" (Klempen, 2003). He wrote, "Using a rational approach . . . is about thinking in a logical, systematic way about problems and decisions" (p.24). This kind of thinking about technology implementation projects means that by controlling the variables and quantifying the amount of time teachers spend on computer instruction per day per student a predictable amount of learning will be achieved. In an effort to achieve this standardization, configurations, flowcharts, stages, and performance standards have been developed and administrators trained in evaluating teachers' delivery of computer instruction.

Others hold firm to the "great man/woman" view and believe that leadership means doing the wishes of the all-

powerful leader figure (Christie & Lingard, 2001; Heifetz, 1994; Rost, 1991). These leaders are seen as agents of change and greatly influence others by using his or her will and the power of persuasion (Bass 1981, Sergiovanni 1989). Gardner (1986) endorsed this view of leadership by stating that the leader "induces a group to take action ... in accord with the leader's purposes" (p. 6). The idea of influencing a group to do the leader's wishes also extends to the organization as a whole. Peter Senge pointed out in his book, *The Fifth Discipline* (1990) "leaders are responsible for *building organizations* [italics his] ... that is, they are responsible for learning" (page 340). These leaders use their influence to create obligatory changes in the way teachers implement computer programs in schools. The leaders believe that computer fluency is critical for their students' success in life, and therefore, they expect teachers to buy into the idea of computer literacy for everyone. Teachers have often been expected to take classes on their own time or required to attend district-sponsored classes to acquire the necessary proficiency.

Another idea of leadership holds that there is a definable set of traits that leaders possess which allow them to excel above others. Many authors have attempted to describe leadership in this manner and were among those who wrote about the various traits leaders should possess in order to influence and successfully lead others (Bennis &

Nanus, 1985; Donaldson, 2001; Dyer & Carothers, 2000; Gmelch, 2002; Henderson & Gysbers, 1998, Kotter, 1996; Kouzes & Posner, 1993; Maccoby 1988; Miller & Miller, 2001). Educators who possess such characteristics as charisma, communication skills, credibility, high energy, good senses of humor, and strong interpersonal skills are often promoted to administrative positions and given support to continue pursuing a variety of career paths within the field of education. Educators who possess highly-regarded traits and learned early how to implement computer instruction in the classroom have often been given leadership roles in school districts such as Trainer of Trainers, Teacher on Special Assignment, Mentor Teacher, Teacher Leaders, District Media Specialist, or other quasi-administrative positions that carry a certain degree of clout and normally include a higher rate of pay beyond that of the classroom teacher.

While many of the researchers' conclusions noted above are regarded in current leadership literature as traditional and outdated, such beliefs and practices are still alive and well in educational organizations today. Leadership is most often viewed as good management. Rost (1991) wrote:

Leadership as good management articulates a paradigm of leadership that fits the descriptors scholars have given to the more widespread industrial paradigm The leadership definitions ... reveal a fundamental

understanding of leadership that is rational, management oriented, male, technocratic, quantitative, goal dominated, cost-benefit driven, personalistic, hierarchical, short term, pragmatic, and materialistic. (p. 94)

Postmodern Ideas About Leadership

The literature is less replete with postindustrial or postmodern discourse on the topic of leadership. There have been several attempts to define leadership in terms that seek to go beyond traditional views (Heifetz, 1994; Fullan 2001a, 2001b). Even though Burns (1978) began his discourse about transformational leadership earlier than the rest, it seems that he started thinking about leadership differently when he wrote, "leadership is the reciprocal process of mobilizing, by persons with certain motives and values, various economic, political, and other resources, in a context of competition and conflict, in order to realize goals independently or mutually held by both leaders and followers" (p. 425). His inclusion of the term followers led to new thinking by others.

Rost (1991) defined leadership as "an influence relationship among leaders and followers who intend real changes that reflect their mutual purposes" (p. 102). Kouzes & Posner (1993) seemed to utilize part of Rost's definition when they wrote, "leadership is a reciprocal relationship between those who choose to lead and those who decide to follow" (p. 1). Freiberg & Freiberg (1996)

adapted this definition further to read, "leadership is a dynamic relationship based on mutual influence and common purpose between leaders and collaborators in which both are moved to higher levels of motivation and moral development as they affect real, intended change" (p. 298).

Some researchers describe leadership by focusing on what leaders do: they collaborate (Chrislip & Larson, 1994); they create change (Kotter, 1996); they employ strategies (Heifitz, 1994); they understand the past to plan for the future (James, 1996); and they empower others (Peck, 2003).

Starratt (1993) expressed his ideas about postmodern leadership while eschewing an actual definition. He stated that postmodern leaders will need to be able to cope with ambiguity and be able to unmask the myths of modernity. According to Starratt:

The new leader must understand that compassion will be needed as much as hope, humility as much as courage, dogged persistence as much as creativity, and lots and lots of laughter. Only then can leaders begin to win the trust of colleagues, and to enlist them in the struggle to reach beyond themselves in order to remake the social drama. (p. 157)

Bergquist (1993) also discussed the idea of uncertainty with respect to postmodern leadership. He espoused that the newly emerging postmodern leader will be able to master the unexpected and tolerate ambiguity.

"Postmodern leaders and followers must be clear about personal and institutional mission and purpose, while fluttering in a turbulent environment" (p. 118).

Postmodern leaders view themselves very differently from modernist leaders. Freiberg and Freiberg (1996) provide an example of such leadership when they quote Southwest Airlines, CEO, Herb Kelleher on leadership: "Leadership is not determined by position or title to any extent, shape, or form. Our people have determined not to regard title or position as especially important because they wouldn't be as free to make things happen" (p. 303). Postmodern leadership is collaborative, multi-directional, episodic, generative, connected, and purposeful (Fullan, 2001b; Rost, 1991).

These postmodern ideas about leadership seem to indicate that when leaders work with others to decide upon and enact purposeful change, significant and meaningful ends can be realized. This idea logically leads to a discussion about what the literature has to say about the concept of relationship as viewed through the modernist's lens and contrasted with the postmodernist's view.

Ideas About Relationship

The idea of relationship is germane to the discussion of leadership and change in the postmodern world because as ideas about and practice of leadership are re-examined, so too are concepts about how individuals relate to and interact with one another. In the postmodern world, the

concepts are inextricably interwoven. Purposeful change occurs when individuals come together in a leadership relationship to create something new.

Fullan (2001a) explored the idea of relationships as being important to leadership and the creation of a culture of change. He stated:

Collaborative cultures, which by definition have close relationships, are indeed powerful, but unless they are focusing on the right things they may end up being powerfully wrong. Moral purpose, good ideas, focusing on results, and obtaining the views of dissenters are essential, because they mean that the organization is focusing on the right things. Leadership, once again, comes to the fore. The role of the leader is to ensure that the organization develops relationships that help produce desirable results. (pp. 67-68)

Fullan (2001a) also discussed the notion that the themes of relationship, support, and communication are important to learning organizations, however, he also pointed out:

New relationships (as found in a professional learning community) are crucial, but only if they work at the hard task of establishing greater program coherence and the addition of resources. The role of leadership ... is to "cause" greater capacity in the organization in order to get better results (learning). (p. 65)

Fullan's (2001a) work points to the importance of developing organizational relationships that "help produce desirable results" (p.68) and help contribute to the organization's learning capacity.

Traditional Ideas of Relationship

The idea of relationship in modernist organizations has to do with hierarchical relationships rather than interpersonal ones. Modern ideas of line and staff functions predominate the literature relating to managerial responsibilities. Bergquist (1993) stated, the "modern era tends to emphasize structures, processes, and procedures that ensure the appropriate expression of leadership and influence Modern authority is expressed through rules, regulations, roles, and organizational structures" (p. 94). Hollander and Offermann (1990) wrote that traditional views of relationship in organizations have had much to do with the idea of power: power over, power to, and power from. The higher an individual's status relative to another's, the greater potential to realize all of these power forms.

Sashkin and Rosenbach (1993) suggested that modern views of leaders and leadership behavior had to do with how others perceived the leader's behavior. In essence, individuals who engaged in a high level of relationship-oriented behavior versus task-oriented behavior were less likely to be designated leaders by their peers. Traditionally, leaders were viewed as individuals who ensured followers got things done and were not viewed as

individuals with whom to dialogue about the virtues of work.

The literature contains ideas of the traditional leader as the one who is set apart from others and removed from relationships. Cronin (1983) wrote:

The strength of leaders often lies in their tenacity, in knowing how to deal with competing factions, knowing when to compromise, when to amplify conflict, and when to move an organization or community away from paralyzing divisiveness and toward a vision of the common good. (p.20)

Zaleznik (1977) purported that "leadership inevitably requires using power to influence the thoughts and actions of other people" (p. 37).

Traditional ideas about leaders and relationships are expressed by Seyfarth (1991) when he wrote, "leaders achieve results by influencing members of the group to work toward attaining group goals" (p. 321). Seyfarth continued his discussion of various behavioral strategies that he suggested should be employed when needing to accomplish different ends, e.g. achievement-oriented leadership and directive leadership.

In essence, the modernist's view of relationship is very much leader centered, positional, and authoritative. This view espouses relationships based on superordinate and subordinate positions. Only persons in leadership positions do leadership, when, where, and how they see fit.

Postmodern Ideas of Relationship

The postmodern view of relationship in organizations involves collaboration, involvement, participation, mutuality, dialogue, and common good. The literature contains ideas about organizations managing chaos in inventive, open ways, with individuals moving together to form common missions and identifying common values (Chrislip & Larson, 1994; Christie & Lingard, 2001; Donaldson, 2001; Fullan, 2001a; Huffman & Hipp, 2000; Kotter, 1996; Krueger, 2002). In the postmodernist's view, organizational charts move away from top-down hierarchies to dynamic matrices and webs that change to meet agreed-upon needs. Leaders and colleagues begin to understand and appreciate the energy and creativity that chaos can foster.

Senge (1990) discussed the idea of common purpose when he wrote, "a shared vision is not an idea it is, rather, a force in people's hearts, a force of impressive power When people truly share a vision they are connected, bound together by a common aspiration" (p. 206). Senge believed that the reason people seek to build a shared vision is their desire to be connected with others. His ideas lead to the thought that the postmodern leader is one who helps create an environment that fosters relationship building and a sense of interconnectedness with others.

Bergquist (1993) said a great deal about relationships in the postmodern organization:

Any organizational transition is best understood not as a shift in the rate of production or in the flow of energy in the organization but rather as a change in the relationships among members of the system or organization A relationship ... is something more than the sum of its parts. (p. 121)

Bergquist had much to say about the flow of conversation between people in postmodern organizations. In fact, he sees organizations as conversations: "Organizations can be characterized as a series of concurrent and sequential conversations between people ... Conversations are the essence of the organization" [italics his] (p. 135). According to Bergquist, postmodern leaders must be "first and foremost a conversationalist" (p. 136).

Starratt (1993) has much to offer about postmodern leaders and their relationship to others:

[They] will see themselves now as less important in the scheme of things than their constituents, for the constituents are the ones who will actually accomplish the work of renewal. The new leader must believe in the followers first, before the followers can be expected to believe in the leader The leader will engage the others in talking about what it is that makes their work a human enterprise, and what it is that they can do to share those human qualities in their lives with others. (p. 158)

Educators can gain insight by reviewing these postmodern ideas of relationship. We can learn to apply the ideas of these thinkers to discover new forums of understanding and commonality among us. The classroom can be a place of isolation for educators, and the school or district office often no better, but occasions can be created so that relationships can be encouraged. How does such change occur? How have the many changes in the field of education and other organizations occurred in the past, and what does the literature offer about change in the future?

Ideas About Change

Trying to study the concept of change is very elusive. The literature about change tends to focus on the esoteric elements and manifestations of change rather than a substantive discussion about change itself. For example, there are discussions of the difficulties associated with major change efforts; there are chapters devoted to why change efforts fail; and, there are narratives on how to avoid the pitfalls of the change process. However, there appears to be limited discourse on the dynamic of change and how best to define it.

Fullan's most recent discussions on change (2001a, 2001b), however, contain many instructive thoughts about the idea of change within cultures and change within the educational context. He made the following observation:

At the most basic level, businesses and schools are similar in that in the knowledge society, they both must become *learning organizations* or they will fail to survive [italics his]. Thus, leaders in business face similar challenges - how to cultivate and sustain learning under conditions of complex, rapid change. (p. xi)

Traditional Ideas About Change

The activity of reviewing the traditional body of literature regarding change is in itself revealing. Much of this literature deals with ideas about change in terms of categories, lists, charts and flow charts, models, steps, structures, systems, and conceptual representations (Bryson & Crosby, 1992; Seyfarth, 1991; Peters, 1987; Sims, Fineman, & Gabriel, 1993; Lindblom & Woodhouse, 1993; Gardner, 1991; Bonstingl, 1991). It seems that the modernist tradition involves developing cookbook approaches to solving problems and dealing with change.

The focus on systematic approaches to change is no doubt a result of the industrial paradigm of scientific thinking; a tenacious belief in control. Traditionalists tend to view the human condition in mechanistic terms whereby the whole is controlled by separating it into parts. Human change can be influenced by manipulating diverse variables and reconstructing them into a different configuration. Change is viewed as external to the individual and the effect of such change is measured by a

set of externally-established norms apart from that individual. Frederick Taylor's ideas of efficiency depict this reductionistic view of change clearly. He creates a false simplicity by implying that the human condition can be reduced to a specified combination of tasks - of static input and predictable output.

The modernistic idea of change revolves around the individual as a distinct entity rather than a part of a societal context. Change is seen as a single event, disconnected from other people or occurrences. Bryson & Crosby (1992) wrote about making small, incremental changes in order to make a big win over time (p. 230). Changes are seen as strategic and involving power in much of the traditional, modernist literature.

Postmodern Ideas About Change

Postmodern thought involves a more holistic approach to organizational change. Senge (1990) posited that organizational change (learning) requires real involvement of all the organization's people in the development and continuance of their vision and realization of their goals on a daily basis. He stated that "though it involves individual skills and areas of understanding, team learning is a collective discipline The discipline of team learning involves mastering the practices of dialogue and discussion" (p. 237).

