An Analysis of the Practice of Selected Elementary Principals in Technology Utilization

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Loyola University Chicago

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AN ANALYSIS OF THE PRACTICE OF SELECTED ELEMENTARY PRINCIPALS IN TECHNOLOGY UTILIZATION

by

Paul A. Roberts

A Dissertation Submitted to the Faculty of the Graduate School of Education of Loyola University Chicago in Partial Fulfillment of the Requirements for the Degree of Doctor of Education

December 1995
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Loyola University Chicago

An Analysis Of The Practice Of Selected Elementary Principals and in Technology Utilization

The current literature is replete with information regarding technology as an emerging theme that will change the face of schools. Individual situations have been noted and exemplary utilization of technological systems in education are being presented through associations and conferences as models and best practice. Little scholarly work has been done to describe the practical aspects of how the principal personally has used technology to produce a more efficient system or how the principal has been assisted in his/her management functions. As technology, with an emphasis on computers is increasingly and rapidly becoming an integral management tool, and as the nature of the principalship allows little opportunity for the study of, reflection on, or practice with new technology, a study is necessary to analyze the practice of principals as they personally work to integrate technology into their management style. The identified need to be analyzed is:

What are some of the changes since the emergence of technology on the elementary principalship? What are some of the results of technology's impact on the principalship in the areas of improved management functions with implications for leadership?

The value of this research is to provide an analysis of the practice of principals in the integrative utilization of technology in management functions and the implications for leadership.
Central to this purpose was to ascertain the level at which technology was becoming an integral management tool, as well as to analyze the practice of principals as they personally work to integrate technology into their management style. The value of this research is to provide an analysis of the practice of a group of selected elementary principals in the integrative utilization of technology in four main areas:

- Communication
- Management skills
- Instructional leadership in the utilization of technology in schools
- Unexpected outcomes

A data base was generated for analysis and extrapolation, as well as base line information. The research produced a data base that was used to draw generalizations, delineating the impact on the principalship that technology has had, and offering descriptive guidance to principals in the use of technology.

Elementary school principals, as the focus of the study, seldom have the administrative staff to aide them in their administrative responsibility to the degree that their counterparts in middle school and high school have. The personal use of technology by the selected elementary principals provided information on the relevance of such usage and their role performance. The analysis led to the emergence of the following conclusions.

- Principals have not utilized technology to reach third level changes or innovations.
- Principals management and leadership styles are not aligning with the infusion of technology to create higher order outcomes for themselves or others.
• Principals are generally isolated from colleagues in their efforts to bring about personal technological change.
• Principals demonstrated a personal confidence level utilizing technology in an instructional leadership role.
• New functions for technology were discovered by principals in the areas of time allocation and management, the ability to condense the teacher evaluation cycle and raise confidentiality, and that networking was a resource that could be used to reach outside of the school walls.
• Through portable technology location becomes irrelevant in many instances for the principal to accomplish his work.
• Communication is enhanced and facilitated through technology.
• Roles the principal are changing with technology.
• The principals developed electronic data management techniques and skills utilizing technology.
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and pursued it with me. My mother, Elsie Roberts, was always an inspiration for facing adversity with a calmness that matched her Swedish wit and sparkle. My aunt, Ethel Horn, who was supportive and enthusiastic in demonstrating her belief in me and for her example of continuous growth and exploration of new opportunities thought out her life. My best friend, George Mertz, for his belief in me 25 years ago with nicknaming me ‘Doc’ and his sharing in my life over the past years. Good friends are rare indeed. My brothers Jim, Bruce and Bill, for their love and sharing of my aspirations, hopes and dreams. For my sons and daughters, Paul, Tim, Beth, and Amy. My children are dear to my heart and I hope they have learned from my struggle, perseverance, and determination that anything is possible.
VITA

Paul Alfred Roberts was born on May 6, 1946 in Elizabeth, New Jersey. He is the son of Wilbert and Elsie Roberts and is married to Judith Louise Roberts. Their family consists of Paul II, Timothy, Beth, and Amy.


