A BLUEPRINT FOR CHANGE : THE RECONSTRUCTION OF A SCHOOL

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(ABSTRACT)

This is a case of technological change as it took place in Jefferson Middle School over eight years. It is a study of how a school moved from the abstract level of visioning and planning to the concrete level of action and implementation. Through interviews, historical documents, and reflection a story is told using a building trade metaphor of how the work environment, governance, and learning evolved under the leadership of a new principal as an instructional technology plan was implemented. A lens metaphor was used to view culture, change process, leadership, and reform and frame the guiding questions and conclusions. The culture was transformed by empowering staff members to act and involving them in decision making. A change in the use of instructional technology occurred because staff members shared ideas; participated in visioning, planning, and training; and used the services of an "outside expert". Leadership roles such as "supporter," "innovator," and "expert" were dispersed among staff members. The staff was involved in building level reform as they identified and solved problems. This case may be helpful to practitioners implementing change.

DEDICATION

To my wife for her patience during my times of distraction and for providing love, support, and encouragement; and to my sons for their love and interest in my work.

ACKNOWLEDGMENTS

The Jefferson Middle School staff created a superb learning environment for students.

The interviewed staff members recalled the people and events that shaped our school.

Sarah, the “outside expert,” provided skills in planning and instructional technology that assisted in implementing our plan.

Tim, the assistant principal, gave technical assistance to the staff in classrooms and me in the preparation of this paper.

My transcriptionist moonlighted to prepare the interview data and matrices.

The members of my dissertation committee gave invaluable assistance.

Steve Parson prompted me to review the dates and relevance of the references.

Sarah Simmons restarted my writing by reminding me that the story had a beginning, middle, and end.

Jerry Niles told me that I did not have to apologize for choosing to write about my work place.

Dave Parks, my advisor and mentor, taught me to verbalize thoughts before writing, graphically organize ideas, and write in a clearer and more concise style. Thanks, Dave, for always having an abundance of time and patience.

TABLE OF CONTENTS

CHAPTER ONE: THE OPPORTUNITY FOR CHANGE

Critics of public education can be heard daily in the media discussing the need for major improvement in public schools. Politicians, educators, and other citizens are in quest of the best way to change schools. Over the past eight years, significant changes have occurred in my school as the staff implemented a plan to integrate technology into the instructional program.

Every school has its story that consists of a setting, characters, and events. All of the characters have stories that relate to how things have become as they are where they work. I will reconstruct past events at Jefferson Middle School in the city of Oakton in a southeastern state with the overall goal of exploring the process and dynamics of practice in one school that occurred from July 1990 to the present. I believe this is an exemplary case of technological change as it transpired at the building level and through it I will provide practitioners with useful information on the change process. I will identify leaders and their roles in carrying out this process, and I will relate the story of how a school moved from the abstract level of visioning and planning to the concrete level of action and implementation.

With exhilaration and some concern, I was appointed principal of Jefferson Middle School on July 1, 1990, with no experience in either middle schools or instructional technology. How would this principalship differ from my fifteen years

as an elementary school administrator? What immediate challenges would I face in working with the students, parents, and staff? The first year was spent learning middle school orthodoxy, becoming familiar with the culture, trouble shooting curriculum issues assigned by the superintendent, and establishing a pilot site-based management council. While learning about the school and performing these tasks, perhaps I was basing my work on experience, reflection, and the art of management (Schon, 1983) as assessment and planning continued.

The establishment of a site-based management team in June 1991 provided the opportunity to work with a core of staff members who had been selected by their teams to serve on the first council. We immediately began to learn about consensus decision-making, the importance of sharing information about the school with the staff, and taking ownership for decisions that were made. I also reviewed with the council the necessity of careful listening to other points of view while we conducted school business. It was through careful listening that we gained the best ideas that everyone had to offer. In addition to this learning, the site-based council designed and approved a mission statement which included beliefs about teaching and learning and decided what should be in the student handbook for the 1991-1992 school year. These activities caused this group to focus on common subjects of interest and established the belief that the staff was involved in deciding the direction of the school.

As we began the 1991-1992 school year, my major concern was that Jefferson was a designated computer magnet center but only five percent of the students had access to computers in their classes. How could we continue to be called a computer school with this obvious misrepresentation of the facts? Possible options included dropping the magnet label or changing the way the school delivered magnet services. I favored dropping the magnet program but did not feel comfortable making this change without first consulting with a district leader. My determination to reach a decision led me to the central office one evening in December 1991. A suggestion by an assistant superintendent kept me from immediately axing the magnet program. She said,

> "You may drop the program if you wish, but first, I encourage you to speak with Sarah. She knows more about the possibilities of instructional technology and how to make it happen than anyone else in the district. Right now, she is a well-kept secret, but she will not stay that way for long."

The next day I called Sarah and scheduled an appointment for January 3, 1992.

Six years later, the school grants a Carnegie Credit in technology to 8th graders, provides a student-to-computer ratio of 5:1, and provides access to technology through a variety of sources such as mini-labs assigned to each team, a research center, a networked Mac lab, a mobile laptop computer lab, multiple units of laser disc players, VCR players, and large-screen TV's for computer displays.

Members of an Oakton City Public Schools Instructional Program Review Committee (1997) commended Jefferson's "seamless integration of technology as a teaching tool within instruction and evidence of a long-range technology plan" (p.1). Students, parents, and staff completing National Study of School Evaluation surveys in 1995 and 1996 responded that students have good access to technology, technology helps students to be successful, technology is viewed as a learning tool, and teachers strongly support the emphasis placed on technology. The visiting committee of the Southern Association of Colleges and Schools on May 6, 1998, said that at Jefferson, "Technology is an integral part of the learning environment as opposed to a separate course of study -- students are immersed." These indicators of the integration of technology with the instructional program did not exist in 1990.

In retrospect, I wondered, "How did all of this change take place over the past eight years? How did the school's culture in 1990 differ from the school's culture today? What were the steps in the change process? Why did the staff adopt technology as a teaching tool? Who were the leaders in the technological change and what roles did they play?" These questions were answered as this case was studied.

Jefferson Middle School in 1998 has an enrollment of 640 students with 30 percent minority representation and 38 percent receiving free or reduced lunches. An average of 60 students attend each year from outside the attendance zone by

applying through the district's magnet office. The use of technology in all subjects is the focus of the Jefferson Magnet Program. Attention to maintaining diversity in the student body is a priority in the application and selection process. Forty-five teachers work in teams serving the sixth, seventh, and eighth grades. Faculty representatives from each team, parents, and administrators form the Site-based Council where decisions are made about the operation of the school.

Involvement with the community includes monthly meetings with a twenty-five member PTA Board and consultations about students with community agencies. Partnerships have developed with Virginia Tech and Virginia Western for student teacher internships and the University of Virginia for professional development.

In conducting the study of the school, two metaphors were used to add meaning and relevance to the inquiry. Much like a photographer, various lenses -- culture, change process, leadership, and reform -- were used in framing guiding questions, structuring the literature review, and drawing conclusions. Like an architect, I organized the findings in phases -- the site-appraisal phase, blueprint phase, and construction phase -- to provide a narrative account of the change process. The use of these metaphors brought a clearer and richer understanding of what occurred at Jefferson Middle School during the past several years.

The Guiding Questions

The following research questions were designed to view the three phases of change through four lenses: culture, change process, leadership, and reform.

The Culture Lens

1. How did the school's culture affect the technological change?
    a. What was the school's culture in 1990?
    b. What is the school's culture today?
    c. How was the culture shaped between 1990 and the present?
    d. How were decisions made about technological change from 1990 to the present?

The Change Process Lens

2. What was the process of technological change at the school?
    a. What affected the teachers' adoption of the change?
    b. What are the teachers doing now that they were not doing in 1990?

The Leadership Lens

3. Who played leadership roles in the technological change, and what roles did they play?

The Reform Lens

4. What actions and events occurring from 1990 to the present are characteristic of building-level reform?

CHAPTER TWO: THEORETICAL PERSPECTIVES

The four lenses -- culture, change process, leadership, and reform -- have a rich supporting literature in the field of organizational studies. The major components of these four lenses are examined here. The changes at Jefferson are part of the national school reform movement; this movement is described to provide a context for those changes. Education, like all professions, has a foundation of knowledge to support its work. This knowledge base supports successful practice and serves as lenses to view what happened in this school. A review of literature on reform, change, culture, and leadership provides the foundation for the study.

The Reform Lens

There are many stories within the topic of school reform. Everyone has an opinion on how schools should be improved. Statistics and documented cases point to many areas requiring attention in the nation's classrooms. Assessments range from dire reports of failure to reports of inferiority when comparisons are made to other countries' educational systems. At best, the overall view of the schools is that they are mediocre. There is no consensus about what schools should be. This lack of a clear vision has fragmented the school reform effort. Two basic strategies have emerged as avenues to school renewal: top-down and bottom-up.

Top-down Reform

The Nation at Risk report (1983) introduced the first round of top-down reform movement by proposing such changes as longer school days, longer school years, more testing for students, increased graduation requirements, and career ladders for teachers. These interventions were based on the concept that schools could be improved by demanding more of students and teachers. Business interests drew up reform plans and provided monetary awards to teachers and schools while the politicians passed laws and regulations to control schools (Mehlinger, 1995).

Another effort in the top-down reform movement was proposed by President George Bush in Charlottesville,Virginia, at the University of Virginia in the fall of 1989. Six goals were introduced in much the same way that a business would list annual planning objectives (Mehlinger, 1995). These goals were:

1. By the year 2000, all children in America will start school ready to learn;
2. By the year 2000, the high school graduation rate will increase to at least 90 percent;
3. By the year 2000, American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter ... , and every school in America will ensure that all students learn to use their

minds well, so that they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy.

4. By the year 2000, U. S. students will be first in the world in mathematics and science achievement;

5. By the year 2000, every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship;

6. By the year 2000, every school in America will be free of drugs and violence and will offer a disciplined environment to learning. (p. 37)

The Goals 2000 initiative was followed by the New Standards Project in 1991 (Mehlinger, 1995). The National Center on Education and the Economy teamed with the Learning Research and Developmental Center at the University of Pittsburgh to develop a national examination system. Their effort, called the New Standards Project, has set goals and standards for all grade levels and subjects. In 1994 the National Education Standards and Improvement Council was established to approve national and state standards meeting its approval (Mehlinger, 1995).

These reform efforts are some of the best known examples of external reformers who usually pose two questions: "What do we want the schools to be like, and how do we get them to be that way?" (Barth, 1990, p. xiii) . Supporters of top-down school improvement tend to create lists of expectations, characteristics, or

competencies for all schools to meet. The basic assumption of these top-down reformers is that educators at the local level do not possess the skills necessary to improve their schools. Direction must come from political and business leaders if the educational system is going to improve.

Bottom-up Reform

The second major reform movement is supported by people who do not favor proposals that treat all schools the same. The leaders of the bottom-up reform group have studied schools for years and have noticed the uniqueness of each school and its culture.

At the foundation of this reform approach is Goodlad (1984) who outlined the problems associated with our educational system and suggested that the solutions to the problems in schools must be solved by well-supported and trained professionals who work in those schools. His basic premise is that each school can become self-directing as building personnel gain the skills to implement renewal. Identification of problems, gathering of data, dialogue, development of solutions, and monitoring of progress are actions that can guide change and create a productive workplace.

Another prominent leader in the bottom-up reform movement is Sizer (1984) who founded the Coalition of Essential Schools. Nine principles have emerged

from his work. The member schools in the coalition agree to the nine principles which may be applied in ways deemed best by the local school staff:

1. Schools should focus on helping students learn to use their minds well.

2. Goals should stress student mastery of essential skills and competency in specific areas of knowledge.

3. Goals should apply to all students, but a variety of practices should be used to fit individual needs.

4. Teaching and learning should be personalized as much as possible.

5. Students should be seen as workers, and teachers should be seen as coaches.

6. Students should receive the assistance they need to successfully demonstrate mastery for graduation.

7. Unanxious expectation should set the tone. (I won't threaten you, but I expect much of you).

8. Faculty should view themselves as scholars in general education and experts in a discipline.

9. There should be considerable time for planning and teachers should be paid competitive salaries.

In 1993, Brown University established The Annenberg Institute for School Reform under the directorship of Sizer. Those who philosophically support

bottom-up approaches have a well-funded center to provide leadership. The institute has developed four principles to guide its efforts:

1. All children must learn and learn well;
2. Each child in school must be well-known and taught in ways appropriate to his or her development;
3. Rigorous intellectual performance is expected of every student;
4. Schools should reinforce democracy, and attention must be given to views of parents and students. (Mehlinger, 1995, pp. 48-49)

The voices of these leading bottom-up reformers and others have been strengthened by noteworthy policy studies in the mid 1980's that suggested reinvigorated teaching and learning could result from empowering teachers with greater responsibility and accountability for decision making. The Carnegie Forum on Education and the Economy in 1985 and the Holmes Group in 1986 established the principle that developing teacher leadership at the school level would bring the expertise of those closest to the problem to the task of school change (Lipman, 1997).

Another proponent of changing one school at a time is Barth (1990). He carefully developed the concept of a school as a community of learners where adults and students learn together to think critically and to solve important problems. These communities strive to provide answers to the question, "Under what

conditions will principal and student and teacher become serious, committed, sustained, lifelong, cooperative learners" (Barth, 1990, p. 45)?

The bottom-up, one-school-at-a-time, and community-of-learners educator operates from a mind set that is very different from the top-down reformers. Barth (1990) stated some guiding principles for the bottom-up approach:

1. Schools have the capacity to improve themselves, if the conditions are right. A major responsibility of those outside the schools is to help provide those conditions needed for improvement for those inside.

2. When the need and purpose is there, when the conditions are right, adults and students alike learn and each energizes and contributes to the learning of the other.

3. What needs to be improved about schools is their culture, the quality of interpersonal relationships, and the nature and quality of learning experiences.

4. School improvement is an effort to determine and provide, from without and within, conditions under which the adults and youngsters who inhabit schools will promote and sustain learning among themselves. (p. 45)

Chrispeels (1992) conducted a study in eight southern California elementary schools from 1983 until 1989. In the report she gave an analysis of efforts by building educators to establish the best learning environment possible for students.

She addressed such factors as culture, curriculum and instruction, organizational structures, and instructional leadership. These areas were studied at each school, and a plan was developed by each staff to address each component.

Data sources consisted of teacher surveys, nine teacher interviews at each site, and scaled scores from the California Assessment Program. Schools were considered effective if they demonstrated a growth of 25 scaled points in reading and math over four years and showed a 10% decrease of students scoring in the bottom quartile over the same period of time.

Chrispeels (1992) concluded: In the most effective schools, teachers demonstrated a clear understanding of their school's mission, there was alignment of the curriculum with the material covered on the standardized tests, and there was a strong and clear academic focus that was supported by staff development. Further, staff development in the more effective schools was of sufficient length, involved a large portion of the staff, and provided time for coaching and sharing.

The Culture Lens

The culture of individual locations is critical to school improvement (Barth, 1990). Hargreaves (1997) takes this position a step farther by asserting that we should be talking more about reculturing schools then we do about restructuring them. When we think of culture at a work location, what does that mean? What activities and behaviors blend to form the culture of a particular group of people involved in performing a similar task?

Culture can be analyzed at several different levels (Schein, 1992). At the surface there are artifacts which are noticed by new members to a group and include visible products such as the architecture and dress of the workers, the visible behavior of the group, and the organizational processes such as site-based council meetings. Right below the surface espoused values begin to form as group members experience success in using processes to find solutions to problems. As a solution to a problem continues to work, it is taken for granted as the way to do things in the organization and becomes the third level of culture or a basic assumption. Basic assumptions are not questioned and are very difficult to change. These levels vary "from the very tangible overt manifestations that one can see and feel to the deeply embedded, unconscious basic assumptions defined as the essence of culture" (Schein, 1992, p. 16).

Culture is the way things are done in an organization. It is the combination of all actions and customs that reveal the values and beliefs of the people who work there. In a school, the leader must be aware of the need to build culture by attending to all the subtle aspects of the environment. Schein (1992) referred to several mechanisms that leaders use to embed their ideas into the daily life of their organizations:

> Through what they pay attention to and reward, through the ways they locate resources, through the role modeling they do, through the manner in which they deal with critical incidents, and through the criteria they use for recruitment, selection, promotion, and communication. (p. 252)

Cunningham and Gresso (1993) provided several strategies needed for a productive culture. These strategies, synthesized from research, are suggested ways to keep a culture healthy while a school continues striving for improved performance. The first one is the *vertical slice* which is a model for bringing together influential people across all levels of the school or district. In a school this group could consist of the administrator, teachers, instructional aides, and students. In a district meeting, the members would range from the superintendent to teachers. In vertical slice meetings members may gain a better understanding of the total organization.

Developing and maintaining *collegial relationships* is the second strategy stated by Cunningham & Gresso (1993). The importance of collegial relationships in a school was supported by a one-year study conducted by Little (1982) involving 105 teachers and 14 administrators. Semi-structured interviews supplemented by observations provided evidence that in the most successful schools teachers participated in the collegial acts of talking about practice, observing each other teach, preparing curriculum, and instructing each other about teaching.

A collegial atmosphere is a catalyst for the essential activity of *building vision*. Once a school creates a shared vision of what it should be like, the staff can begin working to achieve that vision. The vision is a statement of dreams which the school leader must link with supportive actions such as effective scheduling and training (Cunningham & Gresso, 1993).

Members of a school staff create more effective plans for reaching a common vision if they have *access to quality information*. The lack of information is a barrier to fully utilizing the abilities of the group. Access to accurate and concise information aids a group's effort to plan and monitor school performance. "Information stimulates thought and feeds future innovation. Information holds the work group together and allows it to develop a common culture" (Cunningham & Gresso, 1993, p.46).

A healthy culture is also maintained through *broad participation* by a school staff. This practice causes an appreciation for the diversity of talent and the

commonality of experiences and interests. Group members soon understand that together they possess more information and skill than any single member. A sure way to stifle a healthy culture and innovation is for the leader to make decisions about major changes without participation from others (Kanter, 1983).