Bergquist (1993) indicated that the world is becoming more chaotic, subjective, and disparate. Survival requires

fostering a sense of community within our organizations and developing common purpose and values. A critical dialogue becomes more important as members of organizations encounter change and complexity. Individuals need to realize that one person's behavior influences the behavior of others. Organizations are more likely to be seen as processes and relationships rather than as structures. Conversations become the essence of the organization and therefore, individuals should learn to listen to one another in an honest and inviting manner.

Garmston and Wellman (1995) discussed the important postmodern idea of adaptivity for organizations dealing with change. "If adaptivity is the central operating principle for successful organizations ... then we must search for sources of energy to vitalize this process" (p. 8). They further pointed out that leaders must pay attention to relationships, connectivity, and interdependence. Such ideas are foundational in postmodern thinking about change.

Fullan (2001a) observed that, "change is a double-edged sword. Its relentless pace these days runs us off our feet. Yet when things are unsettled, we can find new ways to move ahead and to create breakthrough not possible in stagnant societies" (p. 1.). He helps us understand that change can be successful if strong relationships are formed that involve individuals working together. Understanding,

clarity, and commitment are developed when a sense of ownership and involvement is fostered (Fullan 2001b).

Postmodern thinkers espouse ideas such as the acknowledgement of complexity and diversity when considering the change process. A popular concept in the literature about change is that of chaos and learning to embrace it (Peters, 1987). According to many postmodern writers, chaos allows newness and the emergence of creative responses to disorder and confusion. By embracing change as an opportunity to learn, members of organizations can enjoy the experience of diversity and difference in their interactions. Fullan (2001b) wrote, "The 'knowledge base' of change is becoming more profound, and . . . it is absolutely indispensable to dealing with the relentless ubiquity of innovation and reform." (p. xii)

Summary

Leadership, relationship, and change ... ideas that may initially seem unrelated, and yet when examined through the postmodernist's lens, an unusual interplay emerges. Seemingly disparate ideas are intertwined and the overlap becomes intriguing.

The task of incorporating computer technology into schools is just one change that can take place in a postmodern way. While there is no single approach or outcome that becomes imperative, it seems critical to employ a multi-faceted, multi-dimensional context in which the change will occur.

Educational leaders and teachers can learn much from engaging in critical dialogue about the anticipated changes and new challenges. They can enter into a relationship of possibility and understanding regarding innovative new directions. They can establish common ground in terms of unforeseen difficulties and obstacles.

Responsible leaders will be those who thrive in an open environment and can encourage others (colleagues, collaborators, stakeholders) to enter into mutual dialectic relationships. Most educators realize that schools mirror existing social structure, and perhaps they can also realize that by engaging in a reciprocal relationship of leadership and change, they can bring forth a positive change in society.

Chapter Three

Methodology

Introduction

This chapter will describe the methodology used for the study. Due to the nature of the research questions posited by this study, a qualitative research design was selected. Qualitative design provides an opportunity to study the participants' natural setting and to examine it through their lenses (Lincoln & Guba, 1985). Through the approach of the case study it is hoped that insight can be gained concerning how to accomplish change in a responsible, forward-thinking way. The case study methodology allows the researcher to examine the holistic aspect of a case by looking into reasons and influences. Case study helps the researcher focus on particular programs or events (Merriam, 1998).

The case study methodology used to examine the two situations is an appropriate one for understanding complex ideas about leadership and change. Case study allows the researcher to remember that reality and outcome are predicated and influenced by context, issues, and the

interplay of various events (Merriam, 1998; Lincoln & Guba, 1985). It provides for the researcher to conduct an in-depth, critical examination of the two efforts within the milieu of these elements.

Methodological Overview

Case study methodology provides a rich blend of process and practice and allows for information and ideas to come from authentic sources directly to the researcher. The naturalistic flow of information will provide the reader with current data about the two cases being examined. According to Merriam, "case study has proven particularly useful for studying educational innovations, for evaluating program, and for informing policy " (1998, p. 41).

Case study methodology emphasizes the broad contexts in which reality occurs and encourages researchers to gather data from a wide variety of sources (triangulated data). "Anchored in real-life situations, the case study results in a rich and holistic account of a phenomenon" (Merriam, 1998, p.41). Researchers are the instruments of data gathering and become the receptacle of information. Therefore, highly-developed skills of communication and observation are required (p. 42). Through qualitative research methods such as case study, ideas, theories, and

interpretations are made by induction after the data are gathered and not by assumption ahead of time on the part of the researcher (p. 38). Incremental details are viewed in light of the whole context (p.30).

Research Questions

As stated earlier, the purpose of this study was to examine the interplay, if any, of leadership and change on the task of preparing teachers to utilize new technology in their schools. The investigator developed research questions to help guide the focus of this case study. The first question inquires about leadership's role in the implementation of a school district's technology program. The second question asks, "What role did leadership play in the school's change process?" The third question examines the role of leadership in putting together the district's staff development program.

Data Collection

Qualitative case studies may incorporate several methods of data collection. This study primarily utilized interviews to obtain a holistic view of the two cases that were examined. In addition to the interviews, however, some observations were conducted and field notes were taken. Artifacts were gathered, including technology plans, school accountability report cards, and other documents.

Collection of data from a variety of interview sources ensured a triangulation of the data which strengthened both the validity and the reliability of the findings.

Case Study Selection

In order to ensure that the study would ultimately be applicable to other situations (Bogdan & Biklen, 1992), the cases were chosen based on careful consideration of criteria developed by the researcher. The researcher used the following criteria:

1. Technology programs must have undergone change in the last three years.
2. Reputations for being progressive with respect to technology programs in their schools.
3. Current technology plans that establish goals and objectives for technology implementation.
4. Districts must have technology that is available to staff and students.

Criterion 1 increased the likelihood that the study would be able to examine the ideas of leader and change due to recent alterations in technology programs.

Both districts have added new hardware and software throughout their school site during the last three years. In fact, both have made significant changes within the last year. Riverland School District received a large

technology grant to purchase new labs and servers throughout the district. In addition, Riverland has recently purchased extensive mathematics and reading software programs that are now being used at their school sites (to varying degrees). Stonefield School District has many sites with new computers and has also purchased the same mathematics and reading software as Riverland. They both have staff development challenges in terms of getting teachers trained to help students, as well as the teachers themselves, access the technology.

Criterion 2 helps determine the credibility of the case study sites. The researcher wanted to ensure the study results would have meaning in other contexts, and to that end, she asked colleagues and peers to suggest possible locations for a technology study. Riverland and Stonefield districts were consistently mentioned, along with several others, during those queries.

Criterion 3 helps to identify which districts were earnest about technology. The researcher believed that Districts with current technology plans, as necessitated by the California Department of Education, would be more productive in terms of mining good information about technology. Both Riverland and Stonefield Districts had current technology plans as of the beginning this study.

Criterion 4 identified for the researcher districts that have accessible technology for students and staff. It was important to the study that the kind of technology a district possessed and the kind of technology program it maintained involve students and staff. Some districts have technology that is only available to office staff, teachers, or librarians, and the researcher for this study was interested in technology programs where teachers were using computers with students. Both Riverland and Stonefield Districts' students and staff have access to and use computers regularly (in most cases, daily).

Sampling Method

According to Patton (1990), a type of purposeful sampling alternately known as snowball, network, or chain sampling allows the researcher to help identify participants that will provide the basis for information-rich cases (p. 182). This strategy involved asking participants to refer the researcher to other participants that may have information pertinent to the study.

The researcher conducted the chain sampling from February 2002 through August 2002. The sampling began with top administrators in each of the districts, and continued through various levels at several school sites.

For each of the selected districts, the data collection began with district leaders involved with their technology programs. These leaders were then asked to identify key stakeholders in their school or district's technology programs. The researcher conducted in-depth interviews with 10 individuals. Participants were 1 superintendent, 1 assistant superintendent, 2 district office technology coordinators, 3 principals, 1 assistant principal, 1 teacher/computer lab teacher, and 1 teacher-on-special-assignment.

Entry to the Population

The case study districts were contacted regarding participation in the research study. The researcher met with top administrators in both of the school districts to describe the study and its potential impact on the district. The district-level administrators in each of the locations were interested in assisting educators explore potential ways to facilitate technology implementation into the classroom. They provided approval for the study and gave the researcher the names of key technology leaders in their districts.

Data Acquisition Process

The data acquisition process began in February 2002 and lasted through August 2002. Before each interview took

place, the researcher contacted potential participants and assured them identifying information about the study's participants would be concealed and the strictest confidentiality would be maintained. Each participant was assured only pseudonyms would be used to refer to individuals and any identifying information would be changed.

The researcher used interview questions she developed based on the research questions (Appendix B) for the initial interviews. The researcher used the questions as a guide rather than a strict format when interviewing each participant. The initial interviews were approximately one hour in length. All interviews were audiotaped and transcribed. Field notes were handwritten on the interview guides. The guides, transcriptions, tapes, and pseudonyms were then coded.

Often following the face-to-face interview, the researcher and participant visited classrooms and computer labs to see the technology first hand. Documents, such as technology plans, schedules, and other information were requested as appropriate. Member checks were conducted, usually through follow-up phone calls, after the initial interview, to verify information or to ask clarifying questions of the participants.

Data Analysis

The researcher considered qualitative data analysis strategies outlined by Lincoln and Guba (1985) and by Merriam (1998) before embarking on the analysis of the interview data. The researcher utilized these approaches as she began obtaining interview data. As Merriam suggests, "the right way to analyze data in a qualitative study is to do it *simultaneously* with data collection [italics hers] (p. 162).

Merriam (1998) stated "data analysis is a complex process that involves moving back and forth between concrete bits of data and abstract concepts, between inductive and deductive reasoning" (p. 178). Through the process of analysis, data are gathered, grouped, reduced, and interpreted. Taylor and Bodgan (1984) stated that the goal of this analysis is "to come up with reasonable conclusions and generalizations based on a preponderance of the data" (p. 139).

As the data were received from the interviews and transcribed, the researcher reviewed the data for emerging patterns. As patterns emerged, data were grouped and regrouped using the constant comparative method of data analysis described by Merriam (pp. 161-162). The themes of leadership, relationship, and change were examined in light

of the data. Data management was assisted by the use of data base and word processing software. As Merriam wrote, "data management is no small aspect of analysis" (p. 167).

The data were reviewed numerous times, making notes, identifying units of information (Lincoln and Guba, 1985, p. 344) and coding categories in accordance with the purposes of the research. The notes were sorted and classified and a search for patterns and overarching themes was made.

After the data were organized, they were interpreted according to the research questions in an attempt to suggest an approach, conceptual framework, or perhaps develop a theory. The goal was to draw a meaningful picture of the data through a richly textured narrative, not to propose an answer or a correct way of implementing technology in schools. An attempt was made to understand how leadership and change intersect in people's lives through the undertaking of a significant learning experience.

Establishing Trustworthiness

Lincoln and Guba (1985), stated that issues of trustworthiness are important to all types of research approaches, but due to the nature of case study design, as well as other types of qualitative research, these issues

are of particular importance. The trustworthiness of a naturalistic study is measured by the degree to which it meets four criteria--truth value, applicability, consistency, and neutrality. Truth value deals with the credibility of the investigation. Applicability is the extent to which the study's findings can be applied to other contexts. Consistency is used to determine whether the study's findings would be repeated if the same investigation were carried out with similar respondents in the same or similar context. Neutrality deals with the study's effect of researcher bias, motivation, interests, or perspective.

According to Merriam (1998), "The applied nature of educational inquiry...makes it imperative that researchers and others have confidence in the conduct of the investigation and in the results of any...study" (Merriam, 1998, p. 199). Lincoln and Guba (1985), pointed out that in the conventional research context, the terms that address trustworthiness questions are termed "internal validity," "external validity," "reliability," and "objectivity" (P.290). The researcher used Merriam's model to of dealing with validity, reliability, and ethics when conducting this study.

Internal Validity

According to Merriam (1998), "internal validity deals with the question of how research findings match reality. How congruent are the findings with reality? Do the findings capture what is really there? Are investigators observing or measuring what they think they are measuring?" (p. 201). Reality is a matter of perception and vantage point in any type of research, and despite efforts to obtain data in their purest form, they will no doubt be subject to interpretation, abstraction, and change due to researcher influence. Case study, as a qualitative methodology, assumes that "reality is holistic, multidimensional, and ever-changing; it is not a single, fixed, objective phenomenon waiting to be discovered, observed, and measured" (p. 202).

Several of the strategies suggested by Merriam (1998, p. 204) were employed in order to enhance internal validity. The data were triangulated by using multiple sources of data. The researcher identified initial data sources by talking to the Superintendents of each of the two school districts. They were asked to identify key leaders in their technology implementation projects. The researcher conducted interviews with the individuals identified as key leaders, examined technology plans and

other documents related to their technology project, and often visited classrooms and labs to see the technology being used by students and teachers. Using a purposeful sampling technique known as chain sampling (Patton, 1990, p.182), the researcher identified from the key leaders other participants who would be good interview subjects. This led the researcher to interview individuals from several levels of the school community: teachers, computer lab technicians, site administrators, and district office administrators.

Merriam (1998) suggests that another method to ensure internal validity is to conduct member checks by taking data and interpretations back to the people from whom they were derived for review (p. 204). The researcher accomplished this task by sending transcripts of interviews by to the study's participants for review and comment. This activity helped clarify and enhance initial information gathered through the interview process.

Another strategy for enhancing internal validity is by conducting peer examinations (Merriam, p. 204). The researcher asked colleagues to comment on findings as they emerge throughout the study's stages.

Merriam also suggests that the researcher's biases and assumptions should be openly revealed at the outset of the

study (p. 205). Unlike quantitative research strategies, the qualitative researcher plays an important role as a research instrument (p. 7) and as such, must acknowledge his or her background assumptions that relate to the study's scope.

Reliability

Reliability means that the researcher's findings can be replicated by another researcher studying the same situation. This idea is a central one for more traditional experimental research projects. Qualitative research deals with human behavior, their perceptions, and their interpretation of the current context. Concurrently, if the researcher is the primary instrument for data collection, reality construed in the traditional sense becomes meaningless. Case study situations are highly contextual and usually in states of transformation and flux. Therefore, the qualitative researcher thinks more in terms of dependability and consistency regarding the results obtained from the data (Lincoln and Guba, 1985).