His elementary teaching career was at the junior high level in Clarendon Hills, Illinois from 1968-71. He began his administrative career in the fall of 1971 and has been principal of five schools, encompassing five diverse communities and grade levels from early childhood through eighth grade. He has also taught at numerous colleges and universities in the Chicago area and has presented state wide and nationally regarding the impact of technology on education. He has worked for the United States Department of Education and has consulted with various state agencies regarding technology and education. He entered the doctoral program at Loyola University of Chicago in Leadership and Policy Studies in 1992.
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CHAPTER I

INTRODUCTION

Significance of the Study

Many reports, such as "A Nation at Risk," "America 2000" and "Goals 2000" have identified problems within the public school system and provided goals that centered around the need for change. This heightened awareness for upgrading education to meet the challenges of the future, and not the past, has been a central theme in educational literature and circles for the past ten years. The current literature is replete with information regarding technology as an emerging theme that will change the face of schools and facilitate the attainment of that elusive goal, the redesigned school. Individual situations involving the utilization of technology in educational journals and exemplary utilization of technological systems in education are being presented through associations and conferences as models and best practice. Central to this change is the educational leader in each building, the principal.

Little scholarly work has been done to describe the practical aspects of how the principal personally has used technology to produce a more efficient system, how the principal has been assisted in his/her management functions through this technology or what unanticipated outcomes have emerged through the personal utilization of technology.
The focus on the principal as instructional leader and change agent coupled with Combs identified reasons why reforms are not successful, highlight the need to focus on the principal and how technology is personally impacting his/her leadership role. Combs noted that three considerations or reasons surface as inhibitors to reform efforts. These inhibitors typify the areas of resistance present in educational organizations and are:

1. Reform has concentrated on things rather than on people.
2. Traditional efforts have been based on tired, old assumptions.
3. Solutions are usually dictated from another source and consequently they rarely achieve their anticipated results. ¹

.Statement of the Problem

As technology with an emphasis on computers is increasingly and rapidly becoming an integral management tool, and as the nature of the elementary principalship allows little opportunity for the study of, reflection on or practice with new technology, a study is necessary to analyze the practice of elementary principals as they personally work to integrate technology into their management style. This study examines the impact of technology on the elementary principalship. An in-depth analysis of the collected data will contribute to the data base on the changing elementary principalship and the impact that technology can have on this change process, as well as illuminating advantages that technology may bring to this arena. This study

highlights specific strategies that practicing elementary principals have used as they incorporate technology into the educational setting both personally and in their schools.

**Purpose of Study**

The examination of the current literature on the impact of technology on the principalship is utilized to focus on strategies and emerging trends for the elementary principal and the process of change. No studies have addressed the process involved in the infusing of technology into the elementary principalship position from the perspective of third level changes as presented by John Naisbitt in *Megatrends* and *Megatrends 2000*. Explicit data have not been formulated regarding third level changes brought about by the introduction of technology. The change process has been studied extensively in current literature by Fullan, Bruce, and Sarason with an emphasis on the structure of change and noting the fuzziness or unknown quality of the crystallized final product in the change process. The value of this research is to provide an analysis of the practice of elementary principals in the integrative utilization of technology in four main areas:

- Communication
- Management skills (eg. attendance, data analysis, financial management, discipline, personal time management)
- Instructional leadership in the utilization of technology in schools
- Unexpected outcomes

---


These areas were selected to reflect three primary areas of importance for an elementary principal and a fourth, unexpected outcomes, was selected to reflect the changes that technology has initiated in the principalship that were not anticipated or expected. Communication was selected because of its integral nature to the elementary principalship. Written and oral communication needs to be effective. This is an area where technology was first brought into the principalship and demonstrates integration and growth over time. The second area, management has been a focus for many studies. This also was a primary area where technology was introduced to expedite and enhance the collection of information and thereby create an environment where decisions could be based on more accurate, timely data. The third area, instructional leadership in the utilization of technology, takes a mandate in Illinois schools for principals to assume the role of instructional leadership and focuses on the technology aspect. The final area was developed to ascertain what changes or outcomes had occurred that had not been anticipated.

A data base was generated for analysis and extrapolation as well as base line information. It was anticipated that the research produced data which would yield generalizations delineating the impact on the elementary principalship that technology has had, and offer descriptive guidance to elementary principals in the use and integration of technology into their professional bailiwick or repertoire of skills and tools.
Research Design, Methods, and Procedures

An initial survey was conducted of 310 elementary principals in order to identify elementary principals who have incorporated technology into their personal style. Each principal was asked to supply specific data concerning such factors as the type of technology being used, if he/she was willing to participate, the funding level of the district and state or nationally recognized indicators of academic excellence. The introductory letter and initial questionnaire are presented in Appendix A. The follow up letter confirming individual interviews is presented in Appendix B.