Lifelong growth was also found to be a strategy for developing a productive culture. Effective growth encourages personal and professional development. Success is hindered by a lack of growth. The school culture is energized by people who demonstrate excitement about new ideas and projects. In successful schools, more than in unsuccessful ones, continuous improvement is a shared task that increases adaptability (Little, 1982). Teachers avoid passive routine in the classroom by maintaining current knowledge of ideas, theory, research, and practice (Sarason, 1996).

The quick solutions posed for school improvement in the 1980's gave way to the reform and restructuring efforts of the 1990's. Cunningham and Gresso (1993) proposed that the newest wave of school reform requires that time be given to develop a vision, build collegiality, and create a professional renewal atmosphere. The development of a school culture that supports excellence takes years, not months. The school leader must be at the forefront in establishing the tenets that build a productive culture.

The Change Process Lens

Diffusion of innovation, implementation of instructional technology, and implementation of educational change will be viewed through this lens.

Diffusion of Innovation

Time needed for desired results is an issue in the diffusion of innovations. Getting even a worthy idea adopted is very difficult and may require a lengthy period of time. The rate of acceptance by members of a school staff or any other organization is determined by five characteristics of innovations as perceived by these individuals (Rogers, 1983):

1. *Relative advantage* refers to a comparison made of the innovation with some previous idea. The greater advantage that an innovation is perceived to have over the status quo, the more rapid will be its rate of adoption.

2. The level of *compatibility* is determined by how consistent the innovation is with the values, experiences, and needs of those contemplating a change.

3. The degree of *complexity* is decided by how difficult the innovation is to understand and use.

4. *Trialability* is the perceived possibility to experiment with an innovation or to learn about it by doing. This trait can lessen the uncertainty about the innovation.

5. *Observability* is determined by the degree to which the results of the innovation may be seen by those considering adoption.

In addition to these five characteristics of innovations, Rogers (1983) labeled people according to their adoption of innovations. Though these categories were not produced from rigorous research, they provide one viewpoint of the different rates of acceptance of an innovation that can be found within a group. The percentages indicate the portion of people in each category.

Innovators are venturesome and eager to try new ideas. They are able to cope with uncertainty and occasional setbacks. They are perceived as the gatekeepers of new ideas (2.5%).

The *Early Adopters* are respectable due to being more integrated socially. They are the leaders in establishing opinion (13.5%).

The *Early Majority* is known for being deliberate as it adopts new ideas just above the average rate. It seldom leads but serves an important link in the diffusion process (34%).

The *Late Majority* is skeptical of change. It is cautious and must be pressured by peers before finally adopting an innovation (34%).

Laggards are traditional and have little opinion leadership. They do not network and base decisions on what has been done in the past (16%).

This specialized field of knowledge on the diffusion of innovations is of value to school leaders. The characteristics of the innovations may be helpful in identifying issues that may arise as staff members and the community consider a reform. The Jefferson staff may have considered the advantages of using instructional technology and its compatibility with their style of teaching. Results indicated the opportunities to practice using computers and observe others using instructional technology were factors in the increased use of technology by the staff in the classrooms.

Not everyone at Jefferson accepted the increased use of instructional technology at the same time. It was beneficial to develop an implementation plan with staff members representing different rates of technology adoption. This cross-section of adoption rates provided opportunities for the expression of various viewpoints about the implementation plan.

Implementation of Electronic Technology

Most every proposal calling for educational reform includes technology as a major factor in the change effort (Plotnick, 1996; Means, 1993; Sheingold, 1991). The strongest case for this position is that the use of technology has a positive effect on student achievement. In a meta-analysis of 42 controlled studies conducted by Drowns, Kulik, and Kulik (1985), computer-based teaching raised the final exam scores of high school students in all subjects by an average of .26 of a standard

deviations. The use of the computers also resulted in improved attitudes of students towards instruction.

Sheingold (1991) suggested that technology should be included on the reform agenda with improved teaching and restructuring. Each of the three has potential to redesign education and could make an even greater impact if all were combined in the reform effort:

> Restructuring provides the expectations and organizational conditions that foster and sustain genuine, well-supported, and long-lasting innovation; high standards for student accomplishments and an active learning and adventurous teaching approach (well-matched by newly designed assessments and accountability systems) define both purpose and direction for the innovations; and technologies act as both supports and catalysts for the redesign of learning and teaching. (p. 22)

Implementation of Educational Change

Fullan (1991) is a leader in the study of educational change. His research findings serve as foundational contributions to school reform and change. While his conclusions are suitable for all levels of the educational establishment, they have particular significance for educators in individual schools.

The careful study of the change process has led to the conclusion that there are a small number of crucial themes that determine the successful implementation

of a change in a school (Fullan, 1991). A precondition and the first key theme in a successful implementation is that the principal must demonstrate leadership in setting a vision. *Vision-building* infuses the school with values and purpose and provides the what and how of improvement. A shared vision must portray what the school could look like and provide a basic plan for bringing this about.

As the implementation was started toward a determined vision, the schools experiencing the most success took a flexible approach to planning. This allowed the schools to remain open to unexpected developments and opportunities and to blend administrative initiative and staff participation. In *evolutionary planning* staffs used data to determine what was occurring and took advantage of opportunities to improve the fit between the change and the evolving conditions in the school.

The third key theme is *initiative-taking and empowerment*. Leaders in successful schools encouraged the acting and interacting of others. By delegating authority to steering groups, the professional isolation of teachers was reduced. As teachers were empowered and began to demonstrate initiative, they shared successful practice and became involved in the implementation of change. Continuous communication and collaboration provided the support necessary for accomplishing tasks (Fullan, 1991). As stated by Peters and Waterman (1982):" Nothing is more enticing than the feeling of being needed, which is the magic that

produces high expectations. What's more, if it's your peers that have those high expectations of you, then there's all the more incentive to perform well" (p. 240).

Educational change involves learning new ways to do things. *Staff development and resource assistance* then must be a central theme in the implementation process. Single session inservices have little value and are often led by presenters who are ineffective. Teachers report that they learn best from other teachers but often have little chance to interact with each other. Implementation involves new learning which is strengthened through interaction. Effective staff development consists of "learning by doing, concrete role models, meetings with resource consultants and fellow implementors, practice of the behavior, and the fits and starts of cumulative, ambivalent, gradual self-confidence" (Fullan, 1991, p. 85)

Implementation is more likely to be successful if there are methods in place to check how the change is going. *Monitoring/problem-coping* is providing opportunities for the right people to talk together on a regular schedule with the right data. The information gathered and studied at these meetings may generate ideas that lead to changes in inservice sessions, materials, or organizational arrangements.

The Leadership Lens

The key themes associated with successful implementation do not occur by chance. Vision setting, evolutionary planning, initiative-taking and empowerment, staff development, monitoring and problem-coping demand certain mind-sets and actions by the building leader. The organization of the school is of utmost importance to the success of the implementation process. What is there about a school that supports and presses for improvement? Such features as individual and team planning , shared teaching arrangements, inservice policies, and mentoring and coaching relationships encourage involvement. Any restructuring that establishes the conditions for a collaborative workplace is of great importance to a successful change process (Fullan, 1991).

Goldring and Rallis (1993) identified a role common to effective principals that supports collaboration in schools. These building leaders are aware of the conditions required for school improvement. The principal acts as a facilitator to provide motivation and coordination by making decisions "based on consideration and understanding of participants' positions on issues and then by manipulating time, space, resources, and personnel to join in moving toward the attainment of that position; the facilitator is the enabler of internal leadership" (Goldring & Rallis, 1993, pp. 135-136).

Eleven years of analyzing data led Kouzes and Posner (1995) to develop a list of practices found in leaders known for their effectiveness. Leaders of this type venture out and are known for *challenging the process*. The leader is not always the creator of new ideas but is able to recognize good ideas proposed by others and is willing to challenge the system to get them adopted.

The successful leader is able to look into the future and see what could be. Leaders not only get excited themselves about a greater future for the organization but also are known for *inspiring a shared vision* in the people around them. They understand these people and are aware of their needs, hopes, and values. This knowledge enables the leader to enlist others in seeking and achieving a vision (Kouzes & Posner, 1995).

Visions for a greater future do not become reality through the actions of a single person. Exemplary leaders rely on the assistance of all those who are essential in making the project successful. "After reviewing over 2,500 personal - best cases, we developed a simple test to detect whether someone is on the road to becoming a leader. That test is the frequency of the word "*we*" (Kouzes & Posner, 1995, p. 12). Leaders devise ways to involve those who will be affected by the implementation of a new idea. They are known for *enabling others to act*.

Leaders set an example by completing daily tasks that demonstrate a willingness to do whatever it takes to accomplish the desired goal. *Modeling the*

way wins respect and reveals to others that leaders are fully aware of their guiding principles and beliefs.

Kouzes and Posner (1995) completed their list of characteristics with the realization that achieving the vision is often a long and difficult endeavor. Frustration and exhaustion can tempt people to give up. A proven leader devotes energy to *encouraging the heart* of others through acts of caring and celebrations. Encouragement rewards behavior that is aligned with the recognized values of an organization.

A common trait of successful principals these days is that they are coalition builders (Barth, 1990). They can no longer be the master teacher of every subject and every special education program. Successful principals can no longer control every aspect of school operation but must learn to share leadership responsibilities while providing a daily model of the vision to be achieved. In so doing, a principal is not a controller but a designer of what takes place in a school. As leadership roles are shared by staff members who model what they learned from the principal, the leader's influence impacts the school. "To paraphrase Lao-tzu, the bad leader is he who the people despise. The good leader is he who the people praise. The great leader is he who the people say, 'We did it ourselves.' (Senge, 1990, p. 341). Barth (1990), shared a poem by Stomberg that personifies the sharing of school leadership and the "we did it ourselves" mind set:

> And one day, lying alone on the lawn on my back, hearing only the moan and groan of some far off train on a distant track, I saw above me, 2,000 feet or more, something which to this day, I must say, I've never seen anything like before. The head goose, the leader of the "V," suddenly swerved out, leaving a vacancy that promptly was filled by the bird behind. The leader then flew alongside, the formation growing wide, and took his place at the back of the line -- and they never missed a beat! (p. 1)

Why These Four Lenses?

The topics of culture, change process, leadership, and reform were used like lenses to magnify and clarify the actions, events, and leaders at Jefferson over eight years as instructional technology became integrated with all subjects. The researcher needed a way to organize the guiding questions. The four lenses--reform, culture, change, and leadership-- became the framework for focusing the inquiry. The four lenses were also used to provide the framework for the literature review and conclusions.

CHAPTER THREE: METHODOLOGY

The potential use of multiple sources for data collection is a major strength of qualitative research (Yin, 1994). Evidence gathered from several sources provided a variety of vantage points for the changes that occurred at Jefferson over eight years. The sources that provided evidence for this study are described after a brief overview of the data-gathering methods.

Seven of the characters associated with the technological change at Jefferson told their stories through interviews. Two collaborators not aligned with Jefferson interviewed the researcher, who was also the principal of the school during the reconstruction of the school. Another data-gathering technique involved notebook recordings of staff comments related to their work made in normal conversations. In addition, historical documents were analyzed for information that added details and background to the other data.

Interviews

Six interviews were person-to-person encounters conducted as conversations with a purpose (Marshall & Rossman, 1988) and covered a few general topics that reflected the research questions. These interactions allowed full exploration of the teachers' viewpoints and provided opportunities to probe with follow-up questions and requests for clarification of ideas. Two interviews were conducted with each selected staff member. Because teachers are rarely asked to tell their stories

(Connelly & Clandinin, 1988), conducting two interviews gave them practice in relating experiences and the opportunity to reflect on the questions in the first interview before participating in the second interview. The follow-up interview also allowed me to review the initial interview transcript and design questions for the second session to clarify and develop topics introduced in the first session. Conducting the second session also provided additional questioning experience which strengthened my interviewing skills.

The Interview Questions

The interview questions were field-tested on two staff members in September 1997. These staff members were nonparticipants in the process that followed. These practice sessions gave opportunities to develop clear questions and probing techniques. Questions prompting detailed responses were placed on two index cards which helped organize the flow of each session. Phrases used to probe for more details were included on the cards. I experimented with two tape recorders and selected the one that provided the best results. Being unsure of the condition of the batteries, fresh ones were installed to assure high quality sound. Analyzing the field-test interview tapes helped me determine the value of questions for eliciting responses related to the research questions. The field-test interview data also provided an early indication of themes and supporting details that appeared in

future interview transcripts. The interview questions -- grouped by the lenses used to structure the research questions, literature review, and conclusions -- follow:

The Culture Lens

1. Lets go back in time before we began working together. What was the school like back then?
    a. What was the instruction like in the classrooms?
    b. How was technology used?
    c. How did people get along?
    d. How were decisions made?
2. What is the school like today?
    a. What is the instruction like in the classrooms?
    b. How is technology used?
    c. How do people get along?
    d. How are decisions made today?

The Change Process Lens

3. What events or actions led to the use of technology in the classroom?
4. How do people here take to new ideas?
5. What causes people here to accept new ways of doing things?
6. How does the way you teach today differ from the way you taught in 1990?

The Leadership Lens

7. What people helped to make technology a part of our instructional program?

8. What did these people do to make this happen?

The Reform Lens

The questions used from the other lenses provided data for the elements of reform at the building level.

Purposive sampling based on expertise, special experience, and competence (Merriam, 1988) served as the basis for interviewee selection. A list and description of interviewees follows.

Interviewees

Sarah, Oakton City Public Schools' technology specialist, was a consultant to the technology planning committee formed in January 1992. She worked closely with the principal and teachers during the planning and first-year implementation stages. She organized demonstrations and training programs. Sarah had the vantage point of being involved with the Jefferson technology story in the beginning and observing its growth from her central office position.

Alice had been at Jefferson for 17 years and had experienced a change in job description from librarian to media specialist. At first hesitant to use technology, she assisted in making the media center the central location for technological

training, inventory control, scheduling of the labs, ordering hardware and software, and technical support. Alice's vantage point gave her contact with every teacher as the use of technology increased in the instructional program.

Lisa had worked at Jefferson for 28 years and saw her job title change from library clerk to technology assistant. Initially she had no interest in technology, but she became the primary provider of technological support to teachers as they delivered instruction. Lisa's vantage point was that of a paraprofessional who supported the technological effort in classrooms, the computer lab, and the media center.

Linda had been at Jefferson for 15 years as an eighth grade English teacher. Originally opposed to using instructional technology, she eventually assumed the role of teaching technology exploratories such as keyboarding, Hyper-studio, and home pages. Her technological projects with students were the subject of a May 16, 1997, Oakton Times article. Linda was chosen as an interviewee due to the growth observed over the past seven years in her use of instructional technology in the classroom. She has also assisted district teachers by conducting after-school and summer technological training sessions.

Mary had been a sixth-grade English and social studies teacher at Jefferson for eight years and was a member of the original Technology Planning Committee

that began meeting in January 1992. Mainly interested in instruction and "at-risk students," she gave careful consideration to the use of classroom technology before incorporating it into her teaching. Mary's selection as an interviewee was based on her perspective as a leader in the district's curriculum writing efforts and her involvement with the development and implementation of the Jefferson technology plan.

Dwight came from a secondary background and had worked at Jefferson for nine years teaching math and French. He was selected for interviewing because of his high school perspective and experience teaching two subjects at the seventh- and eighth-grade levels. Initially fearful of using instructional technology, Dwight participated in all training sessions and began using technology to support his teaching in both subjects.

Another source of data was a panel interview of the researcher, who was the principal of the school during the period of the study, by two interviewers. The interviewers were not aligned with Jefferson. They posed questions that deepened my thinking and retrieved information that might not have risen to the surface without their persistence. The panelists required well thought out and complete answers. The interviewers were doctoral candidates in the School Leaders Program at Virginia Tech and were chosen because of their unique characteristics. Beth is a southwest Virginia middle school teacher who also participated in the principal

preparation program at Virginia Tech. She demonstrated an orderly thought process and paid close attention to detail in her questioning. Margaret, a resource specialist for a gifted program in a neighboring district, was a determined questioner and often solicited divergent thoughts in the course of the interview. This interview resulted in data on the principal's perspective about the changes that occurred at the school.

Observations

Another source of data came from listening to comments of faculty members about their work as they performed their daily routine. By "hanging around" at the various locations where the staff gathered -- lounge, hallways, and classrooms -- answers were given to questions that I would have never thought to ask (Whyte, 1981) about culture, change, leadership, reform, and instructional technology. A paraphrase of sixteen informal comments was recorded in a notebook from October 17, 1996 to January 14, 1998. Notebook entries were recorded the same day of each observation.

Historical Documents

The analysis of historical documents provided data from primary sources such as the Instructional Technology Plan (1993), faculty meeting agendas, site-based council agendas, memos, and transcripts. Faculty meeting agendas for April 8, 1992, October 21, 1992, and September 10, 1993, and Site-based Council

agendas for January 15, 1992 and February 19, 1992 provided data. Memos to faculty and central office staff from November 21, 1991, March 1993, and June 4, 1993 also provided data. Student e-mail transcripts from April 9, 1992 to June 1, 1992 were also analyzed for supportive data.

All phases of development in the instructional technology program were described in these documents. Sources were analyzed for information relating to the research questions, and descriptive data from these documents were used to verify emerging themes found in the interview transcripts (Merriam, 1988).

Data Analysis

Data were gathered and placed in three collections. The interview transcripts were placed in a three-ring binder, the historical documents were chronologically arranged in an expandable folder, and the observation notes remained in a spiral notebook. Organization and analysis of the data were the next steps.

Step 1: Organizing a Database

As data were gathered, each source was indexed and placed in a table of data sources. In this manner, all interview transcripts, observation notes, and chronologically ordered historical documents were catalogued by number and placed in a three-ring notebook for effective data management. Multiple copies of the transcripts were prepared for separate analysis of the culture, change process,

leadership, and reform topics. All of these sources contributed to a case-study database (Yin, 1994) ready for analysis.