Merriam (1998) suggested several ways to ensure that the researcher's results are reliable. One of the techniques suggested by Merriam is that the investigator should explain the assumptions behind the study, his or her relationship to the group being studied, and the context

from which the data were collected (pp 206-207).

At the time of this study, the investigator was the Superintendent of a small, rural school district. Her responsibilities included all facets of school administration including the supervision of curriculum, finance, facilities, and technology. Her background with staff development programs and technology implementation efforts provide a significant level of expertise with the topic under consideration. She has the experience and knowledge to gather information from participants that researchers with less experience might miss. The researcher was unknown to the participants in this study prior to the study's initiation. The researcher conducted the interviews and observations at each of the participant's work sites in a confidential, one-on-one setting.

Merriam (1998) also suggests that triangulation be employed by the researcher to ensure reliability of the study's results. The researcher used multiple methods of data collection and analysis as discussed above to enhance the study's reliability. In addition, an audit trail showing the details regarding how data were collected, how categories were derived, and how decisions were made throughout the inquiry help ensure the study's results are

reliable (p. 207).

Limitations of the Study

There are limitations to this study which affect its trustworthiness. The study's credibility is enhanced by the investigator's prolonged engagement within the educational culture, although the investigator was not a member of either of the cases studied. The study is, however, the investigator's first attempt at formal research, and as such, the study may be affected by the imperfect skills of the investigator. The investigator has attempted to control for this threat through triangulation of data, member checking, and peer debriefing, all of which are recommended practices to limit threats to credibility (Lincoln & Guba, 1985).

Transferability of this study may be limited, although the investigator sought to provide the "thick description ... necessary for judgments of transferability" (Lincoln & Guba, 1985, p. 359). This study may be limited in its applicability to other settings as it does not include an urban setting; it includes one suburban and one rural setting.

Summary

The case study methodology provides a useful way to explore situations in a broad, inclusive context. Case

study can be used to gain an in-depth understanding of a situation from the individuals most closely affiliated with the situation. Insights about successful practices can emerge from a thorough and careful study. Merriam (1988) noted "the qualitative case study is a particularly suitable methodology for dealing with critical problems of practice and extending the knowledge base of various aspects of education" (p. xiii). This study hopes to "extend the knowledge base" for those of us who are intrigued by the ideas of technology, change, and leadership.

CHAPTER FOUR

RESULTS

Introduction

As Lincoln & Guba (1985) stated, "The ultimate purpose of any report is to improve the reader's level of understanding of whatever the report deals with, whether some research finding, evaluative judgment, or policy formulation" (p. 358). The description of a case study investigation should result "in a rich and holistic account" (Merriam, 1998, p.41) of the situation being studied. It requires detailed reporting of the case situation, providing accessibility, contextual information, vicarious experience, and tacit knowledge for the reader (Lincoln & Guba, 1985; Merriam, 1998).

Data for this study were gathered in a variety of ways: personal interviews, field notes, telephone interviews, observations, and document review. Appendix C provides the reader with a key for the results cited in this chapter.

Riverland School District is a small, rural school district serving students in grades kindergarten through

eighth. It is the only K-8 school district in its community. There are 4 schools in the district, and the district currently has an enrollment of 2,570 students. Two of its three elementary schools house students in kindergarten through 3rd grades, one houses students in grades 4-6, and its middle school houses students in grades 4 - 8. (AR.RSD.1)

Due to its location near a large metropolitan area and its affordable housing, it is experiencing rapid growth. The district's population is 64% Caucasian, 13.7% Hispanic, 10.3% African American, 5% Asian, 3% Filipino, 2% AmInd/Alaskan, and 1% Pacific Islander (AR.RSD.1). The District has an annual budget of about \$14,000,000 and spends an average of about \$6,300 per student to educate each child (TC.DS.5-31-1). Riverland's students score, on average, in the top third of the state on annual standardized tests (TC.DS.5-31-1).

Stonefield School District is a medium sized, suburban school district serving students in grades kindergarten through twelve. It is the only school district in its community. There are 12 schools in the district, and it currently has 7,800 students. Its nine elementary schools house students in kindergarten through 5th grades, and its two middle schools house students in grades 6 - 8. There

are two high schools; one is comprehensive and the other, alternative. (TC.GC.3-18-1)

Stonefield School District is located near a large metropolitan area and is experiencing rapid growth. The district's population is 80% Caucasian, 10% Hispanic, 4% Asian, 2% African American, 2% Filipino, 1% AmInd/Alaskan, and 1% Other (TC.GC.3-18-1). The District has an annual budget of \$45,000,000 and spends about \$6,500 per student annually to educate each child. Stonefield's students score on average in the top 25% of students on annual statewide standardized tests. (AR.SSD.2)

As explained earlier in Chapters 1 and 2, this study was designed to examine the role leadership played, if any, in the implementation of a school district's technology program, its change process, and its staff development program. The investigation was conducted in two school districts, and a description of the two case reports will be provided--one from Riverland School District and the other from Stonefield School District. There will be a separate case report for each district.

Riverland School District Case

Riverland School District employs 7 administrators, 1 district librarian/IT Director, and 1 technology coordinator (TC.DS.5-31-1). The Superintendent was hired for her current position six years ago. She made it a priority to fund the purchase of new computers to be placed throughout the district's four schools, bringing the average student to computer ratio to its current 3 to 1 (TC.JC.3-18-1).

Riverland has undertaken the replacement of outdated computer hardware, infrastructure, and software over the last several years. A timeline of key events appears in Table 2. Five years ago, the district applied for E-rate funding from the federal government, and as a requirement for receiving those funds, a multi-year technology plan had to be approved through the County Office of Education. The E-rate funding helped the district put the infrastructure in place to establish the network. Funding for hardware and software came through various sources, including the district's general fund and local school site budgets (AR.RSD.1; TC.JC.3-18-1).

Currently, each school in the district has at least one computer lab (larger schools have two), at least 3 computers in each classroom, at least one laser printer,

School Year		Event
1997	July	New Superintendent hired.
1997-98	Fall-Spring	Technology Task Force created. Wrote technology plan.
1998	Fall	John Castle's job description and responsibilities were changed to include Technology Coordinator.
1998	Summer	New principal hired for Madison Middle School.
1998-00	Spring-Fall	Received technology grant funding. Identified other district funds. Purchased new hardware and software; improved infrastructure.
1998-00		Global staff development began.
2000	Summer	New vice principal hired for Madison Middle School.
2000	Fall-Spring	Madison Middle designated as a technology pilot school.
2000-02		Staff development transitioned to site specific efforts. Site hardware purchases were made.

Table 2. Timeline of events in the Riverland case.

and a teacher station in each room. Each lab has a trained computer technology assistant who runs the lab and also helps trouble-shoot problems in the classrooms (AR.RSD.1; TC.JC.3-18-1).

According to one of the study's participants, computers in the lab are used to support classroom instruction and keyboarding (IT.AJ.6-5-1). At the middle school Computers, as a subject, is taught to all of the eighth grade students. Computers in the classrooms can be used by students to access reading and math support programs, to word process, and to create presentations. Teachers can use them to take attendance, keep track of grades and discipline, word process, and post information on web pages (IT.AJ.6-5-1-6).

Leadership and Technology Implementation

One of the purposes of this investigation is to discover what role, if any, leadership played in the implementation of the school district's technology program. Riverland's original technology program began with a core group of teachers who were interested in bringing computers into their school (IT.AJ.6-5-1).

One of Riverland District's long-time employees, teacher Allen James, explained how computers began making their way into the district during the spring of 1981 when

the County Office of Education gave his school two computers:

Being a math teacher at that time, we only had the two computers, so we really started getting involved. We wrote programs; in fact, I wrote a program for the school that we used 4-5 years. It just sort of grew from there. Within a few years, we had enough computers that we had an elective program for computers. (IT.AJ.6-5-1)

Allen's desire to bring technology into the district appears to have played a central role in creating an interest in some of his colleagues, but he did not feel that he had the support of the district administrators at the time. He explained:

[Our project] evolved. Despite the fact that this has been a dream, the time wasn't right ... it was just too early. So it caused problems. But I was pushing it and pushing it. So, there was a little more resistance, but not necessarily from the teachers. At that time, it wasn't there yet. (IT.AJ.6-5-5)

A second phase of technology implementation appears to have gained momentum when a new Superintendent of Schools for Riverland was hired in July, 1997. As a very hands-on leader, Diane Shelby had come from a single-school district

and was used to doing whatever was necessary to bring in resources to her district. During her first few months at Riverland, Shelby created a Technology Task Force, comprised of a group of interested individuals from across the district. The group wrote a technology plan that provided the basis for requesting grant funding to purchase technology for each of the district's schools. This collaborative process allowed the district to replace aging computers with new, state-of-the-art multi-media computers (TC.DS.6-5-1). Teacher Allen James expressed his approval:

From my [vantage] point, I've always wanted a little bit more than we've had. But now I'm pretty happy. Things seem to be really right there at the edge or maybe more. We have a lot, and now we just want to make sure everyone uses it. (IT.AJ.6-5-5)

The investigator determined from this evidence that due to the mutual purpose and collaborative efforts of the group, Riverland's technology project began to take shape, and a change was occurring. The change was enhanced by supportive efforts of specialists, such as the district's Technology Coordinator.

Using the E-rate grant as the funding base, Riverland was able to network the district, which was important to the district's technology implementation efforts.

Riverland's Technology Coordinator, John Castle, who is also its Librarian, played an important role in making the district's computer networking possible.

Mr. Castle refers to himself as the "father of the network" because he had such an integral part in helping to establish the district's project (IT.JC.2-26-1). He explained, "I took it on myself to write E-rate grants. Just finding the money wherever I could to find money for our infrastructure. I did it on the run. Everything was based on necessity - what do we need to get accomplished here?" (IT.JC.2-26-1). Mr. Castle was also instrumental in expanding the district's platform to include PCs in addition to Macintosh computers. He is responsible for training computer techs at each school site to use the network. Mr. Castle is also responsible for keeping the network operating (IT.JC.2-26-1).

Superintendent Shelby expressed a desire to establish a technology pilot school at Madison Middle School. The other schools in the district were also provided with new technology, but Madison Middle was adjacent to the district office, and the technology coordinator could work very closely with the staff at Madison to pilot new equipment and software before dispensing these items throughout the district (IT.JC.2-26-3).

Shelby hired two new administrators for Madison Middle School. Principal Teri Husted had been a teacher in the district prior to being selected as Madison's new principal. David McGrath, who was chosen to be the new vice principal, had been a teacher in a larger neighboring district. They were interviewed by the investigator after having completed their fourth and second years, respectively, at Madison. They each described the many challenges they encountered attempting to work with a veteran staff in order to bring about technology use in their classrooms. Husted shared her strategy:

I'm kind of going in the back door, and I don't know if this is right, wrong, or indifferent, and I haven't seen it play out yet, so it'll be interesting to see what happens. I've kind of let them, like a grass roots effort ... express what they want. (IT.TH.6-21-2)

Husted's strategy supports Fullan's (2001b) belief that change plays out in a sociopolitical environment and that "Solutions must come through the development of *shared meaning*" [italics his] (p.9). It was not always easy to achieve group coherence and commitment. Husted explained some of her frustrations about trying to get a few, very resistant individuals to participate in the technology effort:

I'm going to have to also understand that I'm going to have to leave the 2% behind. I have a teacher that will not even do his grades on a computer because he doesn't believe in it, doesn't trust it. I make him because everyone imports down to the office their grades, so ... instead of using the grade book that's in alliance with our program, he goes in and punches in the final grades. I don't care how you get them to me, but I want your final grades downloaded. That's where we are starting. (IT.TH.6-21-4)

Prior to coming to Madison, Vice Principal David McGrath had been a math teacher in a neighboring district. He had used a popular math software program with his students, and had experienced a significant degree of success while using the program. He knew that Superintendent Shelby had purchased this expensive software program for use at Madison, but its teachers were not using it. He believed the program could also benefit their students, and desperately wanted to see it implemented there. McGrath encountered the reality that some of the organization's teachers put little or no value on the technology project being implemented. As Fullan (2001b) pointed out, "We must come to understand both the small and the big pictures. The small picture concerns the

subjective meaning or lack of meaning for individuals at all levels of the educational system" (p. 8). McGrath explained his experience with this part of the technology implementation process:

When I got the job over here and took a leadership role, I noticed that [this great program] was sitting in a box in someone's room, and it had been there for a couple of years. Never had it been implemented.

(IT.DM.6-13-1)

Fullan (2201a) suggested that quality leadership is necessary in order to help create the school's capacity to change. The leaders should engage in activities that create a common culture of expectations, ensuring that resources and relationships are in tact (p. 65). In deciding that the staff should be trained to use this software, McGrath knew that he had to provide the resources and support to make that happen. He wanted to use the next available staff development day for software training. The staff would be given several options of trainings for their staff development time, and McGrath was concerned that few teachers would avail themselves of software training. He recounted the process and thoughts he went through prior to the training:

I went around and encouraged people. I tried to sell it as best I could. I met with each person individually – just kind of walking by in the hallway. “Hey, you guys might want to come check this out. It’s really good.” (IT.DM.6-13-2)

I did a lot of doubting myself Are you sure this is something that’s going to work here? Different schools have different climates. Is this going to blow up in your face? Do you really know enough to say this is what’s good for kids? So, I did a lot of that talking with myself and finally came to the conclusion that I had enough evidence and data to back it up and give me the confidence. You have to have the confidence. If you’re second-guessing yourself, if you can’t get to that point, it’s best not to do it because the teachers and kids are going to see that in you. But if they see you sold on it, they’ll at least say, “Gosh, why are they so sold?” They’ll at least search a bit in their mind. But, if they see you second guessing or ... if you’re not spending your time on it, then that’s going to speak volumes of how important it is. (IT.DM.6-13-6)

Creating the climate for change through establishing relationships and providing the necessary resources has

paid off for Madison's staff. Husted and McGrath shared that teachers' use of technology has increased noticeably over the last two years and they know what they need to do to ensure progress continues. Husted explained:

We have a couple of teachers [who] have really taken the lead role. I think the computer-based programs have definitely changed the approach the teachers are taking as far as the curriculum goes. I'm now modeling that use of technology, and I know I've got teachers that are going to go, "I want to use that. Can you get me one of those? Can our department buy one of those?" My only fear would be that we stagnate.