A total of 310 questionnaires were sent to elementary principals in Cook, DuPage and Lake counties, resulting in 259 responses returned by the elementary principals. Of the 259 responses returned, 27 indicated a sufficient level of technological utilization, operating expenditure per pupil, state or national educational excellence recognition and an affirmative reply regarding a willingness to participate. The second qualifier, financial resources was based on the Illinois study headed by Arthur Berman, State Senator regarding adequate funding levels. The committee recommendation for and operating tax rate was $4500.00 for each student in the school system. The state guaranteed amount of $2501.63 for the education of each child is almost $2000 less. It was determined that Senator Berman’s Committee’s minimum was an appropriate base level of funding for the infusion of technology to possibly take place. The indicators of academic excellence accepted were the receipt of national awards such as the National Exemplary School Award, the National Blue Ribbon Award or the Technology Model School Award from Illinois. The level of
technological utilization focused on the principal personally using a computer, familiarity with Local Area Networks or Wide Area Networks, e-mail utilization, internet knowledge and confirmation from technology specialists regarding a recognized level of expertise.

After the initial questionnaire was analyzed, the pool of available candidates for in-depth study was determined. The results were then reviewed by three technology specialists who validated selections from their knowledge base. There were twenty-one who completed the screening. After further review and personal contact twelve of these respondents agreed to participate in the study. As a group, follow up interviews were coordinated with the initial questionnaires and recommendations. A semi-structured format was used in the interview process to discover candid information about the utilization of technology relevant to communication, management skills, instructional leadership in the utilization of technology in schools and unexpected outcomes. This type of study relied heavily on the degree of specificity provided by the individual being interviewed in order to identify the specific impact of technology.

The initial questionnaire and interview instrument was reviewed by Dr. Mel Heller, Loyola University of Chicago and Dr. Irene Rielly, University of Illinois. These questions were then validated by technology specialists. Glenn Magle, Technology Specialist from ESC 3, James Flanagan, Illinois Computing Educators Past President and Technology Specialist in School District 34, and John Mundt, Consultant in Technology to Hinsdale School District 86 and Administrative Computing Specialist, Glenview School District were the three technology specialists involved. The goal of this refinement process was to design an instrument for semi-structured interviews that did not contain
vagueness or ambiguities. Two focus interviews were utilized and videotaped for analysis. The questions for the interviews were then finalized relative to the focus of the principal’s personal use of technology and the interview technique of the interviewer was refined.

A total of 21 elementary school principals were contacted for a follow up interview based on the criteria mentioned on page 5 and 6. The interviews provided insights into the personal impact of technology on the elementary principalship as well as enabled the interviewer to probe and clarify answers eliminating vagueness and misconceptions. Permission was granted by each elementary principal to video tape the interview, examine relevant data and documents and study archival material. Upon the completion of the data gathering from the interviews, the responses were analyzed in terms of similarities, differences and unique responses pertaining to the four major areas of investigation, plus the application of related literature where appropriate. The data were also displayed through a matrix based on the three levels of change indicated by Naisbitt as defined in Megatrends 2000.

The three stages are

Stage 1  Least Resistance (in this stage, technology follows the path of “least resistance” into a ready market.

Stage 2  User improves or replaces previous technologies with the new technology

Stage 3  User discovers new functions for the technology, based on its potentials. (What can we do now that was not possible before?)

Limitations emerged from the study from various perspectives. The field

work was conducted over a three month period and was limited to elementary principals in Cook, DuPage, and Lake County who were identified as high-end users. Generalizations are impacted accordingly by utilizing a very select group. The value of the data relied on the candor of those interviewed in sharing the problems, frustrations, limitations and pitfalls in adapting the elementary principalship to the age of communication and technology.
Definition of Terms

For this study, the following definition of terms have been obtained from the literature:

**Architronics** - a term used to describe the coordination of architectural design with electronic technology (Mason, 1983).

**Barriers** - those factors which inhibit the adoption and use of computers in educational administration (Hanson, Klassen, & Lindsay, 1978).

**Change** - the process of transforming and giving a different direction to education (Fullan, 1982).

**Database** - computer-held electronic filing system that allows for the efficient storage and retrieval of data (McKeown, 1994).

**Elementary school** - a public school encompassing any grades kindergarten through grade 6.

**Elementary school principal** - the chief administrative officer on an elementary school (Vogt, 1988).

**Ergonomics** - the science of technology and how it impacts humans in the workplace (McKeown, 1994).

**Paradigm** - a view or perspective that establishes limits or accepted boundaries (Barker, 1984).

**Personnel management** - those administrative tasks related to staff selection, development and evaluation (Frank et al. 1986).

**High-end user** - in this study is a person with a highly developed capability for using technology as indicated by nomination by technology specialists.
**Strategic Planning** - the act of using technology to maximize limited information to establish supportive conditions to make changes reflective of anticipated educational needs. (Chambers, 1994).