Step 2: Analyzing the Data

Each line of the interview transcripts was numbered, and a margin on the left side of each page was available for notes. The four copies of each transcript -- one each for the culture, change process, leadership, and reform lenses -- were read numerous times. Highlighters were used to identify evidence pertaining to the four topics and related research questions. Sentence summaries of the highlighted data were written in the margins of the transcripts. As the summaries were analyzed, sentences were reduced to phrases and words. The researcher discovered themes and supporting details from the words and phrases and began to develop matrices for each of the four topics represented by the lenses. This arrangement of data resulted in the four topics being isolated and unrelated. As the matrices were studied, the data failed to reflect a sequential reporting of actions and events at Jefferson from 1990 to the present. How could the data be arranged to tell about what happened at Jefferson?

A new starting point was reached as the data were viewed in a different way. The events and actions at Jefferson had a beginning, middle, and current-time arrangement. Changes occurred in each of these time frames resulting in transformation of the school. What transpired at the school was comparable to what

occurs in the construction industry when a structure is built. There are several phases in a building project that can be easily observed but may also overlap each other. These are the site-appraisal, blueprint, and construction phases. These phases were used in the matrix titles as the culture, change process, leadership, and reform data were recorded.

The researcher found three components in the culture of the school that facilitated the process of change: learning, governance, and work environment. These components became headings on the culture matrices for the site appraisal (Appendix A) and the blueprint and construction phases (Appendix B). Blueprint phase -- design a course of action -- and the construction phase -- establish a system of support -- were headings on matrices (Appendix B) that were used to study the change process. The leadership data were placed in a matrix with the headings “leaders and their roles ” (Appendix C).

All transcript data were recorded in the appropriate matrix and in quotation form which 'thickened" the entries and increased data density (Miles & Huberman, 1994). Each transcript quotation was labeled with a code such as 4a L72. The “4” identified the transcript as that of interviewee four. The “a” identified the transcript as being from the first of two interviews. L72 means that the quote is from line 72 of transcript 4a. Data from historical documents were labeled in two ways: ITP L113-114 and 6/4/93 HD 11. ITP referred to the Instructional Technology Plan and

"L 113-114" identified lines 113 and 114 in this document. A date and "HD" referred to other historical documents such as meeting agendas. Data from the observation notebook were coded in this way: Notebook 14, p 10, 1/14/98. The "14" is the code for the person making the statement. This is followed by the page where the statement is written and the date of the statement. Pseudonyms were used for all names in the study.

Highlighters and different colored pens were used to identify main themes, supporting details, and significant quotes in the matrices. Summaries from the observation notebook and historical documents supporting the identified themes were placed on the appropriate matrixes.

CHAPTER FOUR: SCHOOL CHANGE AND THE BUILDING INDUSTRY

The findings were organized in three basic phases of a building project beginning with the appraisal of the project site, proceeding to the design or blueprint phase, and concluding with the construction of a structure. The site-appraisal phase is where the building project develops in the mind of the architect. Input about the structure from others is considered but it is the architect who contemplates the unseen obstacles that lie beneath the surface and renders ideas about the potential of the property to support a structure that meet the needs of the tenants. The blueprint phase is where the architect's mental plan becomes a drafted design describing the steps and materials required to build the structure. The construction phase is where the architect adapts the blueprints as changes are needed and confers with others to solve problems and gives input as the structure is built. This building trade metaphor became the framework for writing the report. Figure 1 is a timeline of major events by phase. Data for the Site Appraisal Phase at Jefferson are in Appendix A. Data for the Blueprint and Construction Phases are in Appendix B.

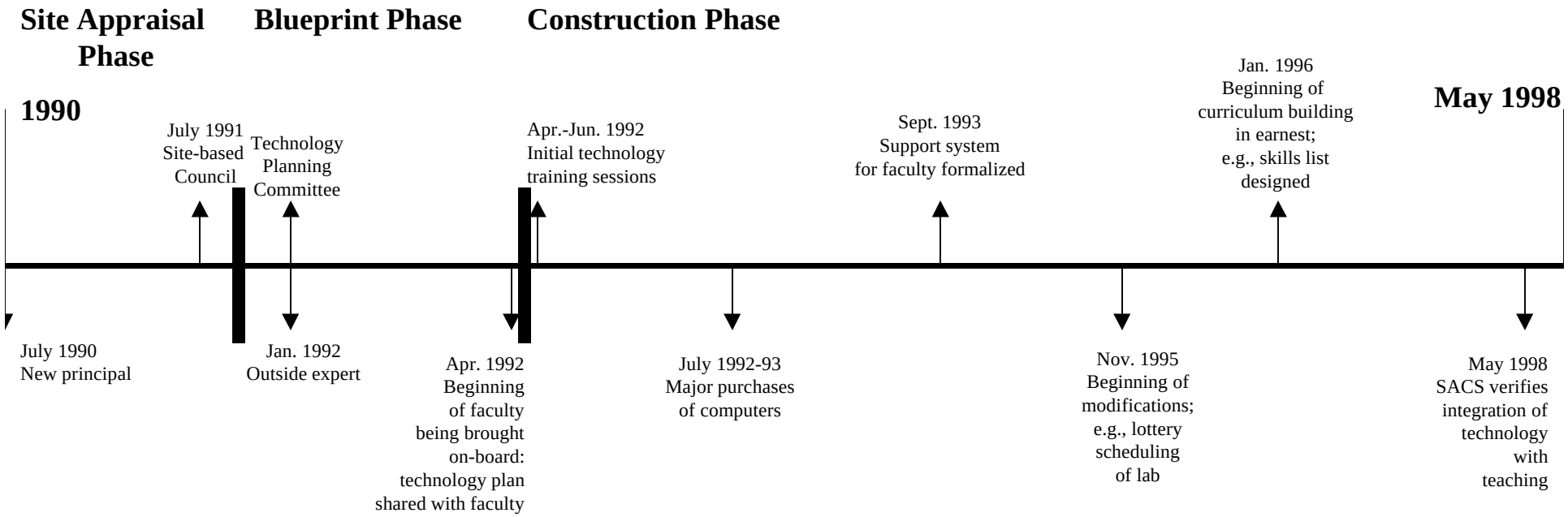

Figure 1. Major events by phases in the transformation of Jefferson Middle School.

The Site-appraisal Phase

As the new principal entering Jefferson Middle School in July of 1990, I was much like an architect viewing a piece of land that is soon to be developed. An architect might ask, “What is the potential of this property? What are the qualities of this land, and what are its characteristics that may not enhance a future structure? What obstacles must be removed, and how much excavating will be required? How will the site appear after the pouring of the footers, the building of the walls, the raising of the roof, and the landscaping?" I asked, “What is this place like for students and staff? How do teachers instruct and how does everyone learn? What are the strengths of this school, and what needs to be improved? What would be the best approach to bring about the changes desired by the superintendent?” My questions were not exactly paralleled with those of an architect but gave the essence of questions asked at a site-appraisal.

In July 1990, these questions and several issues came to mind as I viewed my administrative assignment at Jefferson. I recalled the comments made to me by central office administrators that this school would not be a "career position" and that I was to see this as no more than a three-year assignment. "It's just not the nature of the school staff and community to keep a principal for very long, so don't take it personally when a change in leadership has to be made. There will be a lot of pressure from the parents which you will be unable to withstand for long." In

addition, the superintendent had outlined curriculum issues that required immediate attention. There was concern that student writing skills were not as strong at Jefferson as at a competing private school. Steps were to be taken to strengthen this program. Another issue was the gifted and talented program at the sixth grade. There was not the continuity desired between the gifted and talented programs at the elementary and middle schools. The sixth-grade program was to be modified for better linkage with the structure and goals of the fifth-grade program. As I appraised the site, another factor to consider was the superintendent's determination to adopt a site-based management model which was to be piloted in four schools beginning in the 1991-1992 school year. I had participated in the initial site-based training sessions and was meeting with consultants and principals to design the district's model. With my change in assignment, Jefferson became one of the site-based pilot schools. I would be implementing the newly developed decision-making system in the 1991-1992 school year.

My appraisal shifted to the Jefferson staff and the way in which it would react to these issues. I asked, "How do they work with students and each other? What part does the staff play in making school decisions and in providing input for future plans? What is the nature of the instructional program in this

technology magnet school? Will the staff accept being a site-based decision-making school when they have had no input in this matter? What a paradox! I was coming into a school as the new principal preaching the philosophy of shared decision making and teacher empowerment and making the pronouncement, "We will be a pilot school for the site-based decision-making model."

Components of Culture

As my reflections and findings about the culture from the site-appraisal phase were analyzed, a more complete "survey" emerged of this period. These components of the culture of the school became evident. These were learning, governance, and the work environment. These components became matrix headings and guided my writing about the culture of the school from 1990 to 1998. The learning component in the site-appraisal phase had two parts; the first part was learning instructional technology and the second part was learning of classroom teaching methods used in the classroom to assist student learning. I found that this component expanded in the blueprint and construction phases to include the professional growth of the faculty. The governance component referred to how decisions were made about the daily operation and future direction of the school. The amount and type of input given by the faculty was a key element of this component in all phases. The work environment was determined by the way the

faculty got along in working together. The raw data and sub themes matrices are in Appendix A.

Learning

My appraisal of classroom and technology practices in this phase revealed a reliance by the staff on traditional secondary teaching methods. Most teachers structured their classes more towards a high school approach with "just straightforward lecture" (Dwight). There were few cooperative learning groups. As instructional teaming continued, Alice noticed that the teachers began to use more "hands-on" lessons, and there was an increase in methods requiring student involvement.

At the time the primary hardware used was movie projectors and cassette players. Except for five percent of the students who were in the magnet program, students did not have access to computers in classrooms. Very few staff members were computer literate and the rest of the staff had no access to technology (Mary, Lisa, Dwight, Linda; Technology Plan, 1993). There was no compelling desire to use technology in the classroom. Some of the staff were fearful of using technology with students (Linda & Dwight), and no one was "griping about it [lack of access to technology] because [they] didn't know any better" (Linda). Prior to the purchase of six MS-DOS computers, hardware had not been purchased for three years. A lab of antiquated PC JRs made up almost half of the inventory, and no laser disk or

CD-ROM players were in the school. Technology was talked about a lot, but unless teachers were working with magnet students, only drill and practice programs in one lab were available to the staff (Linda).

Governance

I continued my appraisal by assessing the faculty's involvement in determining school direction and daily decision making. I was unable to find any information about the purpose of the technology magnet program or why it served a small portion of the school's students. No one was aware of faculty planning meetings before the program began in 1987.

Centralized decision-making by the principal resulted in his control of materials, instructional strategies, and information. I recall one of my first contacts with the staff in a preschool meeting in August 1990. Tim, the assistant principal, informed the teachers that they could come by his office and get their room keys whenever they wished. At first there was silence and then laughter as the teachers looked at each other. Tim and I were surprised by the reaction to his announcement. A teacher responded, "What do you mean pick up our keys? We never had keys before; they were never given to us. Do we get to have our own keys?" The custodian locked and unlocked the doors every day.

The previous administrator gave directions about materials and teaching methods to be used. All instructional supplies were ordered by the secretary and

kept in locked storage areas throughout the school. Teachers came to the office and made their requests in writing when they needed paper and other supplies. Some teams were told to use basal textbooks and not to use any supplemental materials. All final decisions affecting school operation were made by the principal (Mary & Dwight).

In May 1991, I conferred with teachers about their instructional team, grade level, and subject assignments for the following year. Many of the teachers thanked me for letting them know what they would be doing the next term so that they could gather materials and plan with fellow team members during the summer. Several of them stated that in previous years assignments were given two to three days before the first day of school. They felt that this late notice had hindered preparation and caused more than the usual start-of-school anxiety.

Work Environment

My first months of appraisal began to provide a clearer view of the "lay of the land". The school's staff was in a state of transition in the 1989-1990 school year due to the district leadership's decision to change from a junior high to a middle school organization. Sixth-grade teachers in the elementary schools and junior high teachers at grades seven through nine were asked to list their two preferences in teaching assignments for the school year. As a result staff assigned to Jefferson was a mix of teachers from elementary and junior high schools. Few

had any middle school experience, and most of the teachers were accustomed to a secondary approach built on departmental organization. "An awful lot of what was happening was guesswork because we were combining an elementary mind set with a high school mind set and trying to figure out what really in fact did work" (Mary). The idea of working on an instructional team with people who taught different subjects was difficult for some to accept. Two of the staff members summed this up well: Alice observed that when previously organized in the subject-specific departments, the staff was not cohesive and department members were possessive of their equipment and material. Lisa felt that "every teacher was on their own."

Placing teachers on instructional teams did not immediately change the way people worked together. "One team would want to do something and felt that if they shared it, somehow it wouldn't be special anymore" (Linda), and there was concern that they would not receive credit for the development of good ideas (Lisa). This mind set kept successful ideas used on one team from being shared with other teams and diminished the learning of teachers and students. A possible cause of this mind set was the prevailing idea that teachers on teams, instructing accelerated students were to use different methods from those used by teachers who worked with students who were on grade level. For instance, only the honors-level English students participated in research assignments and had access to two computers in

the library (Lisa). This arrangement was meant to demonstrate differences in the way students were taught at the various instructional levels (Linda). The practice discouraged the sharing of ideas, limited the strategies that teachers could use to meet the needs of their students, and kept the staff from knowing what was going on in the school as a whole.

My appraisal provided evidence of isolation in several areas of the school's culture. Technology was available only to a small segment of the student body and teaching staff. Successful ideas generated by teachers were kept within instructional teams. Certain teaching practices were exclusive to specific teams and were not to be used by other teams. One person had the final say in ordering and dispensing supplies, giving out information, and making decisions. This person was the principal.

Like an architect, a principal continues to assess the site even in the blueprint and construction phases. The site-appraisal phase continued throughout the 1990-1991 school year and continued to provide information which I used to design mental blueprints for the construction process. During the second semester, I began talking with individuals and in faculty meetings about the importance of teachers being involved in decision making and the expertise they possessed to solve school problems and create improved programs. I often sought input from teachers on instructional practices, school schedules, and exploratory elective classes. In the

area of instruction, we discussed the need for developing high-level thinking skills in all students through the use of effective questioning and graphic organizers. Teachers began to develop class schedules for their own teams and provided suggestions about the master schedule. Exploratory elective classes were redesigned by teachers to include more hands-on activities and topics of interest to both the students and the adults in the classrooms.

In these ways, I was beginning to remove obstacles such as isolation and centralized decision-making from the school site as mental blueprints were drafted and site preparation began that would lead to staff involvement in a major construction project. The staff needed practice in giving ideas to improve our delivery of service to students. The site appraisal phase continued and as I reflected, "Before we consider designing and implementing a plan, is the staff ready to become permanent participants in the operation of their school?" The answer came from the members of the first Site-based Council.

Before the 1990-1991 year ended, teams selected representatives for the Site-based Council which began meeting in June 1991. By waiting until the school year had ended to begin our orientation to the new method of making decisions, interruptions and time restraints were minimized as we worked together to establish our new roles and relationships. No longer would one person be making all the final decisions for the staff. The council members would now be involved in

committee work with other staff members, and joint recommendations would be prepared for the site-based council's consideration. After careful listening and discussion, the council members would work to reach a decision through consensus. I knew that if we all were involved in making decisions, all of us would make sure that the decisions were carried out as intended. By each member taking ownership in the decisions, better decisions would be made, and there was a greater likelihood that the decisions would be successfully implemented (Mark).

To prevent creating winners and losers on the committee after each vote was taken, consensus decision making was chosen instead of voting. Staff members had experienced enough isolation in previous years and now needed to learn to work as a team and appreciate the strengths that each person contributed to the committee. The site-based members also designed operating guidelines for the council which detailed member selection, length of terms, and agenda preparation. Desiring excellent instructional methods for all students, belief statements about teaching and learning were created that stressed critical thinking, use of supplemental materials, writing in all subjects, and involvement of students in the planning and assessment of their work.

After appraising the school’s culture and designing mental blueprints, I was encouraged by the willingness of the staff to become involved in the operation of

our school. Our work as a council in June 1992 prepared us to evaluate our school and ask questions about ourselves (Mark). The appraisal continued as mental blueprints evolved into a written plan.

The Blueprint Phase

After careful examination of the site, the architect knows much more about the property and the plans needed for the construction phase. By doing the appraisal, the architect has also determined what experts will have to be consulted to ensure progress and a successful venture.

As our progress was appraised in clearing away obstacles to making and implementing good decisions, I continued to be concerned that ninety-five percent of the students and most staff members had no access to classroom technology. Given this situation, what should be my course of action as the leader? If I decided to wait for the district or state to create an instructional technology plan, how long would it take? While I waited for the plan, how many students would advance through the school without being prepared for a technologically based world? Feeling an urgency to develop alternatives to the current situation, I met with Sarah, the district's director of technology on January 3, 1992. Sarah became the “outside expert.” The data for this phase may be found in Appendix B.

The Outside Expert

Sarah was new to the district and was eager to offer advice on the use of instructional technology in our school. I soon found that the assistant superintendent's remarks were correct concerning Sarah's vast knowledge about the use of technology as a tool for learning in every subject. It was evident that she possessed the planning and technical skills necessary to help me develop solutions to the technological challenges facing our school. Sarah suggested that in the planning committee we follow a four-point process:

1. Envisioning the future. What would we like to see happen with technology? How will students and teachers use technology? How will technology benefit students and teachers?

2. Assessing the current situation. What technology is available to us now and where is it located? How is the technology being used by students and teachers?

3. Setting goals. How will technology support instruction? What technology skills do students and teachers need to know in each grade and subject?

4. Planning how to make it happen. What steps do we need to take to move from where we are to where we want to be? What will be required to assist us in achieving our goals?

I supported the four-step planning guide not as a rigidly ordered process but as a framework to assist us in considering the essential questions. In the meetings we viewed the steps as flexible and often addressed them out of sequence. By supporting the theme in step one, our planning started by “beginning with the end in mind" (Covey, 1992).

The Planning Committee

Sarah, our consultant, was willing to immediately begin meeting with the Jefferson staff to design a "blueprint" for the implementation of instructional technology. I had to ensure that the blueprint was developed from the thinking and planning of a group and not from a ready-made document assembled by Sarah and myself. My primary goal was that the staff take ownership in the design and implementation of the plan. I decided to form a planning committee which included two teachers, our "outside expert," the assistant principal, and myself. Sarah's willingness to serve on our committee established an opportunity for collaboration between an outside expert and school-based staff members and supported our plan for change.