I've been able to provide a lot of technology. I just want to make sure we continually keep it flowing, and that I'm able to provide the resources necessary. It's really your responsibility as a leader to make sure everybody has enough knowledge to get in there and really utilize it so it's not sitting. I guess the thing I'm happiest with is that it started at the bottom. (IT.TH.6-21-5-6)

Leadership and Change

Another purpose of this investigation was to examine the role leadership may have played in the school district's change process (as it relates to technology

implementation). As Fullan (2001a) stated, "New relationships ... are crucial, but only if they work at the hard task of establishing greater program coherence and the addition of resources. The role of leadership ... is to 'cause' greater capacity in the organization in order to get better results" (p. 65). In this case, the results are the organizational changes and change process.

When looking at the Riverland School District case, the investigator found that the study's participants had much to say about the change process. Participants appeared eager to discuss how the change process occurred and how the dynamic affected them.

Some of the participants discussed the challenging aspects of going through change. Mr. Castle, the District Technology Director recalled:

Some of the biggest challenges are the buy in and getting people trained across the board to do it. Every place I've done any research or talking I'm seeing a similar profile. We have people who can't get enough tech, the people who want nothing to do with it, and everything in between. I don't know if I've seen the magic paradigm to take care of it. Some people will do it kicking and screaming - you can't make me. But, I'm a positive thinker, so my

thinking is: better to light a candle than curse the darkness. So, every person we get to take another step in that direction is another hope. (IT.JC.2-26-4)

Others played a significant leadership role in helping to create change in the district. Teacher Allan James, who has been in the district for many years and had a keen interest early on in bringing technology into the classrooms explained:

[There was staff resistance] ... we are still working on it. We still have a few teachers that just don't see it. They don't have the time. They say, "When do I have the time to learn my software? When do I have the time to teach it to the kids?" They still see it as something extra. So we still have some resistance, but I think it's going to change over the years as new teachers come in. (IT.AJ.6-5-6)

District personnel have tried various strategies to help teachers overcome their objections and issues with the challenges of change. One of their ideas was to use Madison Middle School as a pilot for new programs, giving the teachers there a chance to implement new programs before disseminating those programs to other schools. Superintendent Shelby and Technology Coordinator John Castle felt that proximity would help them better support

new changes before making those changes available to the other schools (TC.DS.5-31-1).

However, Madison Principal Teri Husted faced initial resistance to change. Her new staff feared the unknown changes a new administrator would no doubt bring. She used a slower method, one that acknowledged the existence of the apprehension and anxiety. She shared her approach:

I think you have to be a bit patient because when I first came on board here there were a lot of new programs. [The teachers] were saying, "We're going to [have to] change this and we're going to [have to] do this." Staff was real fragmented. When I became principal, I just said, "We're doing everything the same." As soon as I said that, then they started doing it on their own. Then they started coming up with different ideas. It was really kind of from them. (IT.TH.6-21-3)

James (1996) wrote that some organizations experience a *cultural loss* when participating in new activities or innovations. Groups can feel that they have to give up something important in order to acquire new innovations or skills (p. 106). This could have been a complication of what Husted and McGrath encountered at Madison, a school with an experienced staff. However, after working with the

staff for a few years, Husted and McGrath expressed confidence in how teachers are implementing technology at Madison. Teacher Allen James agrees that the school has made significant progress in a relatively short period of time. He acknowledged that some of the veteran teachers are still very reluctant to use the computers available to them, but many are seeing how the computer can help them.

(IT.AJ.6-5-1)

James stated he felt there were several important factors that helped teachers participate in the technology change effort. One was the assistance and availability of Mr. Castle:

[Mr. Castle] has been great in keeping everything working out right. If there is a problem, we call him up and he goes and helps in those classrooms. We've had good support in this district

(IT.AJ.6-5-2)

James continued by explaining that he feels providing each teacher with their own computer they could use at home helped get teachers' buy in. He also believes that requiring teachers to use computers for attendance, grades, discipline, and email helped many overcome their resistance:

For the most part our [implementation] is improving all the time; it's getting better. It's just not there yet. It's not where we want the teachers to be. But, it will be. It's taken some of the things I've demanded, like they have to take their test on the computer and we have to do our grades on the computer. We want them to a point where they use the whole thing. I just want to make their life a lot easier, not harder. Once they get past the fear

(IT.AJ.6-5-6)

To assist individuals as they are engaged in the change process, it is important to have the support of the larger organization. John Castle feels that the district is doing what it can to support teachers in their efforts to embrace the technology change:

I think that empowering the teachers with the best tools they can use to make professional judgments on what they want to present to the students [is my responsibility]. We've also not been too tight on what they can have and not have. To me, the focus is getting them to communicate, use what's available to keep the communication going, and not to play network god anymore than I have to It can be so tight

that they become discouraged. We're pretty open because of that (IT.JC.2-26-4)

School administrators, Husted and McGrath, have taken on what might be considered by some to be nontraditional roles as they try to support their teachers through the change process. McGrath describes how he is available on an on-call basis to help teachers when they are having difficulties with the technology in their classrooms:

[When a teacher calls with a problem], I say, "I'll be right there" and drop everything and pop down to the room and make it a priority for me. Then the teachers feel as though he just dropped everything he was doing in the office, and they know how busy I am to come do this. So, that must mean something. They feel they can go out on a limb and try new things because they know I'm here. I'm kind of that safety [net].

(IT.DM.6-13-6)

McGrath described the stress involved in trying to ensure teachers are supported through the change effort by not having to deal with small details that can quickly derail staff momentum to change. He discussed in length with the investigator the importance of planning staff development sessions that would go smoothly and not be stressful or distracting to staff:

The hardest part for me ... is, I wake up in the morning and my eyes open up, and I'm thinking, "Okay, this is different than when I was a teacher." When I was a teacher, I would think, "Okay, inservice today. It's a relaxing day. I get to go and just hang out." From this end its, "Inservice today! Do I have the food ready to go, have I talked to the head person in the cafeteria? Do we have juice coming? At the second break, is there going to be fruit? Is there going to be this? Is my technology guy going to be there at 7:30 like I asked him? Did I need to remind him because if he's not there I may not know how to set up the LCD" Those two hours before just kill me. They really do because you're ultimately responsible—seriously—for 25 people enjoying it. That's stressful. That's the hardest part for me.

(IT.DM.6-13-4-5)

Principal Husted expressed a certain optimism and hopefulness that Madison Middle School teachers have begun to embrace the changes technology has brought to them:

I think the culture of our school is starting to change. When the opportunity arises, when I get that interest generated, then I can have a really intense training that is really more specific to people's

needs and start picking up the others to join in. I'm getting the core group on board because they have a purpose. But, you kind of have to pick your battles. If I can get 75% of my staff eventually getting there ...I think they just need a little more time to get that technology in place. (IT.TH.6-21-4)

Teacher James agreed, "Our staff is getting comfortable with it It's going to get there. It's still that slow process" (IT.AJ.6-5-4).

Leadership and Staff Development

Modern leaders are challenged to create knowledge cultures that thrive on acquiring the information they need to be effective. They have to sort through the information glut that is the reality of modern organizations. Fullan (2001a) wrote:

Most organizations have invested heavily in technology and possibly training, but hardly at all in knowledge sharing and creation. And when they do attempt to share and use new knowledge, they find it enormously difficult Identifying the practices usually goes reasonably well, but when it comes to transferring and using the knowledge, the organization often flounders. (p. 79)

Riverland School District sought to support the technology project by putting trained technology staff members in each of its school's computer labs. According to John Castle, District Technology Director, these lab techs work one-on-one with individuals to help troubleshoot problems that occur in teachers' classrooms (IT.JC.2-26-3). This effort was a help to teachers, but as they attempted to integrate technology throughout their curriculum, their training needs grew.

In the early stages of the network project, the district sometimes brought in vendors to demonstrate the use of their products. But after a time, district staff who were adept at computer use, were called upon to train their colleagues (IT.JC.2-26-1).

Mr. Castle explained that the district paid for teachers to take advantage of offerings through a well-known statewide, on-line training project. But, he stated, "We haven't been all that successful so that people will go online when they need to. They don't really do that. That seems to be the downfall I think you're hearing all over the place" (IT.JC.2-26-2). When asked by the investigator what he thought the most beneficial staff development opportunity had been for his district, he replied:

I think one-on-one like regular teaching is the best solution if you can offer it in a timely way. It's difficult. We find out in a group setting that it's frustrating even for the instructors. I get a lot of "ho-hums" from people who are way ahead, and I get this paranoia on the part of some who don't even want to go there, and it's a continuum of that. Some people are on the leading, bleeding edge and can't get enough, and it's very difficult in a group setting - especially with educators - to make it good for what everybody needs. (IT.JC.2-26-2)

[W]e've tried the laundry list. We've tried group settings where they could choose, and we've offered those classes. The upside on that is generally if they sign up for the class it's something they want and will benefit from. The downside of those classes is that sometimes people get in over their heads, and it's really not what they want.

(IT.JC.2-26-2)

We're saying that we'd like to give an opportunity for each staff member to set up one-on-one training with people in the district who are more experienced to meet with them and try to pick up in a focused way where they need the help. (IT.JC.2-26-2)

The individuals at Madison Middle School, the district's pilot school, have tried many approaches to help the knowledge-sharing effort among their teachers. They struggled with basic issues of how to use computers and how to integrate technology into the classroom. Teacher Allen James shared that they had tried many different approaches at Madison over the last several years:

We've offered classes from 3:00-6:00 in the evening for teachers to take, and those have been well supported. The teachers are a lot more comfortable with us teaching, someone they know and trust over somebody coming in. There's a reluctance to leave themselves open for criticism as far as a lack of knowledge. When somebody else comes in, they won't ask questions. We've found it's just easier for us to do it ourselves, and it seems to work. We know what they are doing in their classrooms, so we focus a lot of our instruction based on that comfort zone

(IT.AJ.6-5-2-3)

James suggested that staff development needs to be ongoing, and not just a one-shot approach:

The one area we seem to have problems with is when they come in to take the class, if they don't go back and use it, then in a very short period of time they

forget it. So that's the one area we can probably improve on. Somehow, we can have a class and give them ... a chance to use what they've learned in the class right away. If you don't have a chance to use it right away, like you don't force yourself to use it, then it almost makes the staff development class you had - well, it loses a lot of its value.

(IT.AJ.6-5-2)

Teri Husted, Madison's principal, has tried several approaches with her staff. She's hired outside individuals and utilized local staff expertise:

The one downfall with every single technology inservice I've ever seen ... is how you get everyone in front of the computer and get them to follow along. It really takes a ... powerful presenter, somebody who's a good teacher I guess to do that. Then the staff get frustrated if they don't have a good person doing that and that has been a real pitfall. Then you have to back up and sell again. (IT.TH.6-21-6)

Husted believes that follow-up training has been essential to help support the core group of her teachers who are fully engaged in their technology program:

I've made a conscious effort to make sure we get training and follow-up training. Teachers have been ...

pushy about [saying], "I need some training, I need some training" and that part has been beneficial for us to see. (IT.TH.6-21-2)

We brought back training right before the next school year started, and so they're up and running. And now we're revisiting that again and saying, "Okay, now where are we with that program?" So I think that's sort of the model that's been working best for us. (IT.TH.6-21-3)

In addition to planning and maintaining a cyclical approach to staff development, the Madison administrators recognize that training sessions have to be well organized and practical. Vice Principal, David McGrath, has been responsible for coordinating several of Madison's staff development sessions. He discussed the thought process he went through about how the training should occur and who should conduct the training:

I thought about it long and hard on how I want to do this. Do I want to have a professional come from [the software company] and do the staff development? Do I want to do it myself because I knew the program inside and out? I thought, "Well, no." It's really a touchy deal - the human part of it. If I stand up there and talk to them they're going to feel as if this is like

an order or a demand. But, if I can present it from a peer and not a professional or myself, I thought that would win the most [people over].

What I did is, I had [a veteran teacher] come over. He did an outstanding job ... he stole the show. They loved him. He ... cracked jokes ... He made a really comfortable atmosphere and he didn't confuse people with a lot of jargon ... He came in with, "Here's the nuts and bolts. Here's how it works in your classroom. Here are the systems that I've used. This is what I've found that works and what doesn't work." He made it really practical. (IT.DM.6-13-1)

McGrath continued to have this veteran teacher back to provide follow-up training for the staff. He explained to the investigator that teachers often asked him when the next training was going to be held. McGrath also followed up with teachers informally to find out how they were doing implementing the program in their classrooms. He also inquired about how they felt about the training and asked for suggestions. He explained:

I learned a lot from them [the teachers], and I made those changes for the next [training]. I think they felt like they were validated for the next one. From their end, I got a lot of compliments. They felt like

they weren't sitting and getting more theory. They were actually learning something that was going to help them with kids, and again, it was practical.

(IT.DM.6-13-4)

If the individuals in the organization are committed to the same goals and understand that significant change requires commitment, they are more likely to participate in learning new skills. Teacher James shared:

As far as staff development goes, I think we need to keep on pursuing getting everyone involved. As they see that it's not time consuming, it helps with the time, they will use it. I guess that was the philosophy, if they use it for themselves, [they] would eventually see the value for where it could help kids. (IT.AJ.6-5-7)

Creating an environment for learning begins with the articulation of mutual purpose and ongoing communication about that purpose. Principal Husted made the following observation:

Staff development cannot work if your staff members, if they're not there. Then you go back to the whole vision, purpose. Even if they don't like one another, if they all have the same vision or the same purpose as to what the staff development is doing and how it

will benefit them and their ... delivery to students.

(IT.TH.6-21-4)

Summary of Riverland School District Case

The study's purpose was to examine the role, if any that leadership played in a school district's technology implementation project, the change process surrounding that project, and the staff development involved for the district's teachers. Riverland School District supported the purchase new computers for its schools and the establishment of computer labs in those schools.

Riverland administrators decided to use its closest site, Madison Middle School to pilot new software for those computers. The investigator conducted an analysis of the data provided through interviews, observations, and document analysis of the Riverland case.

The data show that the technology implementation effort occurred in two primary phases. Phase I occurred as early as 1981 when the County Office of Education gave Madison Middle School two computers. At that time, there was a core group of teachers who began developing an interest in technology. They attended CUE (Computer Using Educator) conferences and wrote programs for their students' use.