**Spreadsheet** - computerized numerical information processor such as Lotus 1-2-3. (McKeown, 1993)

**Technology** - in this study includes attributes and hardware that are directly resultant from the microchip such as computers, CDROM, internet, Voice mail, Laser disks, telecommunication, etc.

**Information Age** - electronic information devices provide instant access to the evolving data base of information in the world (Thornburg, 1992).

**Communication Age** - electronic distribution of services, information, and data is not subjected to bandwidth, is becoming virtually free, and available to anyone. Compression and transmission of data are accelerating taking advantage of telecommunications. (Thornburg, 1994).
Organization of Study

The study is developed in four chapters, a bibliography, and appendices.

Chapter I includes the purpose, methodology, research design, methods and procedures, limitations of the study, and other structural information.

Chapter II contains the review of related literature.

Chapter III presents the data collected and analyzes them for similarities, differences and unique responses plus the application of related literature.

Chapter IV includes a summary, the conclusions, recommendations and suggestions for further study.

Appropriate appendices and a bibliography are attached as concluding sections.
CHAPTER II

REVIEW OF RELATED LITERATURE

The purpose of this chapter is to review the literature pertinent to the problem of this study:

What are some of the changes since the emergence of technology on the elementary principalship and what are some of the effects of technology on the elementary principalship in the following areas: communication, management skills (e.g. attendance, data analysis, financial management, discipline, personal time management), instructional leadership in the utilization of technology in schools and unexpected outcomes?

The first section examines current theories on change and the process of change in order to establish a base of reference for what education and, specifically, the elementary principalship faces as we experience the change process and its implications. The second section examines the principalship and describes how this position has developed from a historical perspective. This section also explores the implications of the current educational reform movement and how the change process impacts and relates to the principalship. The third section delineates the impact of technology currently being utilized in the school setting as it relates to the principalship and office applications in general. The final section summarizes and analyzes these related data.
CHANGE PROCESS AND EDUCATION

Change is first intertwined with technology in John Naisbitt's _Megatrends_ and later in his co-authored book, _Megatrends 2000_. In both resources, Naisbitt speaks of three levels of change. The first stage that an organization experiences as it begins to integrate technology is an infusion following the line of least resistance into a ready market. This first phase is as simple as a new product filling a need in a better way. The second phase or stage is where users in the organization improve or replace previous technologies with newer more refined technologies. The third stage of organizational change which technology will go through in any industry, according to Naisbitt, is when users discover new functions for the technology based on its potentials and not on old paradigms.  

Michael Fullan also has explored and studied the process of change extensively. He utilizes a deliberate double entendre in his book _Change Forc_ es to emphasize the nature of change being relentless and that it forces itself on us continually in our lives. The key seems to be developing strategies to contend with the forces of change, consequently, turning positive forces to our advantages and blunting negative ones. The future of the world is a learning future. An understanding of this shift in focus will enable change to be dealt with in a positive, rational manner. This understanding of change will enable all members of any organization to look at trends, shifts and changes in an analytical way and, thereby, formulate a more global plan on direction such

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an organization is taking with fluidity being present in that vision.6

Bruce Joyce summarized in the 1990 ASCD Yearbook, Changing School Culture Through Staff Development, three stages or phases of change that would exemplify most current literature: initiation, implementation and institutionalization.7 Beer and Driscoll discuss the proper conditions necessary for change to transpire. They list five conditions that create a screen through which change efforts will and can develop. These conditions are

1. Key managers must be dissatisfied.
2. The lead person of the organization must be committed and prepared to provide leadership.
3. Additional financial and human resources must be made available for the change effort.
4. Political support must exist before the change effort begins.
5. The scope of the change effort must be met with the appropriate level of time, energy, and support.a

According to Bennes, effective leaders see change as continual and inevitable, and develop visions to incorporate this fluidity into the organizational development. Elementary principals, as leaders, bring an organization to a group awareness of what the future can be through a vision, help create and implement a building vision, and focus organizational energy sufficient to develop the persistence to sustain this vision.9


Michael Fullan brings us to a fuller understanding of change as he presents ten common assumptions about change:

1. Do not assume that your version of what the change should be is the one that should be or could be implemented.
2. Assume that any significant innovation requires individual implementors to work out their own meaning.
3. Assume that conflict and disagreement are not only inevitable but fundamental to successful change.
4. Assume that people need pressure to change.
5. Assume that effective change takes time.
6. Do not assume that the reason for lack of implementation is outright rejection of the values embodied in the change or hard-core resistance to all change.
7. Do not expect all or even most people to change.
8. Assume that you will need a plan which is based on the above assumptions and which addresses the factors known to affect implementation.
9. Assume that no amount of knowledge will ever make it totally clear what action should be taken.
10. Assume that change is a frustrating, discouraging business.\(^\text{10}\)

Fullan's intent with analyzing and gaining a better understanding of change in educational settings is to facilitate principals and educational leaders playing a vital role in the change process as they face the critical issue of education preparing to meet the twenty-first century. He feels that with a positive working knowledge of change, educators will be enabled to become agents, rather than victims, of change.