To ease discussion and provide several perspectives the planning committee was small and representative of varied technological experiences. Becky and Mary, the teacher representatives, were skillful communicators and were respected by their peers for their instructional abilities. Becky taught Algebra I and geometry

to advanced eighth graders. She had been the lead teacher in the computer magnet program which began in 1987, had experience using technology in her classroom, and was considered the "in-house" expert on this topic. Mary taught language arts and social studies to below-grade-level sixth graders and had little experience with technology. She was selected for her instructional skills, knowledge of learning styles, and advocacy for students. Tim was the assistant principal who had been using computers for administrative applications for some time. He had technical knowledge about many kinds of hardware and software and was known for his willingness to assist when problems arose with the use of technology. The final member was the principal. I had limited knowledge of technology but was open to possibilities that existed for using it to assist students in their learning.

Envisioning the Future

The committee first met on January 13, 1992, for the purpose of restructuring technology usage at Jefferson and was guided by the four points proposed by Sarah at our January 3 meeting. I began by introducing Sarah as our consultant and the skills she was willing to share with us. As we considered the first point in the planning process Sarah spoke confidently about the future of technology in education "and her vision was very clear as to how it should be used and how quickly it needed to become a part of the tool kit, part of the tools that we put into

how we teach" (Mary). During the first couple of meetings, we reviewed some of the technological possibilities available for classrooms as Sarah talked to us about her ideas and some of the software options available for various subjects (Mark). While envisioning the future, committee members began considering the third point in the planning process as we discussed specific skills and programs needed by students and teachers. Sarah recalled how quickly the committee members--

> began to really focus on laying out some ideas for each curriculum so that teachers would have an idea of the direction we were headed. We came up with ideas about what software we might use in the math classroom, language arts, etc. We got pretty quickly down to some specifics, and I believe that soon after meeting we had broken down sixth, seventh, and eighth grades and what we would like to see happen at each of those grade levels.

The members met two to three hours weekly through January and in February and March held two-hour meetings every other week. Each individual provided a unique perspective and special skills to the group. Becky, the eighth-grade math teacher, had used computers as a part of her classroom instruction in the magnet program. Understanding instructional technology came "naturally to her but she never seemed to intimidate anybody else and that is a real gift to be able to

encourage people along with technology without stepping on their feet or making them feel like they don't know what they are doing" (Sarah). Becky always contributed her viewpoint in a well thought out way which caused the rest of us to reflect on every word she said. Her positive and confident approach provided support for our new direction.

Mary kept us focused on instruction as the key factor in all of the planning (Sarah). With her experience with at-risk sixth graders, she made sure that the learning needs of all of our students were considered in the development of the blueprint (Sarah). Mary was the "heart" of our committee as she reminded us of the challenges her students faced to be successful with school work and the importance of having them use instructional technology as soon as possible.

With a great deal of computer experience, Tim provided instant information about prices, technical specifications relating to hardware, and software packages. He was always willing to research any questions that arose about school account balances and capabilities of various brands of computers, printers, and CD-ROM players. Including Tim in the design phase united our administrative team in the effort and enabled him to become involved in leading some early training sessions.

Sarah was the outside expert who opened our eyes to possibilities for the use of technology that we would have never considered at this point in our thinking. She destroyed barriers to making technology a part of everyday classroom

instruction (Mary). She convinced us that our vision was possible and made us comfortable in moving ahead with our instructional technology ideas.

The absence of conflict among the committee members was a result of several factors. No one came to the planning table with a personal agenda but instead came with open minds and enthusiasm to try something new (Sarah). Our outside expert informed us in a convincing and straightforward way and encouraged us to ask questions and make comments. She laid the foundation for using instructional technology as a tool for learning as naturally as we had previously used overhead projectors. The committee members were selected because of their self-confidence and willingness to learn. These traits resulted in flexibility and careful listening by the members as topics were discussed.

Setting Expectations

I had personal commitments to seeking input from the staff and generating ideas in the committee on how instructional technology could be used to assist student learning. At the January 15, 1992, Site-based Council meeting, these questions were asked: How would you like to see technology used at Jefferson? What are the factors that will affect implementation of technology at Jefferson? How can these factors be dealt with? The responses were general because of the lack of experience that most had with instructional technology. In answering the first question there was consensus in the Site-based Council that technology in the

computer lab be available to all students and teachers. In answering the second question faculty access to hardware and training were given as factors affecting the implementation of technology. In answering the third question the Site-based Council supported the organization of an extensive training program on beginning computer skills and software packages. The responses to these questions were taken by Becky to the Technology Planning Committee for inclusion in our discussions.

Working to complete step one in the planning process, a draft mission statement was created by the Technology Planning Committee during the next several weeks and submitted to the Site-based Council for approval on February 19, 1992. Becky skillfully summarized the discussions from the Technology Planning Committee that had resulted in the drafting of a mission statement. The mission statement was not a centralized dictate from the principal's office but a sharing of a possible dream by fellow teachers. It was crucial that all information be presented as helpful ideas for students and teachers. The mission statement which follows, was approved by the Site-based Council:

> Jefferson Middle School has a unique mission. Our students prepare for the future by participating in vital educational opportunities through the integration of technology in all subject areas (Instructional Technology Plan, 1993).

The mission statement was clarified by this statement:

> A strong emphasis throughout all curriculum areas is placed on researching, collecting data, analyzing, drawing conclusions, and publishing by using computers, CD-ROM, telecommunications, and laser-disk technology (Instructional Technology Plan, 1993).

In designing and approving the mission statement in the blueprint phase, the staff set forth the essence of their vision and established two expectations which were crucial in the implementation of the instructional technology program:

(1) All students will participate in meaningful technology experiences.

(2) Technology will be integrated into all subjects.

The turning point for using technology in the classroom occurred when the principal made the decision that all students would have access to technology. When technology was made available to all students, Linda recalled that teachers began to share ideas, instructional methods, and became partners in learning technology skills with students. Linda was one of the first to realize "that using technology in the classroom with kids, you take on a different role and you become a learner along with them and its no longer the teacher and the children but everyone is learning together" (Sarah). My reason for opening access to all students was if technology is a positive factor in assisting a few students in their learning then it would be a benefit to all of our students. How could we ethically continue to

keep this assistance from the vast majority of Jefferson students! As it turned out, this decision also equalized access to technology for teachers and created a "learning together" environment. The magnet program thus included everyone and excluded no one.

The second expectation established by the mission statement brought us together as a school staff because we felt responsible and included in this whole process of making instructional technology part of every subject (Linda). The staff members began helping each other in the use of technology in all classes. "When you are all of a sudden put into having to do something, I think you really work together to see that you do it correctly. Everyone is willing to help each other and learn how to [use the instructional technology] so they can teach the students" (Alice). The staff members also learned from the clarifying statement to the mission that instructional technology would now include expanded computer and other hardware use. Instructional technology would no longer be viewed as a separate subject but as a part of learning in all areas.

Planning for Acquisition and Distribution of Hardware

With visioning leading to a mission statement, the second action was to decide how best to use the existing hardware. We could have become stagnant in our activity at this point waiting for the most advanced hardware and software to implement the mission. The Technology Planning Committee felt that we must be

proactive and efficiently use the technology available to us. Distributing the current hardware, kept us moving towards our mission and demonstrated commitment to central office staff members from whom support would be required. Examples of the planned distribution of technology included: removing computer literacy classes from the seventh and eighth-grade schedule so that the lab could be used by teachers as a tool for learning in all subjects, placing five computers in the library to set up a technology media center equipped with reference and telecommunications software, designating twenty-five PC JRS left by the junior high business department for a sixth-grade keyboarding lab and twenty-five Apple GS's for word processing, and purchasing six Apple MAC LC's to be placed on rolling carts for each team. This last planned action proved to be a major factor in increasing teacher use of technology in the classroom. The technology became available for the "teachable moment" with students and practice of newly learned skills by staff members.

Planning Training

Points two and three of the planning process were covered with the distribution of hardware and development of grade-level skill lists including subject-appropriate software programs. Sarah’s expert knowledge of age-appropriate computer skills and subject-appropriate software supported the Technology Planning Committee’s compiling of the skills and software lists. The

Technology Planning Committee moved to point four in the planning process and developed a training program to assist the staff in meeting the newly established expectations.

We had created a mission statement and determined technology skills our students needed to learn and the next step was to provide staff members with training to achieve these goals. Throughout the second semester of 1992, Sarah met with the faculty every other week to demonstrate the use of technology as an instructional tool by focusing on simulations, multimedia presentations, CD-ROM, and telecommunications (Instructional Technology Plan, 1993). [The Instructional Technology Plan was written by Sarah with input from the Technology Planning Committee.] Sarah also trained a few staff members in the use of the Writing Center, Clarisworks, spread sheets, and data bases so that they could assist in training small groups of teachers (Mary). The blueprints for using technology were complete and it was time to implement the Instructional Technology Plan at Jefferson.

The Construction Phase

In June 1992 I marveled at how much progress the Technology Planning Committee members had made in developing a mission statement and designing a blueprint that would guide our work in constructing an instructional technology program. By communicating with small groups and the Site-based Council, the

faculty was informed weekly of the work of the Technology Planning Committee, signaling the fact that information was to be shared and input valued.

The April 8, 1992, faculty meeting formally "unwrapped" the technology plan with Mary and Tim, members of the Technology Planning Committee, and three other teachers presenting ideas of how technology was going to be used in their classrooms. Tim got on line as the faculty watched the Prodigy service appear on the TV screen. Two teachers then brought up a simulation from Prodigy they planned to use with their classes. Mary and another teacher explained how they were going to use Apple Works with Apple II GS computers and The Writing Center with Macintosh computers to prepare students for the writing portion of the Virginia Literacy Passport Test. It was emphasized that students were more eager to develop writing skills when they discovered the ease of creating and editing with the computer.

Careful consideration was given to the makeup of the presenting group. Two of the five presenters were Technology Planning Committee members. This combination of members and nonmembers modeled a spirit of cooperation and demonstrated value for everyone's ability. It was important for teachers to demonstrate technology lessons as new instructional methods were learned. The chances of the new approach being accepted were increased as teachers provided

practical examples to each other. Peers helping peers supported professional nourishment and contributed to individual competence (Joyce & Shower, 1988).

Signs of Change

I began observing evidence of technology being used by teachers in the core subjects, the accessing of an on-line telecommunication service, and the purchasing of hardware. A few students started using Appleworks word processing to prepare assignments in the lab. An eighth-grade civics class communicated from April 1992 to June 1992 through e-mail with Mr. Polhill, a former Iranian hostage. Tim had formed a partnership with the Prodigy on-line service and began training sessions after school. Staff members purchased telephone cables to run down the hall to connect classroom computers to the closest phone jack so that they could access on-line services in their rooms.

Effective Training

The instructional technology program could not be constructed without pouring the footers and laying the foundation with a carefully crafted training plan. In addition to the presentation of practical classroom applications of technology, a schedule of training opportunities was announced at the April 8, 1992, faculty meeting. Two factors in getting people to use technology in the classroom were “the inservicing here at the building at everyone's convenience" and having an administrator present at each training session as a student himself (Mary). Making

sure that either Tim or I were present at the inservices validated the importance of the sessions and demonstrated support of the mission statement. Leaders communicate what they believe to be important by what they say and the time they allot to certain activities (Kouzes & Posner, 1995). The careful scheduling and organization of the training sessions by the principal were crucial to the teachers' acceptance of the innovation. "The best trainers, working with the most relevant and powerful content, will find little success or receptivity in poor organizational climates" (Joyce & Showers, 1988, p. 70). If the staff was going to integrate technology in teaching, the administrators had to be active participants in the training sessions.

Convenience of Training

Another factor cited in the interview data as being a key to the use of instructional technology in the classroom was the convenience of the training. All of the sessions from April 1992 through June 1992 and most of the sessions in the years that followed were conducted at Jefferson. This tactic allowed teachers to learn new skills in familiar surroundings and with the same Apple II GS, Macintosh, and CD-ROM equipment they would be using in their classrooms. In later sessions, this would also include laser disk players. As many of the training sessions as possible were scheduled in the teacher work day at team planning time and in the place of faculty meetings. Sessions conducted after the work day were

voluntary and inservice credit was given. Two days of training were offered on July 27-28, 1992, with stipends paid to the participants. Funding was requested and received for this summer training from the director of secondary schools. In addition to gaining financial support, this communication kept central office staff aware of our determination to incorporate technology into our instructional program.

Developmental Training

A third factor in implementing instructional technology was the developmentally appropriate training for each teacher. There was no entry standard that a teacher had to meet before participating in the sessions. Like students, we have to meet the teachers' needs and provide staff development at whatever skill level is required (Sarah). The skills taught in the early training sessions ranged from setting up and turning on the computer, formatting a disk, and composing with The Writing Center word processor to using Tom Snyder simulations and CD-ROM research software. There were teachers "that were always just a little more advanced or more accustomed to problems, and they were made available on a quick-call basis" (Mary). Sarah and Becky kept training a small group of teachers to ensure that there would be technology instructors available for all skill levels.

An eight-week, district-wide instructional technology course on the Macintosh platform was offered in March and April 1993 by Sarah in the Jefferson lab. Each school was to select two teachers to attend the workshops. Some schools had difficulty finding volunteers to send to the training sessions, but sixty to eighty percent of the Jefferson teachers desired to participate immediately. An additional session had to be scheduled to serve twenty-five Jefferson staff members (Sarah).

Supportive Environment for Training

A fourth factor in implementing instructional technology was that staff development opportunities were delivered in a supportive environment. While learning how to use instructional technology, "we [tended] to protect ourselves from a lot of pressure. I don't think the pressure [was there] that every person [had] to achieve the maximum in technology in a certain period of time. That has made everybody at home with helping everybody else" (Lisa). There was also a mind set that "everybody was expected to have problems and to help each other. It became easier to ask for help" (Linda). The teachers were involved in collegial problem solving as they experimented with new ways to teach students (Joyce & Showers, 1988). Teachers became excited about learning something new and knowing there were people around to help (Alice).

A supportive atmosphere increases the likelihood that teachers will attempt to learn new instructional methods. "Once we started the training, there were lots of times when you had to hold people's hands and tell them, you will get through this" (Sarah). This level of encouragement motivated the staff to increase the time spent learning the new skills. While leading the training classes, Sarah recalled how the teachers interacted with one another. "I would come back a week later and it was evident they had not spent that week idle. They had all gotten together with Becky's help and different key people helping them to practice what they had learned." When constructing an instructional technology program, participants require different amounts of time and assistance before they acquire confidence in their skills.

Access to Computers for Training

On a construction site, progress can be slowed or expedited by the access workers have to familiarize themselves with the equipment they need to complete the job. As teachers build their technology skills, their rate of progress is affected by their access to computers.

A concerted effort was made to have computers available for training, experimenting, and practicing. In addition to having access to the labs and team computers during the school year, most computers were made available for teachers

to take home for the summer for additional practice. It was better for the computers to be used than remain in the building collecting dust.

Unit by unit, our inventory began to increase as we searched for additional hardware through a variety of sources. At the end of the year in 1992, the Technology Planning Committee submitted a draft of our plan to the superintendent and requested funds for hardware. We received funding for six Macintosh computers and two CD-ROM players. Ten additional Macintosh computers were purchased through the Governor's Technology Initiative. Through the 1992/1993 Oakton School Board Technology Initiative, fourteen Macintosh computers, laser and dot matrix printers, and laser disk players were purchased. The additional laser disk players provided teachers with opportunities to increase the ways students could learn in classrooms. All avenues were pursued in increasing access to instructional technology for teachers. When it was learned that the Security Department planned to install an alarm system during the summer of 1992, Sarah and I received approval from central office staff for technicians to simultaneously install a category two local talk network which linked computers in the classrooms to a research CD-ROM tower and a laser printer in the media center.

The new hardware and network increased our capabilities to use electronic technology as a tool for learning. As the new instructional tools became available,

there were more teacher requests to use electronic technology in classrooms. Trying to respond to these requests resulted in a trip to the district's warehouse and demonstrated the importance of providing hardware for teachers. Alice was aware of the priority to increase our technology inventory. She recalled the time in June 1994--

> when we went over and raided the warehouse. Mark realized that there was equipment in the warehouse that was sitting there not being used -- so we went looking. We got a lot of equipment back from the warehouse to use that was from the schools that were being renovated.

This event demonstrated my commitment to providing the equipment needed to construct an instructional technology program. The staff members observed Tim and me unloading several pickup truck loads of computers, printers, TV monitors, and overhead projectors at the front door of the school. This acquisition of equipment made a visual statement that we would do everything we could to provide what was needed to fulfill our mission.

Input Supports Implementation

As our technology inventory grew, it was vital that staff members continue to give input about the implementation of our plan. In September 1992 teachers were asked to put in writing their vision for instructional technology and what would be needed to make that vision a reality. This method was used to gather input from

instructional teams as we implemented our plan. After several months of training sessions and increased access to hardware, what did the faculty see as additional needs in our efforts to provide meaningful technology experiences to all students in all subjects? The faculty's input provided direction for the next steps in the construction phase.

Technical Support

Several teachers requested that a computer specialist be placed on staff to help with training and provide technical assistance. I could see the importance of having someone who was free to assist teachers with technology lessons in the lab or in the classroom. The need for this support had been ongoing and had resulted in the more expert teachers having to leave their students or giving up planning time to assist others. With a room full of students watching, it's a big risk to try a simulation activity or teach word processing skills with a large screen monitor for the first time. If teachers are going to use technology in the classroom or lab, they need a technology assistant to be available to them.

Adding a new position to our staff was not an option, but Lisa, the library clerk, had become involved in the training sessions and had spent much time practicing technology skills on her own. We started calling her the "technology assistant" as she began to trouble shoot equipment problems, set up various kinds of presentation hardware, train others on new software, and provide assistance to

students as teachers taught in the lab. Lisa became a competent technologist and an essential support person in using technology as a tool for learning.