Phase II began when Superintendent Diane Shelby provided the catalyst for receiving technology grants and changing John Castle's job description to include district technology responsibilities.

The change efforts involved at the start of Phase II were initially met with resistance by a veteran staff of teachers who were reluctant to take on another program. They complained about lack of time and resources to learn how to use computers in their classrooms.

John Castle and the two new school administrators worked hard to establish relationships of trust that would support teachers through the change process. The data reflect efforts to work toward creating teacher interest in technology and responding as quickly as they could to needs for support and training.

Several staff development strategies were tried by the Riverland district personnel, including outside vendor presentations, after-school classes, local training, and one-on-one support. The data show that the study's participants believe one-on-one training is preferred by the Madison Middle School's teachers, but they have had successful trainings using subject matter experts from within the field of education.

Stonefield School District Case

The Stonefield School District employs 29 administrators, 1 technology coordinator, and 17 computer technicians. The Superintendent was hired for his current position seven years ago and has been supportive of acquiring new technology for the district's schools. (AR.SSD.2) A timeline of key events for the Stonefield case are included in Table 3.

According to the study's participants, computer technology is used throughout the district for a variety of purposes (TC.GC.3-18-1; IT.TD.2-21-1). Computers are housed in labs and in classrooms. Some schools have labs in their libraries. Computers are used for word processing, instructional support and skill building, and specialized software programs for math and reading (TC.GC.3-18-1; IT.TD.2-21-1).

Leadership and Technology Implementation

To address the study's first research question, the investigator explored the origins of Stonefield's technology efforts. Research data reveal that like many similar change efforts, technology projects began at Stonefield's schools based upon the interest of individual or small groups of teachers or due to the interest of a

<u>School Year</u>		<u>Event</u>
1991-96		Principal Bev Dawson and Parker Middle School teachers were funded for a large technology grant; project began. Principal Tom Danby trained his teachers on technology use.
1996	July	New Superintendent was hired.
1998	Fall	District began funding on-site technology support.
1998-99	Fall-Spring	Teacher Jennifer Sanders began seeking support for software purchase and staff development. Tom Danby purchased site license.
1999-00	Fall-Spring	Global staff development occurred.
2001	Fall	Tom Danby opened Hilltop School.
2001	Fall	Jennifer Sanders hired as a District Teacher on Special Assignment.
2000-02		Staff development specific to sites.

Table 3. Timeline of events in the Stonefield case.

school administrator. Leaders and others worked together to create a significant change for Stonefield.

Bev Dawson, Principal of Parker Middle School describes how her school acquired computers on a large scale in 1991 when several interested teachers and she got together to write a computer grant:

We wrote and received the ... grant and got \$350,000.

One of the things we did over the course of that 3 to 5 year grant was that we established and built a computer lab with state-of-the-art equipment.

(IT.BD.5-30-1)

Dawson explained that over the years, with district administration supporting her, the teachers at Parker provided much of the impetus for continued improvement in technology availability. Dawson demonstrated effective leadership skills as she created a climate of collaboration and showed her willingness to share decision making authority (Dyer & Carothers, 2000).

Parker's new teachers were coming to the school computer literate and helping to keep up the pressure for updated technology, which Dawson said was, "Very positive for us" (IT.BD.5-30-2). Dawson, herself, felt the pressure of learning new computer skills and even took a keyboarding class at the local college to sharpen her skills (IT.BD.5-

30-2). Over time, Dawson found that computer technology became "embedded into their curriculum" (IT.BD.5-30-2), showing evidence of the type of knowledge building and climate for change that Fullan (2001a) discussed.

At another of Stonefield's schools, Principal Tom Danby was planning to open a new elementary school. With the district's support, he was able to establish technology as one of his visions for the new school, Hilltop Elementary. As part of the teacher transfer and hiring process, Danby was able to interview and hire teachers who supported the technology vision and who were technology competent. He explained:

I had put together a ... presentation on my vision for this school, and I had several different layers of things for my vision. When it comes to technology, there was an expectation for each teacher. I also said things like, "All teachers third grade and above will have web pages. We're going to use our technology to really benefit and advance ... our teaching, students' learning, and our communications with parents." So that kind of laid the foundation for what we've done this year and what we're going to continue to do. We were looking for a difference of those who would fit in here and those who wouldn't.

I'm really looking for people that have passion. It was intentional that we all were on the same page, and we all started working together. It was a common vision. We made an intentional commitment to that. (IT.TD.2-21-2)

The district supported the vision and supported it not in just patting me on the back ... but they were also able to invest. We became the pilot school for a lot of things. So the district invested. Then there was the core group of people, staff members. We had a staff of about thirty, and there were about eighteen of us in this core group that really started pushing them. (IT.TD.2-21-7)

Jennifer Sanders is currently a teacher on special assignment with the district. She previously taught third grade at Tom Danby's former school. In her current assignment, Sanders works with teachers throughout Stonefield School District, supporting them in their efforts to use special math and reading software that is intended to help improve student performance in those two subject areas. The investigator was informed that Jennifer had played an important role in the district's technology project. When asked to explain her role in the district's

technology implementation project, Sanders offered the following:

I stumbled upon [the software program] at an unrelated seminar and ... came back and begged Mr. Danby to help me pilot it in my classroom - which we did. Because of our success in my classroom and the impact it had on kids and the reaction of parents, he bought a site license for [the school]. So we then tried to implement as well as we could school-wide that next year.

Sanders appears to have played an important role in the project's implementation. Her role is indicative of the impact individuals have had in acting as leaders to create change that rippled throughout the district. Despite the growing effort to bring new technology into the district, however, Sanders mentioned that there was some resistance to change:

Like anything new, a lot of teachers didn't really understand it, didn't know what it was, how to do it. We had some veteran teachers who were not technologically oriented. E-mail was a challenge, so they really didn't even want to have anything to do with it. Even at that school now, 2-3 years later, they still have the weakest implementation, and I

think it's because of [veteran] teachers who still are very leery of technology. (IT.JS.5-14-1)

Leadership and Change

After examining the data on how Stonefield's technology implementation began, the investigator next focused on another of the study's purposes: to examine the role leadership may have played in the district's change process. As in the Riverland case, the investigator found that several ideas emerged from the data about the change process.

Similar to the data in the Riverland case, some of the participants discussed negative aspects of going through change. Bev Dawson, Principal of Parker Middle School, was responsible for creating the capacity for change throughout her organization. She did so by understanding the diversity in her staff and working with the differences. Dawson's remarks resonate with the pragmatic understanding of the change process that often accompanies experience. She recounted the initial difficulties:

Basically, like anything else, the fear factor really dictates how much or how little people are going to use technology. My staff is really diverse age wise. However, I do have some very veteran staff members who are gurus and take the leadership roles. Like anything

else, you can't force something down somebody's throat. They've got to want it and they've got to see the benefits from it. It's that whole shifting what the norm and what the culture is at sites and at the district level for people to use the technology. But again, there was resistance from those teachers [who] are not comfortable with the technology. (IT.BD.5-30-1)

Jennifer Sanders, district teacher on special assignment, was a relative newcomer to the field of education, coming to teaching after several years in the business field. She appeared to have a lot of energy and was very committed to the impact technology can have on students. She was zealous in her determination to see teachers use a specific software program that she believed helped students become better readers. Sanders experienced a great deal of frustration at the resistance she encountered from some teachers:

That was the most challenging for me because I know how powerful these programs and software can be when implemented properly in the classroom. The fact that I have to wait for somebody to say, "Okay. I'm ready" just really irritates me. In the beginning I pushed too hard. Of course that closes doors and closes minds. So when I started this assignment ... I waited

until teachers called me. When teachers started calling me, that's when I started going into their classrooms and when they talked to their friends about what I had done for them. Their friends started calling. That's when I was booked all day everyday for weeks. Just like anything, that's where it's most effective, when they're ready to learn it is when you'll have the most impact. (IT.JS.5-14-6)

I can be like a freight train. If you find something that's really exciting to you and you know works ... it's like, "Of course you've got to at least try it." One of the other administrators, though, was talking about one of her teachers who has just [started using the program], and she said to me, "I knew if I waited she would be there. But if I had told her ... she had to do it, she would have been very, very angry." There are a lot of things in education that have to evolve with someone who really wants it.

(IT.JS.5-14-5)

Information also emerged about how the change process began to take on a more positive slant for Stonefield's administrators. Tom Danby, Principal of Hilltop shared the importance of being visible, especially during the initial stages of the implementation process:

The whole thing was to get me out onto the campus, everyday, and see what was going on. Watching the teachers begin to use [technology] in their lessons, watching the teacher begin to use the Internet and put it into their daily lessons. (IT.TD.2-21-7)

Bev Dawson discussed the importance of keeping the implementation uppermost in peoples' minds by incorporating it into the routine of the school:

I had the teachers do the push on the technology side of it. I told [them], "From now on, every Monday, you will post your assignments for the week on our web site. It's on a lot of levels, and ... it's all integrated and getting into the culture of the school. It's [also] reminding people, and that's just human nature. (IT.BD.5-30-2)

Fouts (2000) shared "There is a growing body of research that indicates that the computer and related technologies, when combined with teacher training and support, can be a transformational agent and help create new learning environments" (p. 28). This transformational effect began to happen at Hilltop school, according to Principal Tom Danby. He explained that the project's momentum grew from within and teachers began creating a culture of expectation for each other:

What happened ... was that core of eighteen [teachers] really grew to almost everyone on the staff. One of the things we identified early on was there were the explorers and then the pioneers and settlers, and then there were the stay-at-homes. Without saying it out loud, we pretty much assumed that the stay-at-homes, well, we would just ignore their nay-say. They would just never get on board. And finally about a year or two ago, they started to get on board because what they found was they didn't like the complaints from parents, and there was no defense level. It was funny because two of them came to me and said, "We are getting a lot of complaints from parents because the other teachers are creating web sites for the kids and the kids are creating web sites and using the Internet. We don't do any of that, and it's making it difficult on us." I said, "Well, what are your options? You can go to any other school and you won't have that kinds of pressure or you can get on board with the rest of them." They said, "What about not demanding the web page set up?" and I said, "No, that doesn't change." (IT.TD.2-21-7-8)

Teacher on special assignment Jennifer Sanders experienced the transformational effect also. She

explained that implementing the change was voluntary, however, as teachers' successes were becoming widely known, other teachers began inquiring about their success: "The word spread, [and] it was, 'Well wait a minute, what are you doing?'" (IT.JS.5-14-1).

Danby shared that teachers supported other teachers with the challenges presented by the changes. They formed their own, informal support groups on their own time, for specific purposes. They began collaborating about ways to enhance what they were doing with the technology. He explained:

What happened was, you have people in the group [who] have a real intuition about technology, and those people would start accelerating. The others would see them accelerate and go to them for questions because I wasn't always available. They'd even start forming little groups and helping each other out. What I found, too, were grade level groups would get together and in their articulation time, they would say, "Okay, how can we use what we've learned from the computer lab ...? So they'd start integrating what they've learned on the computer to what they can take into the classroom to enhance their teaching and learning.

Some of the outcomes of that were [higher] test scores. (IT.TD.2-21-10)

Others, too discussed the results they began seeing from their change efforts. The culture began to change as individuals took risks and shared their learning experiences. Bev Dawson had been going through the learning process along with her staff:

Probably the most rewarding, for me personally, [is] moving from a non-tech person to more and more of a tech person. And, ... watching the staff slowly but surely take risks, try it, have some frustrations, go back and try it again and to have them fully participate. (IT.BD.5-30-10)

Danby agreed that going through a significant change can be grueling, but there are certainly rewards. He shared, "Getting staff energized [was the most rewarding part]. It's like teaching a class of students and when that little light bulb come on, oh wow!" (IT.TD.2-21-9).

It appears that the change effort was beginning to change the cultural context and create a new knowledge base. Fullan (2001b) wrote, "Real change ... represents a serious personal and collective experience characterized by ambivalence and uncertainty; and if the change works out it can result in a sense of mastery, accomplishment, and

professional growth" (p. 32). Jennifer Sanders related her thoughts about the change experience:

The more refined you become in implementing [the program], the more powerful student learning becomes because the kids become responsible for their own learning. That's a life skill in itself. It's not just technology anymore. For me, I refer to it as my goose bump moment. Where kids have a reaction and they say things to you where it just gives you the chills because it's so powerful. I've had so many of those....It's just so amazing. (IT.JS.5-14-3)

Leadership and Staff Development

In its technology plan, Stonefield School District has delineated goals for teacher and administrator training. The plan states, "All school and district staff need ample opportunities for training which can be attained by inservices, self-study and colleagues" (AR.SSD.1). It also lays out levels of certification for computer literacy and explains that teachers who reach higher levels of certification should be given priority to receive technology in their classrooms (AR.SSD.1).

The district's technology plan also explains that trained Computer Technicians are assigned to each of the

school sites to run the school's instructional lab (AR.SSD.1).

During the course of the study, however, the investigator learned a lot from those at Stonefield's schools about how staff development primarily occurred at the school sites on an informal, as needed basis. Fullan's (2001b) philosophy supports the local, ongoing approach. He began a chapter of a book with the following statements:

Let's get one thing straight from the start.

Professional development is not about workshops and courses; rather, it is at its heart the development of habits of learning that are far more likely to be powerful if they present themselves day after day. (p. 253)

Tom Danby has been a principal in Stonefield for over 10 years and has been assigned to 2 different sites during his tenure in the district. He explained how computer training was accomplished at his first school:

Over the last nine years, we've done a lot of training in technology, an awful lot. I did most of it myself Everyone on this campus is tech set, very set.

(IT.TD.2-21-6)

We had one application a month class. So every month I taught a class after school in the computer

lab on a specific application, and sometimes we'd take a couple months to finish up one application. Then there was an expectation built in from recruitment for hiring amongst teachers who used this technology. So, I was able to grow the staff and to fertilize it with these trainings. Just not my trainings, there were other people who did training both on site and off site. Most of our training was on site. (IT.TD.2-21-6)

Fullan (2001b) asserted that collaboration that focuses on student performance is vital to developing innovative practices. He also wrote that we need to build on valuable work as it is successful; we need to embed successful strategies into the day-to-day work of teachers; and we need to nurture and support school leadership as they are focused on the all of the foregoing activities--in short, we need to "reculture" the profession (pp. 254-255).