Looking at change according to Fullan and the impact of technology on the principalship, it is interesting to refer to the stages of the change process as

outlined by Hall, Wallace and Dosset to gain a historical perspective. They are listed below:

**Stage 0: Awareness**  
Little concern or involvement with the innovation

**Stage 1: Information**  
General Awareness and interest in learning more

**Stage 2: Personal**  
Uncertainty about the demands of the innovation, their adequacy to meet those demands, and their roles

**Stage 3: Management**  
Focus on the processes and tasks of using the innovation and the best use of information and resources

**Stage 4: Consequences**  
Focus on the impact of the innovation on students

**Stage 5: Collaboration**  
Coordination and cooperation with others

**Stage 6: Refocusing**  
Exploration of more universal shifts

Considering these characteristics and assumptions about change and the stages which most change processes generally follow, the principal will be better prepared to incorporate the use of technology in his/her daily work, consolidate the change process which has been undertaken in schools, and to sustain meaningful school improvement for the twenty-first century. Change as Fullan notes, is an extremely difficult process to lead or to follow. Changes that do not require skill on the part of the implementers to comply can be closely monitored and may be mandated (eg. no physical punishment of students), but

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11 G. Hall, R. Wallace, & W. Dossett, *A developmental conceptualization of the adoption process within educational institutions.* (Austin: Research and Development Center for Teacher Education, University of Texas, 1972).
educational changes that require new skills, behavior, and beliefs or understanding cannot be forced. 12

Michael Fullan's statement that "Change is a journey, not a blueprint" brings out the understanding that as the educators and educational systems change, the resulting ramifications are so diverse and multifaceted that educators can only partially know what impact change will have and what the final product will look like. Anxiety, uncertainty, and fear of the unknown are intrinsic to all change processes, and especially at the early stages. According to Fullan, the perverse part of the change process is that as difficulties are experienced in the beginning, his research indicates that the later stages are unpredictable as well. This is where Fullan sees moral leadership and commitment on the part of the principal being important to the sustaining of the journey. Dynamic complexity generates surprises and our ability to deal with these determines the qualities of our lives.13

According to Csikszentmihalyi, unanticipated events and how members of an organization relate to them, both positively and negatively, will determine the quality of the members' lives in the organization as well as the health of the organization. Productive educational change, like productive life itself, really is a journey that continues throughout the life of organization.14

Therefore, problems are inevitable and endemic to any serious change effort. Problems are necessary for learning and successful change

12 M. Fullan, Successful School Improvement, (Open University Press; Melbourne, Australia, 1992), 98 - 103.

13 Ibid. 122 - 131.

management requires problem-finding techniques. A key component of this process is the review of problem-solving decisions after they have been made and a reflection to see what transpired. Avoidance of real problems is the enemy of productive change because these problems must be confronted for breakthroughs to occur. Conflict is essential to any successful change effort. People spark new ideas from each other when they argue and disagree, when they are conflicting, confused, and searching for new meaning, yet remain willing to discuss and listen to each other. Saul observes that the proper way to deal with confusion is:

‘to increase the confusion by asking uncomfortable questions until the source of the difficulties is exposed.’

Systemic change, therefore, is a complex process. A process inherently rich in problems which must be addressed in a spirit of openness and inquiry.

Stacey noted that change is a very difficult process to lead or to follow and even more difficult to sustain. Conflict over the direction that the change process should follow is not only inevitable, but desirable. Changes take time and patience. Not everyone recognizes the needs for change at the same time; nor, in fact, does everyone recognize the need for the same change. What the research has indicated is that when people are involved with the decision making process regarding the change they are encouraged to proceed from one stage of the change process to the next. In this framework, the change

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being sought has a much better chance of being implemented and sustained.\textsuperscript{17}