Approximately one year later (1994), when I was told that her position was to be cut to half time to save money, I responded that losing her full-time services would severely limit the use of instructional technology at Jefferson. A compromise with central office administration was reached, and I agreed to give up a half-time custodial position in the evenings. Lisa's assistance was a key factor in implementing our technology program as she provided training to teachers and students and made sure that equipment worked properly. If there are technical problems beyond her control, she submits work orders to the district technicians. "With Lisa helping the teachers, and them realizing that a problem can be overcome very easily, they are more willing to come on board and [use technology as a tool for learning]" (Alice).

Ongoing Training

Another requirement submitted by teachers for developing instructional technology skills was a request for continuation of training workshops. They asked for time to develop technology experience and for training on the rapid changes in this field. They felt that additional workshop time would increase skills needed to assist students. This request was of great encouragement to me. If any group

should be committed to continuous learning, it should be educators who are implementing an instructional technology plan.

Many workshop opportunities followed. Examples are the faculty meetings October 7 and 21, 1992. Tim was scheduled to present Prodigy training during team planning time, and Alice and Lisa were scheduled to demonstrate CD-ROM research software the following week. Six teachers were listed as trainers in Children's Writing and Publishing Center, Appleworks, Writing Center, Grammar Madness, Spreadsheets, Geometric Supposer, and Graphing.

In the spring of 1993, Sarah offered sixteen hours of training in the newly created Macintosh lab. Topics included: Macintosh Basics, exploring applications for every subject, using telecommunications in the classroom, and exploring computer and laser disk simulations. Several eight-week sessions were conducted for the Jefferson staff and interested teachers from the district.

An example of the effectiveness of the training was observed in the progress made by staff member Linda. She recalled that when talk began about using technology as a tool for teaching and workshops were offered, she felt burnt-out and not interested in learning anything new. Her experience with computers was limited to drill and practice which was not exciting for students. When faced with the challenge of a school-wide technology focus, she said, "Just give me an overhead projector, that's all the technology that I need." But she decided to attend

some training sessions, took a computer home for the summer, made use of technology in her classroom, and learned to create lessons that motivated students. Linda continued developing her technology skills and became a district trainer for teachers.

Increased Access to Hardware

A third request from the teachers was additional access to computers. As teachers increased the use of technology with their classes, it became a challenge to meet the demands on our limited resources. One of the most difficult problems encountered was the frustration teachers voiced with the lack of time in the Macintosh computer lab. Each Friday after 2:00, Alice scheduled the lab for the next week. By October 1995, the demand for lab use had grown to the point that teachers appeared before 2:00 to sign-up. Complaints about fairness issues began to be heard. Some teachers were closer to the media center than others which allowed them to be in the front of the line while others asked friends who had planning time to stand in line for them. Seeing people upset, angry, and in tears, Alice asked if she could develop a fairer system to assign computer lab time. She created a lottery assignment system that allotted an equal number of weeks in the lab throughout the year to all teams. The first lottery was used in November 1995 and has been used to schedule the computer lab ever since.

Desiring to keep up with the increased demand for computer use, funds were combined from our textbook, magnet, and classroom supply accounts to purchase fifteen Apple laptop computers which were placed on a cart. In the next year we added five more laptop computers to our mobile lab, which teachers could reserve for a week in their classrooms. This addition to our technology inventory provided another option for teachers as they increased the use of computers as a tool for learning.

Problem Solving

Problem solving is an essential skill during the construction of any project, and this was the case in transforming Jefferson Middle School. The development of lottery scheduling for the Macintosh lab and acquiring the mobile laptop lab in 1995 demonstrated the ability to identify problems and come up with solutions to remove them. Solutions would also be devised for modifying the blueprints to continue the implementation of instructional technology.

In a sense, a construction project is never completed. Once the structure is enclosed and following occupancy, there is a continual list of deletions, additions, and modifications that are necessary to accommodate unforeseen needs and changes. The Jefferson list included a method of training new teachers in using technology as a tool for learning, a technique for distribution of new equipment to

ensure greatest benefit for students and faculty, and a process to determine student growth in gaining technology skills.

Training New Staff

A reoccurring problem was addressed by asking, "As teachers join the Jefferson faculty every year, how will we assist them in developing their skills in using instructional technology as a tool for learning? Beginning in the 1993-1994 year, a method for giving support to new faculty members was established. New personnel were assigned "technology buddies" from the existing faculty to mentor them in using hardware and software. As training continued, the number of technology-skilled teachers grew so that an "expert" was placed on each instructional team. Another method of support for new faculty was the distribution of a list of teachers and the hardware and software used in their subjects. New faculty were provided technology support from several sources.

Organization of Hardware

Another modification necessary for supporting the implementation of the instructional technology plan was the distribution of hardware. How can the hardware be placed so that learning will be maximized for students? A computer lab was essential for training the staff and providing work stations for students involved in whole class assignments. At first, it was thought that we should plan to add as many labs as possible. As we continued to grow in our knowledge of

instructional technology, we began to consider other options. A Macintosh lab was established in an adjoining room to the library in 1993 where Alice, the Media Specialist, and Lisa, the technology assistant, provided assistance. The location of the lab allowed students needing to conduct research in the library to move to that area, find what was needed, and return to the lab a few feet away. The Apple II GS lab was located in another part of the building where the media specialist could not provide support. Even with the hourly assignment of teachers to monitor its use, it was difficult to maintain this lab. Litter and unreported repair needs caused frustration, and use of the lab decreased. We learned that labs are used most effectively when direct assistance is available. Being able to provide this in only one location caused us to consider an alternate way to setup hardware.

In 1993, discussions began concerning placing hardware in classrooms where word processing, telecommunications research, simulations, and other applications could support learning. An expanded Technology Planning Committee recommended that in addition to the Macintosh lab, technology should be available in the classroom as a tool for learning. The proposed classroom model included five Macintosh computers, an Image Writer printer, and a color TV/monitor for computer and laser disk images. With a member from each instructional team on the Technology Planning Committee, consensus supporting this classroom technology model was reached, and I approved the decision.

Without the necessary resources, the classroom technology model became a goal for the future. Distributing current resources, each team received six Macintosh Computers on carts, a Style Writer and an Image Writer printer, a TV monitor, and network access to a laser printer. The mobility of the computers allowed individuals to schedule the team's mini-lab for specific lessons. Laser disk players were available for check-out in the library. This arrangement was another example of using the hardware available to us and not waiting to act until every classroom had the proposed mini-lab.

Determining Student Growth

A third modification dealt with measuring student progress in learning technology skills. How will we know that students have the technology skills to help them learn? The original planning committee developed a two-page technology skills and experiences list as a guide for teachers. The skills to be mastered by students included organization of files, maintenance of computers and disks, network applications, and printing. Students were to experience using word processing, spreadsheets, graphing, simulations, laser disk players, CD ROM reference materials, telecommunications, and Clarisworks presentation software.

As training and experience led to greater confidence in the staff, the student technology skills and experience list became a list of competencies for each grade level. What had been called experiences on the first list became skills that students

were to master. Additional skills, such as developing class presentations using Clarisworks Slide Show or Hyperstudio and designing home pages on the Internet, became a part of the student technology competency list. During team planning, teachers incorporated the technology skills assigned to their grade level with lesson plans in all subjects.

As students demonstrated mastery in each technology activity, individual skill lists were initialed and dated by a teacher. At the end of the year, student skill sheets were placed in student permanent record folders. Students enrolling in high school in September 1997 left Jefferson with a completed technology skill sheet as verification of the work they had completed.

A syllabus was written May 1997 by members of the technology committee explaining the skill sheets and describing the final exam that eighth-graders took to receive a Carnegie Unit credit. Not only did this modification assist us in determining student growth in technology skills, but it increased accountability in ensuring the consistent use of instructional technology in all classes.

A "Walk-through" of the Jefferson Structure

After a major construction project is completed, the architect meets with those who contributed skills to the venture and inspects the structure. A structure cannot be built by one person. A variety of contributors-- architects, engineers, foremen, and craftsmen-- are needed in a construction project. The contributors'

viewpoints are also needed in the post-construction walk-through. So it goes in a school where there was desire for a different direction and new ways of doing things. A program in a school can not be implemented by one person. As ideas were shared about working and learning at Jefferson, others with visioning, planning, training, and technical skills became involved in implementing an instructional technology plan for students. The Jefferson Instructional Technology Program will never be finished, but viewpoints from participants who implemented the program may help the reader see where the school is at present time in November 1998.

Teachers note an acceptance of instructional technology by students who are at home and at ease using technology to learn (Mary). Students would not consider turning in a report that had not been produced with a computer (Linda), and they take for granted that technology will be used in a variety of ways in all classes. Students view the use of technology as an accepted way of life (Linda, Dwight, Mary, Lisa). It is also noted that all students have access to hardware, and Lisa said, "I've watched the students in the [specialized] handicapped classes progress on the computers. It is amazing what they can do." As students progress in their technology skills, they become mentors to teachers, senior citizens participating in after school training programs, and classmates. A young man who learned to create home pages in the eighth grade began earning pay by designing them for

businesses. Lisa summed up student use of technology as being such a basic part of the school that she could not imagine what would happen if the power went out.

The growth of technology skills by students may be a factor in promoting the increased use of technology as a teaching tool by the staff. Seeing progress being made by students is a motivator for continual learning for teachers (Gusky, 1984). On a recent day a science and English teacher opened a portable wall between their rooms and set up a computer lab using ten lap top units from the media center and fifteen computers on carts from other teams. The teachers assisted students in organizing research, writing reports, and developing science fair projects. Students worked in groups giving technical and content support to each other. Teachers and students were naturally using technology as a tool for learning.

With evidence that students are progressing in the use of instructional technology, teachers continue learning by attending and conducting training sessions, demonstrating new ideas in faculty meetings, and assisting each other by sharing computers and instructional skills. The use of instructional technology is an accepted way of learning at Jefferson.

CHAPTER FIVE: CONCLUSIONS, DISCUSSION, CONSIDERATIONS FOR PRACTITIONERS, AND POSSIBILITIES FOR FURTHER STUDY

Perspectives on the findings will be reviewed in four sections: Conclusions, Discussion, Considerations for Practitioners, and Possibilities for Further Study. The lenses-- culture, change process, leadership, and reform-- used to frame the guiding questions are used in "Conclusions" to view the interior of the structure built after eight years of appraising, planning, and constructing. In this way the essential themes found in the construction project at Jefferson will be explained. In "Discussion," remarks about conducting research at Jefferson precede links between the findings in this study and the work of Fullan (1991), Schein (1992), Kouzes & Posner (1995), and Goodlad (1984). The reasons for using two metaphors are also discussed. Suggestions to practitioners about the implementation of change, possible topics for additional study, and reflections about my leadership style conclude the chapter.

Conclusions

In 1998 it was time to examine the structure that was built over eight years. How was the culture in 1990 different from the culture in 1998? What changes took place? Who were the leaders and what roles did they play? What actions were needed to bring about reform? The four lenses-- culture, change process, leadership, and reform-- were used to view the Jefferson structure in 1998.

The Culture Lens

There was a transformation in the culture of Jefferson Middle School from autocratic control to democratic participation. At the beginning of the transformation in 1990, autocratic control of information, procedures, and equipment resulted in isolation: Ideas were not shared among staff members, instructional methods were exclusive to individual teachers, technology was used by a small percentage of students and staff, and access to classroom supplies was limited. At the time of the study in 1998, a more open participatory culture was evident: Ideas and teaching methods were shared and demonstrated, technology became available to all students and staff, staff members demonstrated a willingness to mentor and learn from each other, and classroom supplies became available to everyone. This transformation evolved incrementally as teachers learned that openness to new ideas increased their skills in planning and problem solving.

There were forces at work transforming the culture:

1. The Jefferson staff experienced three events that had a profound effect on the future of the school: The junior high school became a middle school, there was a change in principals, and the school became a pilot site-based management school. As a result of these events, there was uncertainty about the future, and there was a desire for direction. A vacuum existed that begged to be filled.

2. As the new principal, I was trained in site-based management procedures before coming to Jefferson. District leaders had made the commitment to adopt site-based management and sent four principals to seminars on shared decision making and starting school management councils. This training provided me with a framework for involving staff in the operation of the school. This strategy brought people together to discuss issues that were important to them in a non-threatening atmosphere. Through practice we learned to listen, ask questions, and decide what to do without alienating others. Developing these skills was foundational to implementing an instructional technology plan.

3. As the new principal, I believed in involving teachers in the operation of the school. Staff members became participants in decision making and learned to share ideas and reach consensus in their discussions. This empowerment was evident as they created a mission statement, developed and implemented an instructional technology plan, and solved problems. A community of learners developed, and it was acceptable to try new ideas, receive training, and provide assistance to others.

The Change Process Lens

Jefferson was transformed from a limited-use technology school to a high-use technology school. In school year 1989-1990, five percent of the students had technology integrated with their subjects. All students now have access to

hardware, and they learn a specific set of technology skills at each grade level and in every subject. At the end of the eighth-grade students earn a Carnegie Unit in technology.

Eight years ago few teachers used instructional technology because the magnet program involved only a small portion of the staff, the hardware inventory was limited, and there was little opportunity for training. Training is now readily available and all staff have access to technology in labs, classrooms, and in their homes by a check-out system. The use of instructional technology is a tool for learning, and teachers prepare lessons using many programs and resources, including Slide-Show, simulations, Internet searches, and laser-disk programs. Students use technology to prepare reports, create graphics, design presentations, conduct research, and establish communication.

There were forces at work transforming the staff from limited users of instructional technology to routine users of instructional technology:

1. As the culture was transformed, staff members began sharing views on teaching and school operation and became open to new ideas. The new culture allowed the staff to make changes. They were free to discuss, learn, share, think ahead, act, or explore. Staff members began incorporating the ideas from colleagues into their daily work.

2. An “outside expert” provided knowledge. I was willing to accept assistance in creating a mission statement, developing a plan, and organizing training to implement an instructional technology program. As a leader I could not produce all of the ideas or perform every task associated with the new program. I was willing to recognize good ideas and support the people who created them.

3. Staff members participated in every phase of implementing the instructional technology plan. Involvement caused the staff to take ownership in the plan, the training, and the use of technology. The new program was referred to as “our plan” and not the “principal’s plan”.

4. The staff gave clearly stated expectations: “All students will use technology in every subject, and all students will master specific skills at each grade level.” These were challenging expectations.

5. Effective training and support were provided for the staff. The training was conveniently offered on familiar equipment and at a variety of times. The trainers designed supportive sessions that accommodated all technology skill levels. Access to computers for practice was provided in labs, in classrooms, and through a check-out system.

Leadership Lens

There was a transformation from centralized leadership to dispersed leadership. Instead of one person controlling school direction and functions, many people took leadership roles. These roles were supporter, expert, innovator, empowerer, motivator, trainer, planner, and visioner. I identified the roles and labeled them based on the descriptions of the participants in the study. Ten people took one or more of these roles during the implementation of instructional technology over the eight years of the study. All of these were members of the Jefferson faculty except for Sarah, the "outside expert."

"Supporter," lending assistance to others, was the only role attributed to all ten leaders named in the implementation of the instructional technology plan. Such descriptions as helper, problem solver, troubleshooter, idea sharer, encourager, and equipment provider were used to describe the actions of "supporters".

The role of "expert" was assigned to seven of the ten leaders. These "experts" moved technology skills to a new level, kept knowledge of technology current, gave demonstrations, kept technology centered on instruction, and developed creative projects for students. When the instructional technology plan was implemented, the "experts" delivered technical and instructional information to

staff members to increase skill levels. The availability of "experts" increased the likelihood that the staff would continue learning.

The role of "innovator" was assigned to five of the ten leaders involved in the implementation of the instructional technology plan. Words used by participants in the study to describe innovators were early users of instructional technology, continual learners, technology forerunners, and innovators. In the early phases of the implementation process, there were three "innovators". Another became an "innovator" after realizing the potential of classroom technology in training sessions, and the other joined the staff in 1995 and immediately began developing innovative ideas. These leaders shared creative uses of instructional technology and encouraged the staff to try different teaching methods.

The role of "empowerer" was assigned to two people. Sarah empowered others by helping them acquire the knowledge and skills needed to use the technology effectively. The principal empowered others by establishing a culture which encouraged staff members to share ideas and skills with one another. The ten people named by the interviewees as leaders could not have shared their strengths with the faculty if they had not been enabled to learn technical skills and encouraged to share what they learned. Identifying potential in others and allowing

them to develop it were essential actions by Sarah and the principal in the implementation of the Jefferson Technology Plan.

Other roles named less frequently were “motivator,” “trainer,” “planner,” and “visioner.” Several of the roles were overlapping and could have been combined into fewer categories, but the number of roles illustrates the functions necessary to implement change.

The Reform Lens

If a staff attempts bottom-up reform, they may need assistance in transforming themselves. I was able to mold a culture in which faculty and staff were encouraged to exchange ideas, share skills, and be open to new ideas: The staff learned to identify problems and develop solutions, but technical and instructional assistance was needed to develop and implement a technology plan. Without the contributions of the “outside expert,” I believe the implementation of the technology plan would have taken longer, the plan would have been less extensive, or there may have been no plan at all. It is critical for the principal to know the skills the staff possess and the skills needed from outside resources. It is the principal’s responsibility to identify consultants who can provide the technical knowledge required. Combining the knowledge and skills available within the school and the knowledge and skills of outside experts increases the effectiveness of

a faculty in building-level reform. Effective leaders know the limits of a staff's resources and what to do about these limits (Parks & Worner, 1992).

Discussion

Conducting inquiry at Jefferson caused mixed thoughts about my dual role as change-agent and researcher. At first there was concern about being so close to the events, actions, and people that it would be difficult to describe accurately what took place at Jefferson over the past several years. Eight years have been spent dreaming, thinking, worrying, laughing, and crying over the daily happenings at my work place. The school has become a part of me, and I am forever linked to whatever occurs there. In a broader context I am also linked to fellow school leaders who search for ways to improve the learning opportunities of their students. If there is to be continual improvement, practitioners must be willing to share ideas that may assist others in implementing reform measures. By sharing our experiences, learning continues and opportunities for school improvement increase.