The investigator found Danby to be very committed to the type of "reculturing" that Fullan (2001b) discussed. Danby believed in the power of technology to transform his school culture for the benefit of the students, and he insisted upon seeing it in use throughout his school site. The investigator asked Danby to discuss some of the challenges he had encountered when trying to ensure all of

his staff were adequately prepared to participate in the technology vision. He responded:

I'll tell you what *wasn't* a challenge was finding the time to do it after school. What *wasn't* a challenging was finding the hardware and software: we have it on campus. I think the challenge that we did find in the staff development time was the cost of sending people to training. In-house training was a no brainer. We did it after school, we did it on Saturday's. It was all volunteer. I have teachers who said they'd rather do it on a Saturday than after school. So I offered a Saturday class. They all got credit for it on the salary schedule, credit, but no pay. You try to make it as convenient for them as possible. What I told them was, if you show the interest, we'll find the time and we'll make it work for you. It was finding money for the training for the outside training that was the tough part. (IT.TD.2-21-9)

Later in the investigator's conversation with Danby, when he was discussing the staff at his second site, he continued his thoughts about staff development:

Group planning [was involved in the implementation], and we were all together in the training. I think we all get credit. I didn't do all the training. I did

most of it. We had other staff members who would do some training and of course we sent some people out. That was the challenge, the funding for that.

(IT.TD.2-21-10)

Middle School Principal, Bev Dawson, was not as computer-confident as Danby, but was no less committed to seeing computers used at her school. It seems that she knew the importance of creating the climate for change was to her school as well. As the leader, Dawson enlisted the help of others to ensure appropriate training and support were available for her staff. She shared that her computer lab teacher, Don Griggs, was critical to her site's training and support efforts:

Don has been absolutely fabulous. What he did is he would help people individually. He gave us several inservices. One of the best things is to give little pieces of information out, and what was happening, and the way [he] went about it was, depending on what type of issues people were having with the computer, then he would respond and assist those people individually.

Don spent a lot of time just teaching people e-mail. We just had a little lesson on how to attach something. They all had to learn how to do a document in Word and put it over on their web page, their

calendar for the week. People struggled a bit, but [he] was right there, and you have to have that support. (IT.BD.5-30-3)

Fullan's (2001b) ideas about local, ongoing professional development were evident at Parker Middle School, but as Principal Dawson explained, they had tried many other approaches. She shared that she too had sent some teachers to individual conferences, but she expressed that over time, the need to go outside lessened as veteran teachers became more proficient and as newly-hired teachers were already very computer literate.

According to Dawson, the district has hired subject matter leaders, and the Science lead at her school has also begun to play a lead in supporting others in the area of technology (IT.BD.5-30-6). She shared that as their experience with computers has grown over the years, they have moved to one-on-one support, as the need arises, as the best method for the staff:

You've got to go about it [staff development] in multiple ways in order to get it embedded. That takes time. It's a process.

We've done our own teacher on staff training our other teachers within. I find that to be, in all staff development, I have found over the years that my

best trainers of my teachers are my own teachers. I think it is because they have regard and respect for one another already, and there's a high level of trust. What happens when somebody comes in from the outside, they don't know your past. They don't know your situation at the time. If they're all talking about something everyone knows about then the teachers perceive it as a waste of their time. Or if they go off in some direction that they don't feel is real relevant and pertinent to them teachers feel it's a waste of their time. Don, who works with everybody everyday, knows exactly the kinds of questions and barriers people are facing in technology. He can customize his training based on what he knows from the people who are using it. It just makes a lot of sense. (IT.BD.5-30-5)

I would say your best shot at having it [computer use] happen is each one teach one. It's handholding and it's each one teach one. It's really just ground level change. (IT.BD.5-30-9)

Jennifer Sanders, as a district teacher on special assignment, has also learned that local, ongoing one-on-one support is the ideal way to help teachers during a steep learning curve. Her new role took her out of the classroom

in an attempt to help train teachers district-wide on the use of a specialized software program. She explained that she attempted several different ways to try to help teachers learn the program: special trainings after school, booking with sites several weeks in advance for follow up, monthly newsletters, but in the end, she feels that one-on-one modeling and individual support is the best approach (IT.JS.5-14-3). She explained:

I realized in the beginning of the year when I was doing the after school staff development that I wasn't having the penetration that I wanted. I wasn't getting out to teachers (IT.JS.5-14-4)

Even a week wasn't enough at any one site because of the number of teachers. It was the best I could do to cover as many schools and classrooms and teachers as I could. Then I'd be booked out 3 to 4 weeks, and somebody would need me right then and there. They're having a problem and need me to come help them. I was like, "Could you wait a month?" So that became a challenge. I started getting creative with my schedule and trying to figure out or leave the last hour of the afternoon always open. That way if I needed to be somewhere for a single teacher, I could get there (IT.JS.5-14-4)

I found the best way to [support teachers] is being in the classroom with them to show them the right way the first time For me, the teachers who are implementing [the technology program] most effectively are the classrooms where I was actually in there with them for 2 to 3 days in a row, for at least an hour a day, really showing them how to get it going and how to use it. (IT.JS.5-14-3)

Sanders explained that some schools began paying teachers a stipend to work extra hours to support technology-based programs, and she believes that has helped a great deal. She shared, "There are people at nearly every site who are pretty knowledgeable ... and that's really allowed me to pick up the slack" (IT.JS.5-14-5).

Sanders continues to meet with teachers one-on-one on an on-call basis as she is able. She stated that she tries to make herself available at the teacher's convenience:

Tell me when you have a prep time. Tell me when you have a lunchtime. Tell me if your grade level gets together. I'll do it during your lunchtime. I'll do it during your PE time. Get a group together We'll come. (IT.JS.5-14-6)

Sanders tries to get small groups of teachers together to discuss successes and ongoing problems as a way of helping everyone improve:

They've got to talk to each other. The way I implement [the program] may be a little different from the way you implement it, and you might figure out a trick or classroom management trick. There is constant dialogue between grade levels and teachers and sharing tips and ideas. That has gone on, and that's been great for them. (IT.JS.5-14-9)

Summary of Stonefield School District Case

Stonefield School District supports the purchase of technology through the use of several district and site funding sources (IT.BD.5-30-10; AR.SDD.1). In an effort to ensure that each of the district's students have access to technology, the district has created computer labs at each school and has funded a lab technician for each of the labs. The district does encourage the schools to add technology and they see fit, and consequently, school vary in their acquisition of technology (AR.SDD.1)

Hilltop Elementary School and Parker Middle School have growing technology projects, and teachers are at various stages of computer competence and level of comfort as they assimilate the changes into their curriculum

offerings. Principals Danby and Dawson have both encouraged and required teachers to change by being visible, modeling new behavior, supporting teachers through their change efforts, and establishing expectations about the changes.

Both Hilltop and Parker have tried sending teachers to outside training and having others come from outside the district. They expressed a level of dissatisfaction with both of those approaches. Both principals have provided some degree of local, ongoing, one-on-one and small group staff development support. They, along with teacher Jennifer Sanders, expressed that their greatest successes had been when teachers were trained locally and had regular, individual or small group follow-up.

Summary of Study's Findings

The study's two cases, Riverland and Stonefield, helped the investigator examine the three questions at the heart of the study:

1. What role, if any, did leadership play in the school district's implementation of technology?
2. What role, if any, did leadership play in the school district's change process?
3. What role, if any, did leadership play in the staff development effort?

When looking at the technology implementation effort, the investigator realized the impact of the project went beyond the project itself. There were data to indicate that the culture of the organizations themselves was impacted. Honey (2001) found the same to be true in a school district she studied. She shared the following observation:

Effective school reform--meaning reforms that take root broadly across multiple layers of the educational system are sustained over time and result in demonstrable improvements in student learning--does not require technology. But ... technological tools ... allowed for forms of communication; students production; curriculum development; and collaboration among students, teachers, and administrators, that simply would not otherwise have been possible and that were part and parcel of the school system's process of change. (p. 3)

In examining the technology implementation efforts in the two cases, the data show the two district's programs began with the interest of individuals at the school sites; however, a certain level of ongoing district support was provided in both cases. The catalysts for project implementation were both teachers and administrators, but

it appears that administrator support was important for the long-term viability of the projects.

The change process encountered resistance from some in both cases, but the interested parties seemed to stay the course. Various tactics were employed in overcoming or diffusing resistance, including clear communication of vision, clear communication of expectations, modeling expected outcomes by others, peer pressure, monitoring of implementation, ongoing communication, and one-on-one or small group support.

In both cases, a variety of staff development approaches were attempted. Data show that, for the most part, teachers and administrators found in-house trainers and one-on-one training most desirable. If outside trainers were successful in their efforts, they were best received if they were current teachers. Data emerged that seemed to indicate trainings were most successful if they involved learning small chunks of very specific information that would address a tangible learning outcome, followed by the expectation and monitoring of the implementation of that outcome. The data support Fullan's (2001a) statement:

Focusing on information rather than use is why sending individuals and even teams to external training by itself does not work. Leading in a culture of change

does not mean placing changed individuals into unchanged environments. Rather, change leaders work on changing the context, helping create new settings conducive to learning and sharing that learning. (p. 79)

CHAPTER FIVE

DISCUSSION, CONCLUSIONS, LIMITATIONS, AND IMPLICATIONS

Introduction

According to Lincoln and Guba (1985), the substantive case report should contain "a discussion of outcomes of the inquiry, which may most usefully be thought of as the 'lessons to be learned' from the study" (p. 362) rather than generalizations that can automatically be applied to other situations. They shared that a discussion of outcomes and observations may be helpful in developing an understanding of the cases studied.

Lincoln and Guba (1985) explained that case studies should provide the reader a level of internal consistency, or trustworthiness, so that information can provide a "point of leverage from which to test interpretations" (p. 359). In addition, the case study's elaborate descriptions should provide a sufficient contextual base for the reader to determine whether or not the information is transferable to other contexts and situations (p. 359).

Discussion

This case study had three purposes. It sought to examine the possible role of leadership in the implementation of a technology program, the change process involved, and the staff development efforts that may have occurred. The investigation was undertaken in two school districts, Riverland and Stonefield. Active technology projects exist at various school sites within each of the school districts. The projects vary in terms of scope and level of use, however, they were similar enough to warrant further discussion.

The case findings will be considered from two perspectives - the individual school sites and the larger theoretical frameworks. A discussion of the Riverland findings precedes the Stonefield findings. Each section begins with a review of the technology projects followed by the case findings regarding the role of leadership for each aspect: technology project, change process, staff development approach.

Review of Riverland's Technology Project

Technology implementation in Riverland initially began because of teacher interest. Use of computers was limited to those who showed an early interest in pursuing hardware and software acquisition on their own. They acquired

equipment, materials, and information through grant writing activities, sharing with each other, and by attending conferences. The implementation surged forward when new personnel were hired in key positions: superintendent, technology director, site leaders, and computer assistants.

Riverland now has various levels of computer technology in each of its schools. Schools have computer labs and assistants; each classroom has several connections to the Internet and the hardware to correspond to the connections; and teachers have software to analyze student performance data, record grades and note discipline events, keep track of attendance and parent contacts, communicate via email, and support classroom instruction. Teachers have the ability to create web sites that contain student assignments and products, class information, and various other pieces of information. The district also has ongoing inservice training opportunities for staff to continue learning about computer applications.

Riverland's experience parallels the "evolution of best practices" outlined by Fouts (2000, p. i), starting with teachers learning to program, followed by students using computers to play simple learning games, on to word processing, and eventually to the Internet and the volumes of information available to students to use for research

projects, real problem solving, and other expanded learning opportunities (Fouts, 2000, p. i).

Leadership and Technology Implementation

The investigator used several leadership perspectives to examine the possible role of leadership on Riverland's technology project. Burns' (1978) writings of leadership helped frame the case. He wrote "leadership is the reciprocal process of mobilizing, by persons with certain motives and values ... in order to realize goals independently or mutually held by both leaders and followers" (p. 425). Rost's (1991) definition of leadership was also used as a framework by the investigator as a cornerstone of critical thinking about leadership. He defined leadership as "an influence relationship among leaders and followers who intend real changes that reflect their mutual purposes" (p. 102).

The theme of leadership emerged throughout the investigation of the Riverland case to support the notion that leadership had indeed played a role in at part of the district's implementation project. Leaders, such as Superintendent Diane Shelby, Technology Director John Castle, and site administrators Teri Husted and David McGrath engaged with others (teachers) to bring technology into the district.

The project, however, did not begin as the result of a single moment in time which followed a single impetus to get the project moving. It appears from the interview data collected that the project moved forward in a series of gradual starts and then surged forward. Based on the current proliferation of technology plans and guides (Northeast & the Islands Regional Technology in Education Consortium [NEIRTEC] Project, 2002; TEA, 2002) successful projects are those that are planned well in advance, involve a planning committee of representative stakeholders, and have a specific time for beginning. For example, the NEIRTEC Project (2002) contains the imperative:

Before planning for technology ... it is crucial to develop a clear set of goals, expectations, and criteria for improvement in student learning.

Additionally, it is important to establish and support an ongoing staff development program tied to criteria for improvements in student learning. Then, specific curricula, practices, skills, attitudes, and policies that can be enhanced through the use of technology can be identified. (p.1)

Riverland's project did not follow the process described above. Rather, its evolution appears to have

been a seamless combination of transition points. Data indicated that most transitions involved leadership activity as defined by Burns (1978), Rost (1991), and others (Fullan, 2001a, 2001b; Kotter, 1996; Peck, 2003).

In the beginning, teacher Allen James, and others, worked together to acquire computers and the knowledge that would help teachers and students begin to use them. They were able to include an elective course on computers for students. At some point in their efforts, however, James and his colleagues encountered resistance from others when trying to expand the program further. James indicated that he lacked support from key leaders in the district at that time.

The technology implementation effort surged forward again when Diane Shelby became Superintendent and created the job of Technology Director for then district librarian, John Castle. Shelby supported the technology vision by creating a Technology Task Force comprised of interested individuals from throughout the district. The Task Force created a plan that provided them the ability to be able to request funding for their project. The collaborative effort involved a representative group working together to accomplish a mutual goal.