Problems tend to grow out of change and it is inherent that there are no one-sided solutions. Individual and group development are endemic to education and present unique needs as the principalship has been perceived as a lonely profession. Fullan cautions against moving away from the positive attribute of individualism. He views this capacity to think and work independently as essential to educational reform and believes that this may be facilitated through the personal utilization of technology. Fresh ideas and keeping in touch with our personal reflections are essential conditions that individuals need to utilize under conditions of constant change forces. Further, according to Fullan, solitude has its place as a strategy for coping with change.\textsuperscript{18} Groups are more vulnerable to fadism than are individuals and the suppressive role of groups was clearly portrayed in Lessing's \textit{Prisons We Choose To Live Inside}.\textsuperscript{19}

Groups suppression, or self suppression of intuition and experiential knowledge, is one of the major reasons why ill-conceived innovations flourish, and inevitably fade. The suppression of individual and group impressions gives change a negative image in some perceptions. It appears that change in education has been approached too often as a group-think process where we drive a good idea to extremes. Fullan notes that celebrated collaboration as automatically good is a misnomer. He also contends that participatory site-

\textsuperscript{17} R. Stacey, \textit{Managing the Unknowable}, (Jossey-Bass, San Francisco, CA, 1992), 141 - 146.

\textsuperscript{18} M. Fullan, \textit{Successful School Improvement}, (Open University Press; Melbourne, Australia, 1992), 105 - 106.

based management is not the answer in all situations. Mentoring and peer coaching are not a must in all situations for important change to take place. Pushed to extremes, collaborations becomes an uncritical conformity to the group and suppression of individual dissent. A respect for individual and personal visions is an important source for organizations who are focused on inquiry. When the future is unknown, and the environment changing in unpredictable ways, sources of difference are as important as occasions of convergence.\textsuperscript{20} Properly managed conflict is essential to productive change. The stages of forming, storming, and norming need to precede performing. In this process, the act of storming makes problems the critical issue. Honoring opposites simultaneously, individualism and collegiality is critical in the change process. Being alone while in a group simultaneously is facilitated with the advent of technology and, specifically, the communication age.\textsuperscript{21}

Michael Fullan notes that both top-down and bottom-up strategies must be employed for a successful complex organization to facilitate change and to manage or control the process. Many examples are presented by Fullan regarding centralization and decentralization to demonstrate that neither, used exclusively, flourishes. He charges that change flourishes where there is a 'sandwich' effect with consensus above and pressure below. A two-way relationship of pressure enabling support and continuous negotiation fosters change being met by organizations and growth to take place. An important factor is that every person in the school is a change agent. Change is too important to leave only to the experts and because of it's complexity, no one


person could possibly understand the complexities of change in dynamically complex systems and, therefore, each member of an organization is morally bound to being a member of this process. Also, the conditions for the new paradigm of change cannot be established by formal leaders working in isolation. All members of an organization have the responsibility to help create an organization capable of individual and collective inquiry as well as continuous renewal. Technology, again, can facilitate this. The dilemma of contending with over control on the one hand, and chaos on the other, typifies the exciting and uncomfortable position of contending with the forces of change. Working with polar opposites typifies this change process according to Fullan.22

A variety of avenues need to be pursued simultaneously to ensure change will happen. The leader and organization needs to push for change while allowing self-learning to unfold. The leader and organization needs to be prepared for a journey of uncertainty where problems are perceived as sources of creative resolution. An organization needs to have a vision, yet, not be blinded by it. The individual and the group must both be valued, while incorporating the centralizing and decentralizing forces. An organization needs to be internally cohesive, but externally orientated and, more importantly, valuing personal change agentry as the route to system change as an exemplar of the change process.

Vision and strategic planning come after a realization of what change is and how we can grow through the changes process both individually and as a group. The critical question is not whether visions are important but rather, as individual and group visions become crystallized and formed, how they can be

22 M. Fullan, Successful School Improvement, (Open University Press; Melbourne, Australia, 1992), 67-75.
reshaped given the complexity of change. Visions are an outgrowth of the skills and clarity fostered by learning. It is the crystallizing of new beliefs that, according to Fullan, should follow implementation rather than proceed it. Change should be fostered with vision and a strategic plan to follow. A shared vision which is started through the actions of members is better generated through their actions. Systemic change takes time and the result are deeper, more powerful shared visions which inspire committed action on a day-to-day basis throughout the organization. These shared visions need to remain dynamic and changing to meet the living nature of the growth process.\(^{23}\)

Michael Fullan then goes on to explain the needs of educational reform from a change perspective. Knowing that the problems are complex and intractable in education, he sees reform efforts failing due to this nature as well as that the strategies being used do not focus on things that will really make a difference. Many of the goals of education for students, such as having a sense of purpose, habits and skills of inquiry, ability to work with others, and to deal with change, are precisely the skills of change agentry. You cannot have students as continuous learners and effective collaborators without teachers and principals having these same characteristics.\(^{24}\)

Four central themes seem to play out through the literature on change as reported by Cox and DeFrees. These components of change are:

1. Getting clear on the focus of change - building a shared vision of what students should know and be able to do. Defining outcomes for students that bring visions to life. Expanding professional development to include learning while doing and from doing.