Following will be a discussion of my search for a metaphor to bring relevancy to the study. Selecting a metaphor was vital to structuring and clarifying my writing. This section ends with a discussion linking my findings with those of Fullan (1991), Schein (1992), Kouzes & Posner (1995), and Goodlad (1984).

Use of Metaphors

It is essential that our experiences be shared in an easily understood way. Using metaphors may increase understanding by adding meaning, relevancy, and clarity to our experiences. The lens metaphor (culture, leadership, change process, and reform) was chosen to guide the inquiry. The four lenses were helpful in framing the guiding questions and organizing the literature review, but as I began to organize the findings, the lens metaphor was a hindrance to narrative writing about the people, actions, and events in the Jefferson story. As the writing became stilted and impersonal, frustration set in. How could I remove the straight jacket that had stopped my momentum?

As the data matrices were studied, it became apparent that the experience to be shared was in an early, middle, and late sequence which made the use of the lenses cumbersome. The consideration of these time frames led me to search for a way to present the findings in a different format. The building-trade came to mind as being similar to the implementation process in a school. Architects work in overlapping phases to appraise the site, create a blueprint, and construct a structure. Principals work in overlapping phases to evaluate the school, design a plan, and implement change. The straight jacket was removed as I saw the similarities between an architect and a principal and a construction site and a school. This new

metaphor became the framework for reporting the findings in the phases of site-appraisal, blueprint, and construction.

As the writing of the construction phase was completed, I realized that the conclusions were thematically related to the guiding questions and did not fit in a time sequence like the construction phases. The lenses had been an effective framework for the guiding questions and thus became the metaphor for the related conclusions. The lens metaphor provided structure to the guiding questions, literature review, and conclusions and became "bookends" on either side of the findings. The building trade metaphor provided a way to present the sequenced experiences of the findings in a narrative style. The intent was to use metaphors to bring a clear understanding to what occurred at Jefferson Middle School over several years.

Links to Literature

The work of the practitioner is strengthened when linked to an extensive research base. Comparing the work of the practitioner with summaries of research from many studies may add meaning to building-level reform measures. Fullan's (1991) key themes in the implementation process were used as the framework for linking Schein (1992), Kouzes & Posner (1995), and Goodlad (1984) to the findings at Jefferson.

Instead of making lists of factors involved in the change process, Fullan (1991) identified key themes in the implementation process. These themes were apparent as instructional technology was implemented at Jefferson. The first theme was the vision-building process which helped people "to picture" what the school could look like and provided a general strategy to make that happen. The Jefferson planning committee developed a vision of what instructional technology could accomplish in the classroom for students and teachers. Developing a shared vision about possibilities and desired futures brought staff members together in a collaborative pursuit (Kouzes & Posner, 1995) to design a mission statement. When a group of people share a common vision, the vision "becomes more alive, more real in the sense of a mental reality that people can truly imagine achieving. They now have partners, 'cocreators' " (Senge, 1990, p. 212). The development of the mission statement was an early action that revealed the espoused values of the group. This was an important first step in establishing a shared assumption (Schein, 1992) about the use of instructional technology as a tool for learning.

Evolutionary planning was apparent as different groups of people talked together to monitor progress, take advantage of unexpected opportunities, and solve problems. The Site-based Council and instructional teams were early organizational structures used for idea sharing and planning. In 1991, these organizational artifacts (Schein, 1992) were not completely understood by the faculty. But as the

faculty gained experience in planning, decision making, and problem solving, they learned to adapt their plans to the conditions in the school (Fullan, 1991). An example of the faculty adapting plans to school conditions was proposing the installation of a local network simultaneously with a security system which increased the use of technology in classrooms. Evolutionary planning supported the implementation process as staff members stayed alert and looked for unexpected opportunities like the installation of the local network.

Actions such as distributing hardware, designing training programs, and providing equal access to computers increased. The successful outcomes of these joint actions encouraged the faculty to continue meeting and planning future actions. So the involvement of the faculty in decision making began in visible committees which became meaningful artifacts of the culture. As more decisions were implemented, faculty involvement in school operations evolved from the artifact level to the value level and gradually became an unchallenged basic assumption of the school's culture (Schein, 1992). Participation in decision making became "the way we do things around here." This was evidenced by the staff's involvement in training new teachers and organizing for the use of limited hardware in the later stages of the implementation process.

Another theme found at Jefferson was the empowerment of others and encouragement of initiative (Fullan, 1991), as evidenced by the sharing of power

and influence with the "outside expert" and planning committee. Successful leaders involve others and give them discretion to make decisions (Kouzes & Posner, 1995). Teachers are often isolated from peers and have few opportunities to share their experiences. Leaders support change by setting up opportunities for people to discuss and demonstrate what they have learned from practice. Effective leaders know that "implementation is very much a social process" (Fullan, 1991, p. 84). At Jefferson, an empowered staff that discussed, decided, and acted became the unquestioned way of conducting school business.

Learning new ways to do things is at the heart of implementing change (Fullan, 1991). Staff development was a foundational theme in the implementation process at Jefferson. The faculty valued a training program that was conveniently scheduled, developmentally designed, clearly articulated, and supportively delivered. The convenience and developmentally designed factors did not appear in Fullan (1991). Fullan listed concrete training activities, continuous support, and interaction with peers as components of effective staff development programs. My findings identified peer assistance, lack of pressure, and technical help as components of effective staff development for the implementation of a technology program.

Restructuring (Fullan, 1991) is the final theme and is concerned with organizational frameworks within a school that support renewal. There are

organizational frameworks in a work environment-- such as governing councils, planning time, and training programs-- that support renewal at the building level. Restructuring may include implementing the organizational frameworks which support school renewal (Fullan, 1991).

The Jefferson faculty developed the capability to be self-renewing as they learned to identify problems; discuss, formulate and implement solutions; and monitor daily actions. These characteristics enable school staffs to take care of their own business by dealing with problems, communicating with parents, and designing alternative programs of instruction (Goodlad, 1984).

Considerations for Practitioners

As I reflected on what I learned from this study of leadership, school culture, change, and reform in my middle school over eight years, several points seemed to have special relevance for principals in general. These points concern principal isolation, team training, obstacle removal during the empowerment of others, the communication of the vision, and the value of outside technical assistance.

Principal Isolation

The school business is complex, stressful, and often uncertain, but many of us would make the same career decisions to work with children, parents, and fellow educators. I have often thought that we could lessen the complexities, reduce the

stress, and create more certainty in our profession by developing stronger collegial ties. Educators correctly speak of the isolation of teachers from meaningful discussion and problem solving with others. This isolation may be even greater among building administrators who attend monthly meetings and occasionally escape to a conference, but rarely discuss successful practice except for debriefings in the parking lot after a principal's meeting enroute to lunch room duty. Time must be made for sharing experiences from our schools.

Team Training

Bring people together and help them function as a team before implementing change. Do not assume that a staff is able to work together, formulate plans, or create a vision. Many teachers have never been involved in meaningful participation; they have decided such issues as the paint color for rooms and the desirability of having chocolate milk as an option on the cafeteria menu. Starting a new position as principal, hold discussions with staff members individually and in small groups during the summer. Ask for their views of the school's strengths and challenges. This activity creates an atmosphere of care and trust and models the importance of listening as opinions are shared. As the staff members leave the discussion, make notes about their opinions and your perceptions of each staff member's skills that may strengthen the new team.

Provide opportunities for staff members to be involved in small tasks before major changes are considered. Working on the student and teacher handbook, analyzing test data, and listing effective instructional practices will provide experiences in speaking, listening, creating, and deciding. Create as many successful experiences as possible. Successful experiences build confidence and cohesiveness among staff members.

Obstacle Removal During the Empowerment of Others

Remove obstacles that hinder improvement, and empower others to do the same. The principal has the power to make life easier and more pleasant in the schoolhouse. No one expects us to have all the answers or solve all the problems, but we can create an atmosphere in which people say, "We are in this great task together and possess the skills to solve problems and make this a place of learning for students, community, and faculty." With this mindset established, look for obstacles that need to be removed and empower your team to remove them. The Jefferson staff removed the obstacle of limited technology use by designing a developmental training plan and increasing student and teacher access to hardware.

Communication of the Vision

Keep the vision fresh and focused. It is not enough to create and implement a mission that represents a staff's vision. The vision must be brought to people's

attention on a regular basis. It is the leader's role to remind staff members of the reasons for the vision and the actions required to achieve it. Bring to the faculty any information supporting the vision. At the beginning of two school years, I shared research with the staff that supported our mission. Each piece of research was included in the teacher handbook. The first was a list of skills that an expert panel listed as necessary if students are to be successful in the twenty-first century. The second was a list of skills that employers desire in their workers. My intent with both documents was to support our mission of preparing students for the future.

Another way to freshen the vision is to have teachers demonstrate successful classroom activities related to the vision during faculty meetings. Teacher demonstrations add interest to these meetings. In this case I believe that demonstrations increased the use of technology in classrooms by generating interest in specific hardware or software. After the demonstrations presenters sometimes became consultants to the faculty for the activity.

The Value of Outside Technical Assistance

Consider involving a person from outside the school in the visioning and planning activities. A staff may profit from the viewpoints and expertise of someone not working at the school who can provide different perspectives, fresh ideas, and unique skills. This strategy may provide creative approaches to school

improvement in all stages of the implementation process and is another way for the principal to model the sharing of leadership roles.

Carefully select the person coming from outside the school to work with your faculty. Consult with associates about the person's background and skills. In talks with the person being considered determine if the skill level and communication style of this person are appropriate for working with your faculty.

Possibilities for Further Study

All staff members interviewed had been at the school for at least eight years. Several interviewees had been there longer and provided perceptions of the school before 1990. The responses were informative regarding the shaping of the culture. What would be the viewpoint of the faculty who came to the school later in the cultural shift? What did they find to be the important beliefs and assumptions? How were each of these learned? How long did it take them to learn these? If there were differences in values, how did the faculty deal with these? It would be beneficial to principals to know how culture is learned and modified by new faculty. This proposed study could provide insight into how principals can facilitate cultural change. This proposed study could begin with Louis (1980) who suggested that newcomers to an organization be given previews "of typical entry experiences and ways to manage them and timely formal and informal feedback from superiors" (pp. 452-453) on job performance. These actions may reduce uncertainty and

provide direction on the way things are done in the organization.

The role of the "outside expert" was crucial in the technology transformation at Jefferson. Much educational reform depends on the advice from those not working in schools. A study could provide guidelines for principals desiring to cooperate with "outside experts" for school reform. What are the characteristics of effective "outside experts?" Where does one find a person with the needed expertise? What can a principal do to prepare the "outside expert" for a successful entrance into the school? How does a principal prepare the faculty for accepting the outside assistance? Answers to these questions would provide information to help in the selection of a consultant and increase the likelihood of a successful experience for the "outside expert" and the school staff.

Jefferson Middle School became a high-tech school. However, questions remain. Do the technology experiences of our students make a difference in their lives? There is ongoing discussion about the benefits of integrating technology with instruction. What are the benefits derived from using technology? Are the benefits worth the costs? How does the achievement of students in technology-rich schools compare with that of students in technology-poor schools? A comparison of high-school and college grade-point averages, standardized test scores, attendance rates, career fields, and attitudes toward school could reveal the effects of instructional technology on students.

Concluding Remarks

This report would not be complete without a review of my leadership style and the role it played over the past several years at Jefferson. My philosophy has been to be concerned with getting the job done and not with who gets the credit. For me, gratification comes from seeing something work well: implementing a program, improving teacher performance, or teaming to solve problems.

Most teachers take for granted that things run smoothly in our school. They are not always aware of why things work the way they do, and few of them point to leadership as the reason. This reaction is a result of a style which does not require my hand in every action and decision. As the leader, I set the stage by displaying patient dissatisfaction with the way things are and describing possibilities of the way things could be. I foster conditions that permit others' talents to emerge and develop high quality relationships among the faculty and community. My direction often is given from backstage or as a member of the faculty. I see my responsibility as providing what is needed for each situation through training, planning, effective hiring of faculty, and communicating.

Success for me, has been seeing change in teachers who were once reluctant to share ideas but who now are willing to help the staff in fulfilling its mission. They have learned that there are enough problems to solve and enough praise for everyone. They have learned that we are most effective when we make our

strengths available to coworkers. I realized the culture had changed when staff members ceased using personal pronouns such as I, me, and mine and began using pronouns of ownership such as we, us, and ours.

This inquiry helped me articulate the philosophy of leadership that has guided my work. Much reflection was required to determine why things happened as they did at Jefferson. Standards and programs from the departments of education in Richmond and Washington will always be factors in change efforts, but the results of reflection on practice at the building level may also impact school reform. There is potential for change leading to improvement from the ideas and actions of those who daily experience frustration and exhilaration while working with colleagues and students. Lessons learned from reflecting on experiences can be of value to school principals as they implement school reform.

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Table A1

Site-appraisal Phase: Raw Data Matrix for Components of Culture

Learning	Governance	Work Environment
"I think an awful lot of what was happening in Oakton was guesswork at first with middle schools because we were combining an elementary mindset with a high school mindset and trying to figure out what really in fact did work." 1A L86-89 [2 French classes] "they were structured more towards the high school, not as much cooperative learning groups as we have now but more just straight forward lecture, going over work, teaching." 5A L54-56 "With the magnet school, they were self-contained. All day long and even when they went to an exploratory, they went as a group to the exploratories. They were not mixed with any of the other students at that time." 5A L59-62 [As teams were formed] "I could see more hands on in the approach to teaching. I think less standing up and lecturing….I think more student involvement began to take place." 6A L37-39 "classes were structured more towards high school…just straight forward lecture." 5A L56 [library] "the English classes were involved in research." 4A L72 "only the honor students did research" 4A L75 [library] "one or two computers for the gifted program and the other students weren't allowed to touch it." 4A L127-130	"A higher percentage of [Jefferson staff] were probably more in the framework of interpretation of a high school with departments and the chain of command." 1A L26 "there was the newness of teaming" 1A L40 "for some teachers…it was unacceptable" [teaming] 1A L42 "they [Jefferson staff] were very open to beginning to take part in the operation of their school. That, I suppose, was a good foundation to look at our school and ask questions about ourselves and what we were about." 3 L22-25 "I knew that if we all were involved in making decisions, we would all make sure that the decisions were [carried out] correctly and expeditiously, if we all took ownership in it." 3 L49-51 [About the former principal] "definite ideas how things should be handled…his method was to clear everything through him first." 1B L28 "we were able to do a lot of things only after we were given clearance to do them." 1B L30 "Overall the faculty was held back from knowledge from a lot of things that went on in the building." 1B L31 "the principal at that time [Jones] would make the final decision [about issues] 5A L46 Discussed: shared decision-	"This school was still in a real transition into becoming a middle school." 1A L19 "Many of the people called upon to work in a middle school had never experienced that sort of setting." 1A L24 "You [new principal] walked in and inherited a state of nothing that was static." 1A L29 [before teaming] "we were not cohesive, we were departmental and each department was very possessive of their equipment, material…we didn't have the sharing that I find we have today." 6A L29 "every teacher was on their own, there weren't teams." 4A L72 "we had a lot of one teacher going after another teacher, stabbing them in the back." 4A L106 "a lot of people did not get along with the principal before" 4A L19 "there was a lot of mistrust; he [previous principal] didn't trust a lot of the teachers and a lot of the teachers didn't trust him." 4A L18 "it made sort of a pressured atmosphere for everybody." 4A L27 "everyone became…paranoid and they were afraid to talk to each other…afraid to say how they felt about things." 4A L35 "the stress that the teachers were under, sort of passed on to the students." 4A L42 "people did not get along" 4A L19 "each department was very

Table A1

Site-appraisal Phase: Raw Data Matrix for Components of Culture

[library] "we could spend days just doing pickup stuff like straightening the shelves, etc." 4A L78 "only a small percentage of our staff was even remotely computer literate." 1A L99 "some of them felt intimidated by using a television and video-tapes in the classroom." 1A L100 [Before technology focus] "At that point, it was basically 16 mm projector and cassettes." 6A L46 "In the classrooms, except for the magnet program, there was no use of technology. There were no computers available." 5A L67 "only the magnet students (30 to 40) worked with technology." 4A L127 "teachers, had no access to it" [technology] 4A L130 "we understood we had a couple of Mac's but nobody ever saw them. We had one Apple IIE in the library but that was for the gifted program only, we were not supposed to let anyone else use it." 4B L10-12 [Magnet] "got the technology and rest of the school didn't." 7A L40 "I was afraid of them [computers]." 7A L52 "We weren't griping about it [no access to computers] because we didn't know any better." 7A L66 Early indication of technology use in classrooms. E-mail transcripts between 8th grade civic students and former hostage Mr. Polhill April 1992 – June 1992. H.D.6	making, deciding by consensus, obstacles to listening Completed: design of the council, list of teaching and learning beliefs. 11/21/91 HD "Do you remember the first faculty meeting we had at Jefferson? I told the teachers that they could come to my office and pick-up their keys. At first the teachers were silent and then they began to laugh and one of them said, "what do you mean pick-up our keys. We never had keys before – they were never given to us. Do we get to have our own keys?" Notebook 14, p10 1/14/98	possessive of their equipment." 6A L26 "when we first began as a faculty under your administration…I don't believe we knew really what team concept meant." 1B L78 "often felt my judgement was not trusted and I didn't know what was going on in the school as a whole." 7A L15 "one team would want to do something and felt that if they shared it, somehow it wouldn't be special anymore." 7A L18 "honor classes were asked to do certain things and those not teaching honors classes were asked not to do those things – we wanted everyone to see that we had a difference in levels." 7A L21 "I found that the staff many years ago, weren't willing to share. If they had a good idea, they didn't want to share it. They wanted all the credit for it." 4A L238

Table A2
Site-appraisal Themes and Subthemes Matrix

Learning (change)	Governance	Work Environment
Teaching Methods Mostly high school lecture Some evidence of increased activities involving students Little understanding or use of computers for learning Small inventory of computers Computers used by teachers and students in magnet program	**Centralized Decision-Making** No evidence of faculty planning committee for magnet program Previous principal determined use of supplies, strategies, and information	**Work Environment** Transition of faculty to middle school and teaming Faculty possessive of materials, equipment, and ideas. Strained relationships and isolation Guarded communication