The effort then surged forward further when key leaders continued the project's progression by working with their teachers to learn new applications in their classrooms that would help improve student access and outcomes. Principal Teri Husted described her strategy as "going in the back door" and as a "grass roots effort" (IT.TH.6-21-2) as she worked with her teachers to increase their acquisition and use of new technology. The data indicate that as the need arose, it was validated by others, and a solution was sought to address the need. But, rather than a well-planned, pursuit of an end goal, it was a project that percolated and progressed at various times.

Leadership and Change

With the discussion of leadership as a backdrop, the change process, as it relates to the employment of technology in the classroom, can now be examined. At this point, postmodern ideas about how organizational change (learning) occurs may be instructive.

As discussed earlier in the study, Senge asserts that change requires real involvement of the organization's people in the development and continuance of their vision and realization of their goals on a regular basis. He stated that "though it involves individual skills and areas

of understanding, team learning is a collective discipline The discipline of team learning involves mastering the practices of dialogue and discussion" (1990, p. 237).

Fullan explained that "it is abundantly clear that one of the keys to successful change is the *improvement of relationships*" [italics his] (2001b, p.4). Fullan supports the idea that change is a social process that should involve the development of shared meaning (pp.8-9).

The idea of leadership as a mutual, collaborative process can be conflated with the ideas of change as a social process, involving team learning and group interaction. Using these ideas the data from the Riverland case can be examined.

The data clearly reflect a certain amount of resistance to change existed in the Riverland case. However, it was interesting to note that the investigator found no data that would indicate the technology implementation overall was mandatory for teachers. There were certain parts of the project in which teachers were expected to be involved, such as taking attendance and using the computer to generate grade reports. However, data did not indicate that teachers were required to use the computers for instruction.

The district did establish a pilot at Madison Middle School in order to give teachers a chance to try new programs before disseminating them district-wide. However, the programs were said to be available to teachers, but not required for implementation.

It seems that some of the teachers at Madison were initially reluctant to embrace the technology changes, but when given time and support, they gradually started asking to participate and asking for support. Over time, data indicate that most of the teachers use the computers that were available to them to complement their instruction.

The concept of "support" emerged as a central theme throughout the Riverland data. Teachers expressed the desire to continue the implementation, but still had a certain level of anxiety about the amount of time required to assimilate the changes. Data reflect that administrators, at the site and district level, were eager to provide the necessary support to help ensure teachers felt supported in their change efforts. Teaching colleagues also supported others while attempting to implement software programs in their classrooms.

While acknowledging the change process has been slow, Principal Teri Husted reported she felt the culture of the school has begun to change (IT.TH.6-21-4). The investigator

believes this could indicate that the school might be ready for a broader context of organizational change (learning).

Leadership and Staff Development

Given the backgrounds of leadership and change, the case now turns to discuss the potential role of leadership within the staff development efforts undertaken by staff of Riverland School District to implement their technology program.

In the very early phase of its technology program, Riverland's teachers were on their own to obtain, maintain, and use computers. They attended conferences and worked with each other to achieve their own desired level of comfort with the new technology. During later phases, the district staff brought in vendors to demonstrate how to use their products. They also provided access to on-line training for staff. Eventually, the district used teachers from neighboring districts or provided the training using in-house personnel.

The data clearly reflect a preference for training that involves either one-on-one support or training that is provided through a known individual, preferably a fellow teacher. Teachers preferred focused training that allowed them to progress at their own rate, with on-going support.

Themes of collaboration, support, communication were evident throughout the staff development data. As important as these ideas appear to be however, there were data that could indicate the existence of potentially negative relationships that were counter-productive to the efforts of most teachers to learn effective ways to create a community of learners. For example, the idea of *resistance* emerged at several points through the data.

Resistance was noted in the Riverland case situation. It occurred both with teachers and administrators. Determined leaders with a clear vision worked through the resistance in several ways. Some leaders were able to bypass the resistance by involving interested individuals, many of whom had already invested some time to acquiring technology and technology skills on their own. This seems to have been an effective strategy that worked for them. Many of the non-participants eventually expressed their desire to acquire technology and be trained in its use and application.

Another method for countering resistance in the Riverland case was to ignore it. The leader seemed resigned to the fact that a certain percentage of her teachers, who happened to be nearing retirement, were not willing to participate in the technology project. It seems

the amount of effort it might have taken to see that these individuals participated was not considered a valuable investment. These teachers were required to meet minimum expectations, and beyond that amount of compliance, no further obligation was made. This left the principal the time, energy, and financial resources to concentrate on those individuals who were at least willing to participate and those who were eager to participate.

Leaders also made the effort to express their support and encouragement to those who were participating. They tried to respond in a timely manner to problems and help teachers deal with challenges as they arose. These responses could have been a positive strategy for dealing with resistors.

Review of Stonefield's Technology Project

Technology implementation in Stonefield initially began in much the same way as in Riverland School District, because of the interest of a few individuals and small groups. These individuals were supported by their administrators, and computer acquisition began when small groups came together to write technology grants.

As the district grew, and a new Superintendent was hired, the technology project moved forward at a rapid pace. Data reveal that teachers and administrators in

Stonefield felt supported by the district in their efforts to bring new technology to their schools. Participants indicated that computer technology is used throughout the district for a variety of purposes (TC.GC.3-18-1; IT.TD.2-21-1). The district eventually created computer labs at each school and hired computer aides to run the labs. Computers are used for word processing, instructional support and skills building, and specialized software programs (TC.GC.3-18-1; IT.TD.2-21-1). Internet hook-ups were established and, according to Principal Bev Dawson, the technology program became "embedded into their curriculum" (IT.BD.5-30-2).

Stonefield's technology efforts have moved classroom activities beyond conversations about computers toward discussions about learning and positive impacts on students (Dwyer, 1995). As Fouts (2000) described, "Technology [can] help transform the nature of the school experience" (p. 1). The data show that participants began supporting one another through the change process by helping each other trouble-shoot problems, talking about how they are implementing new software programs, and by learning new concepts together.

Leadership and Technology Implementation

Using the previous ideas about leadership as the theoretical backdrop for discussion (Dyer & Carothers, 2000; Fullan 2001a, 2001b; Miller & Miller, 2001; Peck, 2003), the investigator examined Stonefield's implementation project data.

As with the Riverland case, the data indicate that Stonefield's technology implementation was a result of episodic, collaborative efforts on the part of key leaders and their teacher colleagues. At Parker Middle School, Principal Bev Dawson and several of her teachers worked together to develop a vision of technology early on for their school. They collaborated on the development of the language that went into a technology grant, and upon the successful funding of that grant, implemented their mutual vision.

The impetus for the technology program at the newly-constructed Hilltop School came about in a very different manner, but was realized only through the mutual efforts of school leaders and teachers working together to a common end. Principal Tom Danby was charged with creating the vision for the new elementary school, and a central theme of his vision was to create a school environment that made technology an integral part of their everyday instructional

life. He shared his vision with potential transfer teachers and with potential new hire teachers. In his presentations to others about his vision, he stated, "We're going to use our technology to really benefit and advance ... our teaching, students' learning, and our communications with parents" (IT.TD.2-21-2).

Pronouncements such as Danby's could initially seem dictatorial or autocratic in nature. However, data demonstrate that in the case of Hilltop, teachers were given the option to choose whether or not to transfer to the new school or to stay in their current assignments. In other words, their decision to join Danby was an indication they supported the technology vision and were at the least willing to support it with their efforts. Upon visiting Hilltop's classrooms and talking with teachers, the investigator found that teachers were eager to share the positive impact their technology program had on their learning environment. It appeared to be a mutually-agreed upon effort.

The investigator found that technology was readily available throughout Hilltop and was in use in various settings: the office, the library/media center, and the classrooms. Students, teachers, and staff were observed using technology in small groups, whole classes, and

individuals. Activities included communication tasks, researching for reports, taking assessments, and conducting presentations (FN.HES.2-21-02). The information gathered during the observation reflected positive engagement with the technology at hand, and users were observed to be comfortable with it in the various situations observed.

Leadership and Change

The key to successful change is the improvement in relationships between all involved and not simply the imposition of top down reform (Fullan, 2001b). The data indicated that the change process in the Stonefield case appears to have occurred at various levels of the organization, over a period of time. Some, but not all, veteran teachers, new teachers, site administrators, and district administrators worked together to create mutually-agreed upon change.

The data indicate that although there were some resistors to change, there were few mandates from the administrative levels to incorporate the changes in the classroom. The exception to that was at Hilltop School, and only after the teachers were given the clear choice to transfer to the new school or stay where they were. Once they decided to transfer to Hilltop, it was assumed that by doing so, they agreed to participate in the change process.

When some teachers, after transferring, expressed their frustrations about the requirements, they were given the option to transfer out, but the vision, the expectation, did not change.

The Hilltop principal's method for countering resistance was by clearly delineating his expectations for teachers who were voluntarily transferring to a new school environment. He then actively monitored teachers' implementation efforts. The mandate did not appear to be heavy-handed, on the contrary, the implementation was a critical part of the school's culture and context. The principal incorporated his expectations by threading them into the fabric of the way the teachers conducted their instruction, monitored student performance, assessed student progress, and communicated to parents. In essence, resistors were pressured by the culture and context of the environment to comply. They became uncomfortable resisting the change efforts.

According to Fullan (2001b) change is an uncertain balance between stability and excitement, and leaders need to develop the school's and the individual's capacity to change together. To be successful, all involved need to feel a common stake in the future. As Fullan stated, "Clear statements at the outset may help, but do not

eliminate the problem; the psychological process of learning and understanding something new does not happen in a flash ... it is at the individual level that change does or does not occur" (2001b, p. 47).

To help teachers assimilate the changes, administrators provided support by allowing teachers to share their experiences - good and bad - and by trying to listen to their requests. They also were visible around their campuses and monitored the technology implementation project first hand. They talked to teachers informally about how the project was proceeding. Data show that the administrators also communicated their expectations by requiring teachers to use the technology in various ways. Additionally, Principal Dawson shared the learning experience with her staff as she too had to acquire technology skills in order to use computers in the same way she was asking her teachers to use them.

Leadership and Staff Development

The ideas of collaboration, mutuality, and support continue to resonate through the study's data as the discussion turns to an examination of Stonefield's staff development. Just as the impetus for the technology implementation did not occur in isolation, and the teachers were not required to deal with the change process alone,

they were also not left on their own to learn how to implement technology in their classrooms.

The data show that site administrators and staff worked together to learn about the new technology. At one school, the principal held voluntary classes at teachers' convenience to help them learn new applications. The principal reported, "We were all together in the training . . . we all get the credit" (IT.TD.2-21-10). At another site, the lab tech was available for informal trainings to help teachers learn new applications, such as email. Support personnel were hired to be available to assist teachers when they needed information or advice. In addition to reports of collaboration and support, the investigator noted prolific use of the word "we" throughout the interview transcripts of both administrators and teachers, reflecting the mutual effort and purpose of the study's participants.

Through the study of Stonefield's case, the investigator did not find data to support that a top down staff development effort was in place. It appears that a district-wide plan for computer literacy certification exists, but data show that most staff development takes place at the individual school sites through a variety of ways.

Principal Danby, a proficient computer user, conducted many of the staff development activities for his staff himself. He held voluntary trainings on Saturdays or after school - whenever teachers requested that trainings take place. He worked around their schedules, finding out when it would be convenient for many people to attend. Teachers decided what programs they wanted to learn, and Danby provided the instruction and follow up. These staff development strategies appear to have occurred as incidental to the development of this staff's technology program. There was no evidence that the trainings were a part of a master plan for technology, but rather an effort to meet an emerging need as the school acquired and implemented more technology.

Teachers in Stonefield School District also got together informally to support each other. Subject matter experts emerged who could help colleagues when off-campus trainers were not available. Stonefield did hire a teacher-on-special assignment, however, to provide teachers throughout the district with specialized software training. She tried various approaches to supporting teachers, but found it difficult to meet with teachers at the moment a critical need arose. She shared that her work became easier as individuals at the school sites developed a level

of comfort with the software and could help support others at their school sites.

The data seem to be very consistent about the lack of desirability to hire outside consultants to conduct staff development sessions. They were thought to be too expensive and often not as adept at targeting specific needs as local trainers. Local trainers were also thought to be more credible to their colleagues. This experience echoes what Fullan (2001b) wrote, "Professional development is not about workshops and courses; rather, it is at its heart the development of habits of learning that are far more likely to be powerful if they present themselves day after day" (p. 253).

Conclusions

This investigation sought to examine the possible role leadership may have played in the implementation of technology projects, the change processes involved, and the ensuing staff development programs. Findings in the two case studies were analyzed and discussed. Each case was discussed from two perspectives - the individual case and the larger theoretical frameworks.

The two cases were discussed and case study evidence was examined in light of the three research questions regarding leadership and implementation, leadership and

change, and leadership and staff development. At this point, based on the investigation's findings, the following conclusions can be drawn.

With respect to the study's first research question, what role, if any, did leadership play in each school district's technology implementation project, the data support the conclusion that leadership appears to have played a significant role in both districts' projects. Based on the theoretical assumptions that leadership occurs when leaders and others are involved in mutually deciding to embark upon a change effort, the investigator discovered evidence of such leadership in both cases.

It is interesting to note, however, that the leadership efforts were not necessarily clearly understood or planned to be a clearly delineated effort; they appeared to occur episodically and fluidly concurrent within the normal scope of business. There was no evidence of a significant demarcation of the event, no fanfare, only a purpose to accomplish something.

Both Riverland and Stonefield's cases showed that individuals at the grass roots levels were involved in their districts' technology programs. Even after the technology became more available throughout the districts, teachers and administrators were involved together in

making the technology programs progress to ultimately become "embedded" in the learning environment. There was no evidence of top-down mandates for implementation from the district level despite district investment. At the same time, however, there was evidence in both cases, of administrator expectation and monitoring on the local level. But the evidence did not indicate that teachers and administrators were at odds or antagonistic about the implementation.

Chrislip and Larson (1994) stated, "Collaboration involves sustained, self-critical interaction among participants" (p. 96), and evidence of this kind of effort emerged in both cases. The investigator determined that the episodic nature of the implementation process continued due to an ongoing effort of key leaders and teachers to sustain movement forward. In other words, the process of growth and challenge became self-perpetuating.