2. Making change organizational and systemic - restructuring is all about time - making time, taking time and finding more meaningful ways to spend time. Power of students to think, teachers who can make decisions and administrators who are advocates for learning with school board and parents who are active and knowledgeable participants in the educational process.

3. Managing the ongoing change process - restructuring means learning to manage and maintain change over time, among many people, and in many areas. Restructuring generates questions faster that they are answered. It takes time, persistence and after assessing results, modifying the system as necessary.

4. Deploying state restructuring grants and funds to spur change - professional development, released time and legitimization will provide an opportunity to analyze and reflect.25

These themes are played out and focus efforts on eight basic issues that have directed Fullan’s work and efforts:

- Conflict is a necessary part of change.
- New behaviors must be learned.
- Team building must extend to the entire school.
- Process and content are interrelated.
- Finding time for change enhances the prospects for success.
- A vision with small building blocks can create consensus and progress.
- Manageable initial projects with wide involvement and visible concrete results sustain the restructuring process.
- Facilitators along with opportunities for training are critical components. 26

A vision provides a guide for the action an organization participates in and the culture of the school creates a knowledge base from which any member of


the organization is able to articulate the vision to others for enculturation. The use of technology by principals must be promoted with a menu philosophy rather than mandates being the operating structure. A connection with the wider environment is important in keeping needed change reflective of societal changes. Educational organizations articulate the key characteristics noted by Fullan or Cox and DeFrees through a commitment to produce teachers who are agents of educational and social improvement.

THE PRINCIPALSHIP: ITS' DEVELOPMENT AND IMPLICATIONS OF THE EDUCATIONAL REFORM MOVEMENT

Scott D. Thomson coordinated efforts to delineate a knowledge and skill base for school administrators including principals for the National Policy Board for Educational Administration. In its' fifth draft, this paper has identified 21 domains in which the leadership positions mentioned above are directly involved in. Eleven of these are process or skill orientated, and ten are predominately content focused. These process rich and content rich domains impact one another in practice, and constitute the essential repertoire of knowledge and skills required for principals to practice according to this national study. They are

LEADERSHIP: Providing purpose and direction for individuals and groups; shaping school culture and values; facilitating the development of a shared strategic vision for the school; formulating goals and planning change efforts with staff.
INFORMATION COLLECTION: Gathering data, facts, and impressions from a variety of sources; seeking knowledge about policies, rules, laws, precedents, and practices; managing the data flow and classifying and organizing information for use in decision making and monitoring.

PROBLEM ANALYSIS: Identifying the important elements of a problem situation by analyzing relevant information; framing problems; identifying possible causes; seeking additional needed information; and exploring possible solutions.

JUDGMENT: Reaching logical conclusions and making high quality, timely decisions based on the best available information and giving priority to significant issues.

ORGANIZATIONAL OVERSIGHT: Planning and scheduling one's own time and others; work so that resources are used appropriately, and short and long-term priorities and goals are met; scheduling flows of activities; establishing procedures to regulate activities; monitoring projects to meet deadlines; empowering the process in appropriate places.

IMPLEMENTATION: Making things happen; putting programs and change efforts into action; facilitating coordination and collaboration of tasks and establishing project checkpoints and monitoring progress.

DELEGATION: Assigning projects, tasks, and responsibilities together with clear authority to accomplish them.

INSTRUCTIONAL AND THE LEARNING ENVIRONMENT: Creating a school culture for learning; envisioning and enabling with others instructional and auxiliary programs for the improvement of teaching and learning; ensuring appropriate instructional methods; designing positive learning experiences; accommodating differences in cognition and achievement; mobilizing the participation of appropriate people or groups to develop these programs and to establish a positive learning environment.

CURRICULUM DESIGN: Understanding major curriculum design models; interpreting school district curricula; initiating needs analyses; planning and implementing with staff a framework for instruction; aligning curriculum with anticipated outcomes;
monitoring social and technological developments as they affect curriculum; adjusting content as needs and conditions change.

**STUDENT GUIDANCE AND DEVELOPMENT:** Working with faculty and staff to identify professional needs; planning, organizing, and facilitating programs that improve faculty and staff effectiveness and are consistent with instructional goals and needs; supervising individual and groups; providing feedback on performance; arranging for remedial assistance; engaging faculty and others to plan and participate in recruitment and development activities; and initiation self-development.