Table B1
Major Contributors to Implementation: Raw Data Matrix

Design a Course of Action Blueprint Phase	Establish a System of Support
The Planning Committee ***Mary*** "My task was to worry about at risk children and computers and what I would do to make sure that at risk children had their hands on top notch technology as soon as or before anyone else." 1B L161-163 "And I continued to speak to that every time we met as a committee." 1B L164 "They [committee members] seemed real enthusiastic about trying something new." 2A L23 "Came to the meetings without knowing a lot about technology but definitely knowing a lot about instruction." 2A L122 "That is the key role Mary played – keeping us focused on the instructional part of it and knowing so much about the kids and how they learn." 2A L126-128 **Sarah** 1st step – "vision was revealed to a committee" [by Sarah and principal] 1A L127-130 Sarah "walked in and said this is possible. These are the ways that we can do this." 1A L130-131 "This is the kind of machinery we can use, these are the programs everyone needs to be available to assist students with; therefore, you've got to increase your knowledge in that." 1A L170-172 "Set upon a plan of action where she said let me train so many people right now, let me show you what I have. She brought in catalogs and explained what the catalogs meant, which we didn't know." 1A L172-175	

Table B1
Major Contributors to Implementation: Raw Data Matrix

"So her job was really a big job. She was convincing in what she told us and I feel very honest." 1A L182-183 "Sarah was on the front end of it and knew more than probably most people in Oakton at that time knew about technology and the implications for the future and her vision was very clear as to how it should be used and where it needed to happen and how quickly it needed to become a part of the toolkit, part of the tools that we put into how we teach." 1A L150-155 "I became more and more comfortable after listening to her [Sarah] several times explain it should be approached because I had never been exactly happy with it being a separate subject and I never understood how it was going to become a part of a classroom with it being a separate subject. So once that barrier dropped for me, I began to see clearly where it [technology] belonged with 6th grade." 1B L155-160 "We began to really focus on laying out some ideas for each curriculum so that teachers would have an idea of the direction we were headed, we came up with ideas about what software we might use in the math classroom, language art, etc. We got pretty quickly down to some specifics and I believe that soon after meeting, we had broken down 6th, 7th, and 8th grades and what we would like to see happen at each of those grade levels." 2A L73-79 "Initially, we took time to get caught up with what the possibilities were, with what a dream would be. We would listen to Sarah talk to us about what her dream was and she would tell us about options, she would tell us about software packages that were available." 3 L120-123	

Table B1
Major Contributors to Implementation: Raw Data Matrix

Becky "Her personality is such that she is bright and technology was something that came very naturally to her but she never seemed to intimidate anybody else and that is a real gift to be able to encourage people along with technology without stepping on their feet or intimidating them or making them feel like they don't know what they are doing." 2A L116-120	

Table B2
Major Contributors to Implementation: Raw Data Matrix

Design a Course of Action Blueprint Phase	Establish a System of Support Construction Phase
Vision held by several people "Many people did not see this [technology used daily in classrooms] coming. They didn't recognize the importance of it." 1A L121-126 "First there had to be a vision" 1A L119 "The need was [to daily use technology in the classroom] not particularly pressing at the point where this [technology focus] began." 1A L120 "We had other people [Sarah-outside expert] that shared that vision" 1A L129 "Becky had the vision…in tune with technology…very gifted teacher" 1A L185 "Once that vision was revealed to a committee…we were given information, and were told to think about the future use of technology" 1A L129 "invested time, staff development, raising the comfort zone of all the faculty with the machinery and the language that goes with it" 1A L136 "Through the committees we aligned ourselves to certain benchmarks [goals, objectives within the technology plan]" 1A L132 "She [Sarah] lead us around places that we could have fallen down…She offered a lot of expertise and advice." 1A L177 "we've had a faculty that bought into this because of the vision that came from you [principal] at the front end and the kindness and concern for people's self confidence…that was very new with some people." 1A L203 ***Planning*** *Planning/Assessing* – how technology was used/what we had • Most of the technology in the school was found in two locations: the magnet program (accessible by 5% of the student body) and in computer literacy classes (isolated from the curriculum) • The two major uses of computer technology were for	***Effective Training*** "Once that was in place [establishment of technology planning committee] you [principal] backed off into more guiding and being there as a consultant" 1A L169 "I think fear is the thing that hurts us the most and without training, there is still a lot of fear." 2A L17 "staff development has to be a real strong component" 2A L306 *Training a core group* "Sarah said let me train so many people right now, let me show you what I have." 1A L173 *Training-- demonstration* demonstration by Ted of Prodigy on a TV monitor. Two teachers selected a science simulation that they were going to use with students. 4/8/92 HD *Training by the "outside expert"* Visible, active expert "She [Sarah] was frequently in this building…she was very much a worker as well as a consultant." 1A L179 "She was convincing in what she told us and I feel like very honest." 1A L183 *Training-- convenience* "I think the key to it all [using technology in the classroom] was the inservicing here at the building at everyone's convenience, usually having an administrator present at each one of those inservices as a student himself." 1B L168 "have training for every teacher, to have in-service training at the school so every teacher has a chance to learn the new technology." 5B L77-78 "when someone has something new and you have

Table B2
Major Contributors to Implementation: Raw Data Matrix

drill and practice and word processing (other than the magnet program) • The school had recently purchased 6 MS-DOS compatible computers but prior to that new technology had not been purchased in more than 3 years. • A lab of antiquated PC JRs made up almost ½ of the school's computer technology. • The school had no access to laser disks or CD-ROMs • A small part of the staff was quite computer literate; mainly those teachers teaching computer literacy classes or those involved in the magnet program. • Access to va-pen and prodigy was available and utilized by several teachers • All computer technology (except in the magnet classrooms) was found in labs. No computer technology was available in classrooms. • There was little evidence of the integration of technology with the curriculum. ITP L43-61 *Planning/Restructuring* The 7th and 8th grade computer literacy classes were removed from the schedule. Necessary computer skills will be developed as a natural outcome of classroom activities. ITP L85-88 The 25 Apple II GS's will remain in the present lab along with printers and LCD projection screen. ITP L95-96 The 5 Emerson (IBM compatible) computers will be used to develop a technology media center in the library. The computers will be equipped with CD-ROM, application software, telecommunications software, and educational games designed to encourage students to think critically and logically. ITP L103-107	them demonstrate it at a teachers' meeting, the next day we can hardly find enough equipment for everyone to use." 6B L86-87 Throughout the remainder of the '91-92 school year, Sarah, was asked to meet with the staff every other week in order to demonstrate state-of-the-art technology and to introduce teachers to examples of how technology can be a powerful instructional tool in the classroom. ITP L133-136 Monthly site-based technology inservice was continued during the 92/93 school year.These workshops were conducted by members of the Madison faculty and Sarah. ITP L142-144 An eight week instructional technology course was planned for the spring of 1993. This provided in-depth technology training on the Macintosh platform focusing on using the technology in Jefferson teachers attended the class. ITP L145-148 Unwrapping technology action plan Listing of upcoming training sessions Sessions scheduled during planning time, after school, and in the summer (July 27-28, 1992) Also state that in future faculty meetings, these would be demonstrations and sharing of technology experiences 4/8/92 HD 5 Memo to Central Office requesting funding for summer training – 6/4/93 HD11 Announcement of 8-week technology training course to be given at Jefferson on Macintosh platform, Spring 1993 HD 9 6 mentoring teachers listed with specific subject software 10/21/92 HD 8

Table B2
Major Contributors to Implementation: Raw Data Matrix

The 25 PC Jr's will remain in their present location and will be used primarily for 6th grade keyboarding. ITP L108-109 Six new Apple MAC LC's will be purchased and placed on rolling carts, one for each team. ITP L113-114 *Planning/Communicating the plan* How would you like to see technology being used at Jefferson? How can these factors be dealt with? 1/15/92 HD 3 – most concern from the faculty was need for hardware and training Discussion of 1992-1993 technology plan Philosophy – all students to use technology in all classes Use of existing hardware What will it take to successfully implement this technology program? Training – to feel comfortable Training – at Jefferson (held away from Central Office); software must be better organized; more phone lines needed for on-line services Technology plan and mission approved 2/19/92 HD 4 Mission Statement Jefferson Middle School has a unique mission. Our students prepare for the future by participating in vital educational opportunities through the integration of technology in all subject areas. ITP Appendix A Unwrapping our technology action plan meeting 3 main uses of technology 1. Improvement of writing and graphing skills word processing and publishing 2. Gathering information, CD-ROM, Prodigy 3. Critical thinking skills simulations 4/8/92 HD 5	Training-- Developmentally Designed "Sarah made us feel very comfortable with asking questions" 1A L181 "Anywhere someone entered in that strand of staff development, there were opportunities for them to move along." 2A L317 "We have to meet the teacher's need at different levels" 2A L320 [why do people help each other?] "We tend to protect ourselves from a lot of pressure. I don't think the pressure is here that every person has to achieve the maximum in technology in a certain period of time…that made everyone at home with helping everyone else." 4B L107-110 "We had people here in the building that were always just a little more advanced or more accustomed to problems and they were made on a quick call available basis." 1B L174 *Training--access to technology supports use* "Technology is in place, it is readily available in my room to explore possibilities that I didn't even know about when I first began this." 1A L248 "Right off the bat we had the technology and the lab that made training real accessible…Jefferson was quick to get some of the first presentation systems which made the training work well." 2B L52 [Another factor]"that helped teachers move from practitioners to integrators at Jefferson was a progressive philosophy about where technology should be. Technology was put on a lot of rolling carts and available in the classroom." 2B L127 "They [principal & assistant principal] made sure that we had the computers, it was a priority." 6A L284

Table B2
Major Contributors to Implementation: Raw Data Matrix

"After developing a mission statement, the committee collected school based information which helped to assess the current technology usage and helped them to make recommendations for change." ITP L40-42 ***Expectations*** "We began to focus on laying out some ideas [technology] for each curriculum so teachers would have an idea of the direction we were headed." 2A L74 "We got quickly down to specifics…we had broken down 6th, 7th, and 8th grades and what we would like to see happen at each level." 2A L78 " recommending that we take those few resources [limited amount of computers] and try to spread them out in the classrooms." 2A L6 The committee's charge was to begin the planning process for restructuring which included: • Envisioning for the future • Assessing the current situation • Setting goals • Planning how to "make it happen" ITP L17-20 *Expectations—setting priorities* "The turning point for using technology in the classroom was when you [principal] made the decision that all students should be part of our magnet program." 7A L84 [The reason why so many teachers were interested in learning about technology was that] "we had a goal…."we had met the summer before and said this is what is going to happen." 2A L189 "Teachers realize if they didn't receive the training, they couldn't make that [the goal] happen in their classroom." 2A L19	"I think the beginning [using technology as a school] is getting the equipment here."6A L293 "Another thing that has really helped us is getting the laptop computers – we had teachers in tears because they could not get booked into the lab…we have a laptop lab now and another lab in the library…it goes back to the [building] administration and the decision to see to it that teachers have the access they need." 6A L339-344 "Setting up a computer lab, putting computers on each team, purchasing laptop computers [increased the use of technology]." 6B L32-33 "She [Sarah] did some classes and we were all encouraged to take computers home for the summer." 7A L80 *Obtaining, gathering equipment* "One time I really remember when we went over and raided the warehouse. The principal realized that there was equipment in the warehouse that was sitting there not being used. So we went looking. We got a lot of equipment back from the warehouse to use, this from the schools that were being renovated and were not going to be used the following year in that school." 6A L230-234 "Sometimes by just bugging people, you have to be very persistent and you have to keep telling them, 'I need this, this is how we are going to use it.' Jefferson has the reputation of using whatever is given to them." 6A L235-237 At the end of 1992, the technology committee submitted a rough draft to the superintendent and asked for funds to acquire more state of the art technology. Six new Macintosh computers and 2 CD-ROM stackers were purchased. ITP L167-169 Ten Macintosh computers were acquired through

Table B2
Major Contributors to Implementation: Raw Data Matrix

"Once as a school you said this is a priority…the teachers just jumped on that." 2A L202 "The plan was specific and teachers knew what the expectations were." 2A L215 "In the planning, curriculum and instruction has to always be the priority….Instructional leaders have to be involved." 2A L302 " Knowing that they [teachers] have a week or several weeks in the computer room and that they are expected to be in the computer room teaching their children how to use a certain program,in order to do that,you have to learn that program and be comfortable with it." 6B L99-101 <u>*Expectations--technology to be a tool for learning*</u> "I think this [sharing technology ideas, expertise] came about really when we were told we had to use the technology. At that point, [teachers were] helping each other. When you are all of a sudden put into having to do something, I think you really work together to see that you do it correctly…everyone is willing to help each other and learn how to do this [computer software programs] so they can teach the students." 6A L66-70 [events leading to our use of technology] [Expectations were that] "all teachers would be responsible for teaching technology as a tool for learning. It would be a part of every class." 7A L122 " When it was decided that technology would be a part of our learning and not something separate, that had a tremendous effect on everyone's thinking about it…everyone felt responsible and included in this whole process…it brought us together as a school." 7A L135-136	the division technology coordinator as a result of the Governor's Technology Initiative. ITP L173-174 Through the 1992-93 Technology Initiative initiated by the school board, an additional 14 Macintosh computers, laser and dot matrix printers, and laser disk players were purchased. ITP L175-177 ***Support for Training*** <u>Risktaking</u> "It is because the atmosphere here is one if you try and it doesn't work, then don't do it again, but keep trying. I don't think anybody here is afraid to take a chance." 7A L108-109 "If you are not learning something new and growing, you are not a very inspiring teacher….Most everyone [staff] is a really good model of lifetime learning." 7A L112-114 "They [teachers] got caught up in the excitement of learning something new and knowing there were people around to help them." 6B L65 "Everybody was expected to have problems and to help each other. It became easier to ask for help." 7A L143-144 Listing of teachers and software programs they could provide support for and a listing of new teachers and their technology mentors. 9/10/93 H.D. 14 <u>Troubleshooting-- technical assistance</u> "She [technology assistant] does a beautiful job of troubleshooting….She is in and out of classrooms all day long…with [her] helping the teachers and them realizing that a problem can be overcome, they are more willing to come onboard." 6A L333-335 "That whole staff in there [media center] with

Table B2
Major Contributors to Implementation: Raw Data Matrix

	[the media specialist], trying to make sure the equipment was always up and ready and going for us to use for the class. That was helpful." 2B L55 <u>Encouragement</u> "Everybody is at home with helping everybody else." 4B L107-110 [Becky's] "real gift[was]to be able to encourage people along with technology without stepping on their feet or intimidating them." 2A L119 "Once we started the training, there were lots of times when you had to hold people's hands and tell them you will get through this." 2B L36 "The thing during training that I remembered the most was how teachers interacted with each other. I would come back a week later and it was evident they had not spent that week idle. They had all gotten together with Becky's help and different key people helping them to practice what they had learned." 2B L40-43 <u>*Training-- results*</u> [What causes people have to use technology is] "seeing everybody else use it and seeing the advantages of technology." 4A L169 "getting the equipment as we needed it" 4A L250 "It is available [technology] for them and you see computers going up and down the hall all day…[teachers] are sharing with each other to make it available, nobody has the it's mine attitude." 4A L273-275 "The ease of using the technology…if I'm going to do cards for vocabulary…it is easier to go to the computer, type it up and give a slide show and I have it saved for years to come." 5A L246-250 Allow students to have up-to-date

Table B2
Major Contributors to Implementation: Raw Data Matrix

	knowledge….Last year we did a stock market game in civics in which we used the Internet to get stock prices instead of using the paper which had the day before prices." 5A L254-256 [While doing French vocabulary on a slide show] "I can walk around the room and listen to students pronounce and give more individual student attention." 5A L58-59 "You realize what time-savers they [computers] are." 6B L49 "The teachers saw this [technology] was a wonderful tool for helping the students in their self-esteem as well as in today's world. If you don't know how to use computers and technology, you are going to be out of the loop." 6B L54-56 "They [teachers] realized the advantage of the technology…saw the enthusiasm in the students…saw it as another way of learning." 6A L303 ***Network*** Over the summer of 192, security installed the wiring to begin work on a school wide local talk instructional network. ITP L170-171 <u>Planning continues after construction begins</u> During the summer of 1993, the technology planning committee was expanded to include additional faculty members; one per team and the media specialist. This committee met over two days to evaluate the current technology usage and to continue planning in order to reach their "vision." ITP L153-156 The original planning committee initially identified areas across all disciplines where it would be important and beneficial to integrate technology (Appendix B). The

Table B2
Major Contributors to Implementation: Raw Data Matrix

	expanded committee discussed these areas and defined a list of minimum technology outcomes expected from all students. ITP L157-160 If you were to give advice to another middle school about starting a technology program: "Get everybody involved from the beginning…people[who are] afraid of technology and people who have used it." 7A L211 Make it available to them through classes: "Don't make it just for the elite – open it up to kids, get as many computers as you can so they are everywhere." 7A "Let the staff know they are expected to use it." 7A 217-220 "Have some training for every teacher at the school." 5B L76 "Have a computer lab set up but also have individual computers throughout the school." 5B L79 "Have a resource person who you can contact in case you run into problems." 5B L86 **Proposed Classroom Model** – evolving use of technology After almost two years of planning and evaluating, the planning committee recommends the follow instructional technology model for all classrooms. ITP L181-183 Each classroom will be equipped with the following hardware and software: 5 Mac computers with CD-ROM 1 Image writer printer 1 27" color TV/monitor (can be used to project computer image or laser disk image)ITP L215-218

Table B3
Blueprint and Construction Phases: Components of Culture Raw Data Matrix