The cycle of building the capacity of the organization for change (Fullan, 2001b) helped the investigator address the study's second research question by concluding that leadership was in evidence as the two districts encountered and embraced the change process. A commitment to a mutual purpose and shared belief in ongoing implementation and the

incorporation of the changes brought by the implementation was in evidence.

In each case, teachers supported each other by developing informal groups to help create positive conditions for change. They engaged in leadership by involving themselves in reciprocal relationships by persons with common motives and values (Burns, 1978). By engaging together in change, teachers and others create a self-perpetuating synergy that helps support everyone through the change effort.

The study's third question had to do with examining the role, if any, leadership played in the districts' staff development program. The investigator found that both of the districts had gone through very similar stages in attempting to help staff members acquire the necessary technology skills to use the technology in their classrooms. They had employed outside consultants and vendors and each determined that those efforts were not effective. They had attempted group classes and on-line training courses, with mixed results. Both districts' data demonstrate that one-on-one support is the most effective.

Fullan (2001b) espouses individual growth within the context of the organization as a whole. Through his work, he shares that professional growth should be a progressive

process achieved by the individual but for a common purpose.

Change is multidimensional and ongoing, and in order to prepare for that change, individuals should develop "habits of learning" (p. 253) that are pursued in a collaborative manner. Leadership should reverberate through all levels of the organization in sporadic surges as a need is identified. Individuals throughout the organization will then feel comfortable about embracing change as a vital and inherent component of the learning organization.

In the cases studied, the data indicate that some evidence exists of engaged leadership activities in the staff development approaches. These are evident in the collaboration, mutual support, sharing of information, and eager response of individuals throughout both organizations.

One-time, outside assistance was not successful, neither were the isolating experiences of on-line courses. Individuals preferred the direct, personal response to an expressed need to either of the above. It appears they felt more secure about learning challenging concepts and trying new ideas when experiencing the reassurance of the support of a peer or colleague.

In summary, school districts who wish to embark upon technology implementation efforts in a positive, productive way, creating meaningful change, and develop teachers' capacity to use the technology should consider involving those who have a common stake in creating the changes.

Fullan (2001b) wrote, "The process of educational reform is much more complex than had been anticipated. Even apparent successes have fundamental flaws (p. 17)." He concluded that it takes about 3-8 years (depending on the configuration of the organization) to create successful change. But, he concludes, "*By more intensive and more thorough use of the change knowledge, ... we can accelerate the process of successful change*" [italics his] (Fullan, 2001b, p. 18). The two case study districts had individuals who worked together to significantly change the way they deliver instruction and engage in the educational process.

According to Fullan (2001b), the key words for future change are "meaning, coherence, connectedness, synergy, alignment, and capacity for continuous improvement" (p. 19). Many of Fullan's ideas as well as other change themes have emerged through this study. Figure 1 captures these themes and depicts them as critical ideas to consider before beginning a significant change effort. As Figure 1 suggests, productive change efforts are often non linear,

and involve sustained dialogue, planning, and commitment in order to remain viable.

Limitations

According to Lincoln and Guba (1985), the trustworthiness of a qualitative investigation is measured by its credibility, transferability, dependability, and confirmability. There are limitations to this study which affect its trustworthiness.

The study's credibility is enhanced by the investigator's prolonged engagement within the educational culture, although the investigator was not a member of either particular case being studied. This study is however, the investigator's first attempt at formal research, and as such, the study may be affected by the imperfect skills of the investigator. The investigator has attempted to control for this threat through triangulation of data, member checking, and peer debriefing, all of which are recommended practices to limit threats to credibility (Lincoln & Guba, 1985).

Transferability can be problematic for all qualitative research, but it has been the goal of the investigator to provide the "thick description ... necessary for judgments of transferability" (Lincoln & Guba, 1985, p.359).

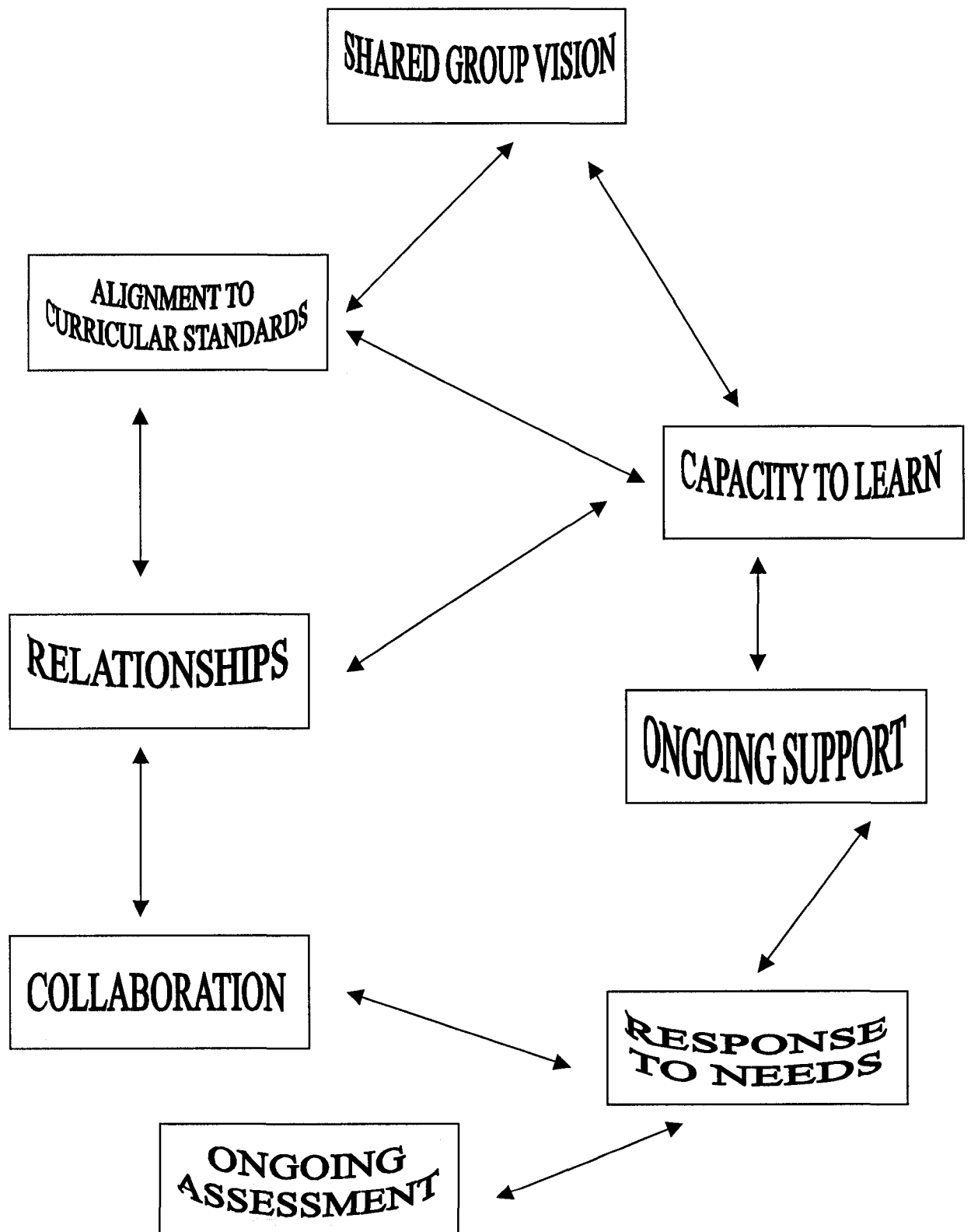


Figure 1. Key themes for effective change efforts.

This study, however, has these limitations to its applicability to other settings: it does not include an urban setting and investigated only one suburban and one rural district. The study's focus was to explore the impact of human interaction and support rather than on the degree to which individuals or groups mastered or implemented technology in their schools. It did not attempt to quantify or compare degree of technology usage by school or district personnel.

To enhance the study's dependability and confirmability, the investigator has engaged in record-keeping which makes the conduct of the study transparent. Careful record-keeping created a portfolio for each case that would allow an auditor to examine to verify that the investigator has established trustworthiness.

Implications

As school districts embark on technology implementation projects, the challenge exists to find an effective way to incorporate the changes that will develop. There are numerous steps a district should go through before moving forward with such a project. The findings of this study have implications for educators who want to move forward with their projects in a productive, informed way.

The study was based on the assumption that schools are responsible for equipping their students with the appropriate technology skills to be successful problem solvers throughout their lives. It also assumed that most educators realize their responsibility toward implementing effective technology programs but are frustrated in doing so when faced with many limitations on time and resources. The study has sought to discover how postmodern leadership can help create positive change in districts thinking about technology projects.

Summary

Many school districts are struggling to implement successful technology programs. They are faced with significant challenges such as limited funding, time demands, training programs, standards and accountability, and resistance. Creating the context for change can be difficult unless teachers are involved in the planning, training, and evaluation of the project. Educators can easily become frustrated by these numerous challenges.

This study examined the technology implementation efforts of two school districts, one rural and one suburban. The investigator studied whether or not leadership played a role in the implementation, the change process, and the staff development efforts.

The study's results showed that leadership had indeed played a role in each of the two districts' efforts. Collaboration, mutual purpose, and ongoing support were key themes that emerged throughout the study. As individuals worked together to create technology projects, worked through the challenges together, and helped one another learn, their projects moved forward, creating a context for continued learning for everyone.

The study shows educators that effective change must be accompanied by open engagement with others. Leadership occurs through supportive relationships with colleagues who have established common purposes. Creating viable technology programs requires this type of engaged leadership.

Individuals affected by change need to understand they are a part of the change effort, they will be supported through the change process, and they will celebrate successes and learn from failures in a collaborative environment. Technology plans can be a necessary and effective tool to help formulate specific goals and desired outcomes. The knowledgeable individuals, however, will realize that mandated change does not create a real commitment to change. Such changes will be embraced

through open, honest dialogue; effective leadership; and ongoing support.

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Appendix A

Access Letter

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January 29, 2002

Mr. George Cardoza
Deputy Superintendent
Stonefield Unified School District
Stonefield, CA

Dear Mr. Cardoza:

Thank you for considering participation in my doctoral research project. I have enclosed a description of the study for your perusal. The information includes an abstract of the proposed study and a summary of issues related to conducting this study in your district.

I am excited about the possibility of using Stonefield Unified as the suburban setting for the study because of your commitment to technology in your schools. I hope the enclosed information will assist you in your decision to allow access to your district for the proposed study.

If you have any questions or need additional information, please contact me at the above numbers.

Sincerely,

Rebecca D. Gillespie

Appendix B

Interview Questions

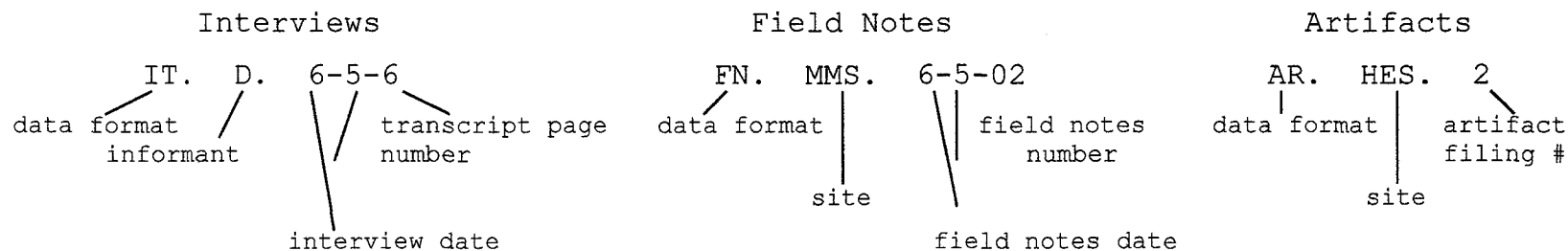
Demographics: Name, years of teaching (and/or administrative experience), degree (s), school/community setting, assignment.

1. Please describe your school's technology project.
2. How did your school become involved in the project?
3. What type of staff development was provided?
4. What role did others play in your success, or lack of success, in the technology project?
5. Who were/are the key individuals in the project?
6. What were the positive outcomes of the staff development?
7. What, if anything, didn't work or could have been improved upon?
8. What were the most challenging parts of the implementation process?
9. What were the most rewarding parts of the implementation process?

10. How were teachers (or administrators) involved in the implementation process?
11. What were your reservations about the project prior to its inception?
12. What unforeseen impact did the project have on you and your students?
13. What would have made the project more effective?
14. Have there been any significant changes in curriculum, instruction, or student outcomes since project implementation?
15. Was there any resistance to technology among staff prior to beginning implementation?
16. Did you have any fears or concerns regarding technology prior to the implementation?
17. Is there anything else you would like to add?
18. Is there someone who might have very different opinions about this project with whom I should talk?

Appendix C
Data Citation Formats and Keys

Text Citation Formats



Keys

Data Formats

AR=artifact
 FN=field note
 IT=interview audiotaped
 TC=telephone

Field Notes

RSD=Riverland Dist. Office
 MMS=Madison Middle School
 SSD=Stonefield District Office
 HES=Hilltop Elementary School
 PMS=Parker Middle School

Riverland Part.

DS=Diane Shelby
 JC=John Castle
 AJ=Allen James
 TH=Teri Husted
 DM=David McGrath

Stonefield Part.

GC=George Cardoza
 BD=Bev Dawson
 TD=Tom Danby
 JS=Jennifer Sanders

Appendix D
Riverland Artifacts

<u>Filing #</u>	<u>Name</u>	<u>Significance</u>
1	Technology Plan	Triangulate staff development
2	Telephone call notes Diane Shelby	Triangulate implementation and staff development
3	Telephone call notes John Castle	Member checking to verify information
4	Website Information	Demographic information Testing information Triangulate implementation process
5	School Accountability Report Cards	Triangulate district information and implementation activities
6	Site Observation Notes	Triangulate implementation and verify information

Appendix E
Stonfield Artifacts

<u>Filing #</u>	<u>Name</u>	<u>Significance</u>
1	Technology Plan	Triangulate staff development
2	Telephone call notes George Cardoza	Triangulate implementation and staff development
3	District Newsletter	Verify district information
4	Website Information	Demographic information Testing information Triangulate implementation process
5	School Accountability Report Cards	Triangulate district information and implementation activities
6	Site Observation Notes	Triangulate implementation and verify information
7	Mini-Review Observations	Triangulate implementation activities