Learning	Governance	Work Environment
Integration of Technology into the Classroom "Teachers,faculty,administrators, students,see it [use of technology] as an accepted way of life." 1A L106 [Technology] "is incorporated into everything we do." 1A L105 "Jefferson is well on its way to realizing that technology is just a tool and a resource and it's the curriculum and that is the end in itself." 2A L258 "They [teachers] have come a long way in educating themselves to how technology should be used." 2A L263 "We are continuing to grow with every piece of [technology] equipment.You demonstrate it to the teachers and everyone is wanted to use that equipment." 6A L108 "Once they[teachers] learn something [technology] and see how well it works with their class, they are more than willing to use it more and more." 6A L119 "The kids take it for granted that in all classes they will use technology." 7A L62 "Kids wouldn't think of turning in a paper that wasn't typed." 7AL63 [Technology] "is just a basic part of our school that I really can't imagine if the power went out what we would do." 7AL65 "I was more of a lecture type teacher giving notes, going over work…[now] instead of me always	**"People became involved** in it [committees] and the problem became theirs and not the administrators, but ours, things became very relevant to the faculty." 1B L46-47 "Decisions were not things that needed to be made behind closed doors, but to be put out on the table and be discussed and that answers didn't have to happen immediately but we could have time to wait and investigate and come back together and maybe reassign committees and put together a final decision that revealed what the best choice was for everyone concerned." 1B L58-61 "This team mentality went not only with the students that you served but with the entire school working as a team toward an end result." 1B L82-83 **Decentralized Decision Making** "ideas were shared among small groups and then there was always a platform to those ideas to come back together and be discussed." 2A L274 "when there was money available, they [teachers] got to decide to spend it on a quick take camera or a scanner." 2A L276 "teachers always felt they were involved in that decision making process." 2AL278	"School has become very, very **student centered**." 1B L25 "Teachers know about the problem and work together to help the student." 4A L114 "They [teachers] take the whole child into focus rather than what they're teaching." 4A L116 "Technology has allowed students to be given more individual attention which I think all teachers strive for at Jefferson." 5A L173 "They [teachers] worked to help one another get on board [with a technology plan] much earlier than most schools." 2B L57 [Technology] "is made available and you see teachers going up and down the hall all day to share computers – nobody has the 'it's mine' attitude." 4A L274 "I have never worked in a school where people get along and are as willing to share ideas, materials, as they are at this school." 6AL55 "We work very well together." 4A L104 "Everyone seems willing to share their ideas and work together." 4A L107 [People are}"enthusiastic about whatever somebody else is doing." 4A L108 **Teaming** "I love the team concept." 4AL108 [On teams,]"teachers know about the problem and work together to help the student." 4A L114 [Team members]"take the whole child

Table B3
Blueprint and Construction Phases: Components of Culture Raw Data Matrix

being the one interacting with students. I allow students to interact more by using the computer, using the technology, the slide shows, Rosetta Stone [French] and laser disk for Civics." 5A L237-240 "We are far more advanced than most college campuses [in the use of technology] and students are very at home and at ease using technology as a tool and not as a separate subject." 1A L104-110 "You [principal] led the staff through various avenues of learning but always one step at a time. We [staff] would stop – learn a new idea or skill [instructional technology] and then move on. By doing this the staff could always build their new skills on previously learned ones. The various avenues of learning were necessary due to the different levels of understanding concerning technology on the staff." 1 Notebook, page 2, 3/13/97 Linda and I [principal] were talking about the 8th grade project of teaching students to design home pages. Linda said that a good strategy for her was to teach something while she was still learning the skill herself because the questions from students helps her to better understand the skill. 7 Notebook, page 1,3/10/97 "Come and see my room. I have several work stations set up for students. A computer for word	"Starting from scratch and developing that plan [technology] and being involved all along the way is what is going to make things successful." 2A L286 "I've always felt that the staff had a tremendous amount of input in the decision making."7A L195 "There is more faculty input into making decisions.The faculty comes together in a site based meeting and discusses issues and they go back to that team and talk about the issues and then it is brought back to the site based council." 5A L262-265 [Now] "There is more faculty input into [decisions] being made." 5A L262	into focus rather than just what they're teaching." 4A L116 [Teams]"helped bring this school together." 6A L "Communication opened up to a different level." 1A L48 "You came up with a blend of people that could serve the clients or the students in a better way." 1A L65 "We were encouraged to go and sit down and talk to other teams about what had been successful for them." 1A L67 "Developmentally, it [teaming] was right on target…the communication opened up to a different level that it had ever been within the school." 1A L48 "We have learned a lot of things through mistakes and we grew from each time that we were unsuccessful." 1A L50 "The atmosphere here is one of if you try and it doesn't work, then don't do it again, but keep trying. I don't think anybody here is afraid to take a chance." 7A L107-109 "Learning is what keeps us alive…if you are not learning something new and growing yourself, you are not a very inspiring teacher." 7A L111 "Most everyone {Jefferson teachers} is a really god model of lifetime learning." 7A L114 "I've always felt that the staff had a tremendous amount of input in the decision making." 7A L195 "everybody who learned new things (technology) wanted to learn new things {technology} wanted to share

Table B3
Blueprint and Construction Phases: Components of Culture Raw Data Matrix

processing in the hall, another is in the room for graphing results from an experiment, and there is a microscope activity in the middle of the room. 9 Notebook,p 3, 10/2/97 I presented for PBS mathline [Internet math information] on 10/25/97 to the Blue Ridge Council of Teachers of Mathematics. 10 Notebook, p.5, 10/28/97 I have two notes from parents telling me of their involvement with their children on research assignments, using CD-ROM reference sources and the Internet. They were thankful that their children had these types of activities and that they as parents had learned much about technology also. 15 Notebook, p.6, 11/12/97 "[The library]is close to 100% usage even our math classes use it quite a bit." 4A L92 [In the library]"we have an open-door policy. We encourage everyone to come in and do research." 6A L151 "Every student gets the opportunity [to use technology]." I've watched the students in the handicapped classes progress on the computers—it is amazing what they can do." 4A L133 "It [technology] is incorporated into every curriculum."4A L141 [Technology]"provides a lot of different ways to approach any lesson." 1A L254 [Technology]"makes the		and we really became a community of learners not just the students but the teachers and administrators. 7 B L36-39 "I think that we were taught so much to help one another here that you wanted to help someone at another school who didn't have everything that we did. So you almost felt like we were overly weathly at Jefferson and so many things to offer." 1B L184-186 [after decision made to give access of technology to all students" "it mushroomed…the change in the whole school…the whole atmosphere of sharing our teaching methods, sharing our knowledge with each other and letting the students help u learn about the technology. 1A L93-97 "it creased a university atmosphere – everyone teaching everyone teaching everyone else, learning atmosphere. 7A ***Open to New Idea*** "be hard pressed to find anyone in the building, the maintenance staff to the administrative personnel, who doesn't recognize the vale of trying a different approach or a new idea." 1A L219-221 "seemed real enthusiastic about trying something new. 2A L23 "Jefferson's whole staff was ready to move in that direction [technology training]." 2A L170 "You had 60-80% right at the beginning excited about the

Table B3
Blueprint and Construction Phases: Components of Culture Raw Data Matrix

possibilities [teaching a lesson] unlimited." 1A L255 The other day I used several technologies in one lesson." {flex cam, computer, laser disc player, and VCR]. "I did not realize how much I had used until the lesson was over." 8 Notebook, p. 2, 9/9/97 "I got a note from a student thanking me for using the flex-cam because it helped him understand using the meter side of the ruler." "If we can't work them into the library, then we will provide them with a cart of materials." 6A L212 "Let them [teachers] use what we have [in library] that will help them with what they are teaching." 6A L165 "In all grade levels, you have your cooperative learning group. Students are working independently with the differentiation we are doing. All classes are broken down into group where students learn to the best of their ability and based on interest too." 5A L114-117 "Children can certainly explore options that I can't think about so I've had to learn to be more like a channel for themto learn." (1A L257) "That has turned around…everybody uses it [library]." 4A L76		training." 2B L33 "I think everybody is really into trying new ideas." 4A L218 "I don't think there is a single teacher that I know of here who if someone has a new idea to share, they are not willing to try." 5A L215-217 [Being open to new ideas] "is a part of our commitment to education." 6A L79 "I think they are very open." 6A L78 [Being open to new ideas] "is expected." 6A L79 "Any new person coming in [to Jefferson] knows that they have to learn this[technology skills]." 6A L79-80 [It's]"incredible.I've never worked in any school where people were so eager to try things." 7A L105-106 "If you are not learning something you are not growing yourself, you are not a very inspiring teacher." 7A L112

Table C1
Leaders and their Roles: Raw Data Matrix

Leader	Role: Supporter	Role: Visioner	Role: Empowerer
Alice	“never too busy to stop and replace a battery, go through a catalog.” 1A L195 “fundamental in setting up simulations, laser disks, CD ROM’s, collections of software.” 1A L197 “staying up to date in finding out all kinds of new machinery.” 1A L200 “making sure our library is linked for the best research results for children.” 1A L201 “trying to make sure the equipment was always up and ready for us to use for the class.” 2B L55 “instead of just maintaining a library with books, she started making sure the library had CD ROM, laser disk, even now having their own individual lab within the library.” 5A L205	“Alice and Lisa have been in on it [technology focus] from the beginning and have been tremendously helpful to everyone...whether it's about books or software or cables." ”7A L160	
Lisa	”could facilitate the management of the technology.” 2B L142 ”We have several people who are knowledgable and you can turn to such people as Lisa who can help you solve problems. A person like that is very important to have.” 5B L88 “She does a beautiful job of troubleshooting. She is in and out of the classrooms all day long. 6A L328		

Table C1
Leaders and their Roles: Raw Data Matrix

Mark	“You came up with a blend of people who could save students in a better way.” 1A L64 “My responsibility any time we have vacancies is to hire people who are open to being life-long learners and open to seeing good communications.” 3A L266 [why do the teachers take to new ideas?]”All the teachers selected up ‘til now, they all have qualities in which they have good teaching skills. They also want to go beyond just basic teaching. When they were chosen, that is one of the reasons they were chosen…they wanted to do more and more for the students.” 5A L226 “In order to keep her position full time, Mark had to give up a part time custodian to keep Lisa here all day. He made the commitment to keep her here full time.” 6A L326	“The vision had to happen fast.” 1A L127 “Once that vision was revealed, it was presented to a committee by yourself and we were given information.” 1A L128 “The vision would never have been there had it not been for you.” 1A L159 “We met first as a committee…we were given six or seven points that you had figured out about the future of this school.” 1A L162	[When Mark came the]”exposure to the inner workings of how things were going to happen, the amount of input the faculty was allowed was sharply increased.” 1B L34 [The staff was]”no longer thinking of what the administration is going to say but how do we feel about these things and the importance that we make good, solid decisions."” 1B L50 “Everyone here feels that they have input on what is going on with technology.” 6A L358 “We have a very open faculty that feels that they can say what ever they want to say and what they are saying will be heard.” 6A L359 “Decisions [since 1992] are made by the people involved.I’ve always felt that the staff had a tremendous amount of input in the decision making.” 7A L195

Table C1
Leaders and their Roles: Raw Data Matrix

Leader	Role: Expert	Role: Supporter	Role: Innovator
Ann	"able to take certain applications and see where they fit into science." 2A L157	"willingness to help everyone else who was having problems [learning intergrade]." 6B L26	
Becky			"When I first came,Becky was one of the few teachers who dealt with computers and technology in teaching." 5A L182 "Becky kept on learning and coming up with new views and new uses for the computer in the classroom." 5A L192
Sue		"[willing] to help any other faculty member with trying new things and just jumping in." 4A L208 "she is willing to share all her new uses of computers with the faculty." 5A L211	"Anything [technology] new she saw, she wanted to try.She was the forerunner of everybody using slide shows." 4A L212 "she demonstrated it [slide show] at one of our teachers' meeting and every teacher in the building wanted a color monitor to go with their computer." 6A L115
Linda			"started using word processing…she increased it to hyper-studio allowing students to do hyper-studio projects and she took it one step further by having them create web pages and learn about the internet." 5A L197 "the first that got the camcorder and did all these creative projects. When computers came, Joyce took off again. Linda has been our creative user of computers." 6A L278

Table C1
Leaders and their Roles: Raw Data Matrix

Leader	Role: Expert	Role: Supporter	Role: Motivator
Mark		"present at each one of those inservices as a student himself, learning this technology with the rest of us." 1B L169 "you seemed real enthusiastic about trying something new." 2A 124 "you and have [technology hardware] worked hard to keep us up with what everyone else has." 4A L259 "encouragement of you [use of technology by teachers] to use it constructively and see that the students get what they need to go out into the world." 4A L266 "you…tend to protect us from a lot of pressure…that every person has to achieve the maximum in technology in a certain period of time…that has made everybody at home with helping everybody else." 4B L107 "The principal realized that there was equipment in the warehouse so he and Tim and myself went looking. We got a lot of equipment." 6A L231 "The principal made sure that we had the computers…it was a priority." 6A L284 "[Why is technology used the way it is?]	[Why is the staff open to accepting new ideas?] "I think the leadership from administration, we know that this is expected of us…knowing the expectations from the administration, they are enthusiastic about it and we pick up on that." 6A L96 [action or events that impacted our use of technology] "asking, encouraging the faculty to take classes that Sarah offered – these furthered their knowledge of computers." 6B L14 "we were required [to learn and use the intergrade system for computing and recording grades] everyone got on board and started doing their grades through intergrade." [Several teachers] were willing to help everyone having problems." 6B L21 "that al teachers would have access to technology and that all teachers would be responsible for teaching technology as a tool for learning…it would be a part of every class." 7A L122

Table C1
Leaders and their Roles: Raw Data Matrix

Becky	"Becky kept on learning more about computers and coming up with new views and new uses for computers." 5A L191	"A lot of it goes right back to the administration and the decision to see to it that teachers have the access they need." 6A L345 "computers were accessible…lab, team computers, laptop computers, gave us an additional lab." 6B L33 "By making equipment and programs and teaching of programs available…everyone came on board." 6A L37 "Making [the principal] computers accessible so that we could learn at our own rate and making classes accessible to us so that we could learn it in an atmosphere where we were all learning together." 7B L24	"Because you [Mark] were so enthusiastic about everyone getting on board and gently guiding us into this [use of technology]." 7B L23
Sarah	"she offered a lot of expertise and advice." 1A L179 "was on the front end of it and knew more than most people in Oakton at that time and the implications for the future." 1B L151 "she had to be in the top 2% of the country of innovation…she was so much further ahead than we were at that point in time." 3A L101	"she was frequently in the building…she was very much a worker as well as a consultant." 1A L179 "was just absolutely fantastic in the amount of time she gave us and the expertise that she gave us." 6B L68	"she knew how to state things and then get other people to respond." 3A L193 "she accepted everybody where they were… no one [felt] threatened." 3A L210 "[Linda's eventual acceptance of technology] it was being patient with her…training opportunities did not make people feel inferior or fearful." 3A L296

Table C1
Leaders and their Roles: Raw Data Matrix

Leader	Role: Visioner	Role: Planner	Role: Trainer
Sarah	"we had other people who shared that vision…Sarah is one." 1A L130 "Sarah came in [to the original planning meeting] with a list of possibilities." 1A L169 "her vision was very clear as to how it [technology] should be used and where it needed to happen." 1B L153 "we [planning committee] would listen to Sarah talk to us about what her dream was and she would tell us about options." 3A L121	"These are the ways we can do this." 1A L131 "we [planning committee] first started looking at what we had [technology] how it was being used…if we envision the future [using technology] what would it be like? How do we reach that goal? 3A L124-128	"[Sarah] let me train so many people right now, let me show you what I have." 1A L173 "she accepted everybody where they were and provided training at different levels…no one was threatened." 3A L210
Mark		"You [Mark and Sarah]…I'm not sure who did what but I know there was a lot of planning." 7A L154 "I know that Sarah was very instrumental in helping you lead us down this path [technology]. 7A L156	

Table C1
Leaders and their Roles: Raw Data Matrix

Leader	Role: Expert	Role: Visioner	Role: Supporter
Becky	"allowed the freedom to share what they knew with everyone." 1A L139 "very skilled and trained." 1A L139 "very much in tune with technology." 1A L186 "a very gifted teacher who inspired students." 1A L186 "has gone on to be the technology person for the city." 5A L190	"had the vision too because she was very much in tune with technology." 1A L185	"real gift to be able to encourage people along with technology without stepping on their feet or intimidating them." 2A L119 "willingness to help everyone else who was having problems [learning intergrade]." 6B L26 "The principal was extremely helpful in teaching staff [technology skills]." 7A L163
Leader	Role: Planner	Role: Expert – Instruction	Role:
Mary	"part of that initial meeting to make some decisions." 2A L22	"that is the key role Mary played – keeping us focused on the instructional part [in early planning meetings]." 2A L127 "perceived as master teachers by their peers." 3A L104	

Table C1
Leaders and their Roles: Raw Data Matrix

Leader	Role: Supporter	Role: Expert	Role:
Tim	[Tim, Becky, Sarah] "[Intergrade] a godsend in our recordkeeping world [they] have held our hands through [learning the system]." 1A L208 "times when we had a computer problem and I would go running to Tim to come and straighten it out for us." 4A L231 "Mark and Tim have worked hard to keep us up with what everyone else has." 4A L259 "Tim and Mark made sure that we had computers – it was a priority." 6A L284		
Linda	"There to help other teachers." 2B L144 "we have several people who are well knowledged who you can turn to such as Linda who can help you solve problems and a person like that is very important to have." 5B L88 "willingness to help everyone else who was having problems [learning intergrade]." 6B L26	"took everything to a new level rather than just being content with some of the basic technology skills." 2A L150 "able to really integrate things into the classroom – bring the limited resources together." 2A L152 "facilitated the use of the [technology] instruction in the classroom." 2B L143 "is very good with the computers…she is so creative that she can come up with wonderful projects for the students." 4A L197	

Table C2
Summary of Leaders and Their Roles

	Visioner	**Planner**	**Trainer**	**Expert**	**Supporter**	**Motivator**	**Innovator**	**Empowerer**
Sarah	X	X	X	X	X	X		X
Becky	X			X	X		X	
Mark	X	X			X	X		X
Alice					X			
Lisa					X			
Mary		X		X				
Tim				X	X			
Linda				X	X		X	
Ann				X	X			
Sue					X		X	