**MEASUREMENT AND EVALUATION:** Determining what diagnostic information is needed about students, staff, and the school environment; examining the extent to which outcomes meet or exceed previously defined standards, goals, or priorities for individuals or groups and designing accountability mechanisms.

**RESOURCE ALLOCATION:** Procuring, apportioning, monitoring, accounting for, and evaluation fiscal, human, material and time resources to reach outcomes that reflect the needs and goals of the school site.

**MOTIVATING OTHERS:** Creating conditions that enhance the staff's desire and willingness to focus energy on achieving educational excellence; encouraging participating, supporting innovation; providing coaching and guidance; providing needed resources and serving as a role model.

**SENSITIVITY:** Perceiving the needs and concerns of others and relating to people of varying backgrounds.

**ORAL AND NONVERBAL EXPRESSION:** Making oral presentations that are clear and easy to understand; utilizing appropriate communication aids.

**WRITTEN EXPRESSION:** Expressing ideas clearly in writing; preparing brief memoranda, letters, reports, and other job-specific documents.

**PHILOSOPHICAL AND CULTURAL VALUES:** Acting with a reasoned understanding of the role of education in a democratic society and in accordance with accepted ethical standards.
LEGAL AND REGULATORY APPLICATIONS: Acting in accordance with federal and state constitutional provisions, statutory standards, and regulatory applications; and administering contracts and financial accounts.

POLICY AND POLITICAL INFLUENCES: Understanding schools as political systems and relating policy initiatives to the welfare of students.

PUBLIC AND MEDIA RELATIONS: Developing common perceptions about school issues; responding skillfully to the electronic and printed news media and enlisting public participation and support. 27

Technology and information systems are supported by the guidelines proposed by NCATE in their 1995 curriculum guidelines for educational leadership. This facet of organizational leadership also resurfaces in another area instructional leadership. Technology's role in communicating, supporting management and business functions, developing long range plans, monitoring the effect of technology on curriculum, instruction and management systems and relating this to student outcomes are competencies that Scott Thompson delineates in the NCATE curriculum guidelines. 28

James L. Doud also conducted an extensive ten year study of the K-8 principalship and found that extraordinary changes had taken place in the principalship. Precipitated by the U.S. Department's A Nation At Risk: The Imperative for Educational Reform, a myriad of additional reports were generated, each focusing on promoting the specific agenda of the sponsor as a


way to improve the nation's schools. Principals have perceived their responsibilities changing in four primary areas according to Doud: building level authority and responsibility, curriculum development, development of instructional practices, and personnel evaluation. This demonstrates the heavy impact change has on the principal and the array of areas that the principal must manage and deal with appropriately. The intent of this report and other reform efforts was to identify areas of growth for the principal that would lead to improving schools with the intent to provide students with the necessary skills to compete in a global society.

Cohen noted that the principalship is a position filled with ambiguity. Educational leader and professional administrator, the principalship reflects four general areas of functionality; management of the school, supervision of staff development, supervision of instruction, and public relations. The principalship is generally perceived as becoming more complex and intricate through the last decade. Reform efforts and movements have had a great impact on the role of the principal according to Blome and James with legislative efforts crystallizing the importance of these changes. Many states enacted reform legislation which listed instructional leadership as an integral


32 A.C. Blome, & M.E. James, (The Principal As Instructional Leader: An Evolving Role. NASSP Bulletin, 69 -481, 1985), 48 -54.
part of the role of the building principal.

Delineation of the scope of these efforts as they affect the principalship are replete in the literature as demonstrated through Stronge work in his reference to this evolving role:33

While the development and support of high quality learning environments should be fundamental goals of principals, the managerial function and instructional leadership are not mutually exclusive. The proper issue of school improvement and the role of the principal is not middle management versus instructional leadership; rather the focus should be managing for productive schools.

Historically, the refutation and rebuttal of the Coleman report titled Equality of Educational Opportunity, 34 and Jencks and Associates report from Harvard Inequality: A Reassessment of Family and Schooling in America, 35 drove the effective school research and its focus on instructional leadership. The effective schools research that was driven by these studies focused on individual schools and classrooms. The impact of the building principal on student achievement and the role of instructional leadership emerged. Behling commented on the role of the principal.36 His review of effective schools literature focalized on four basic roles:

(1)According to Blumberg & Greenfield, principals who are effective


instructional leaders are also good managers 37

(2) Fiedler notes that principals may use a variety of leadership styles and be effective in improving the instructional program 38

(3) Effective principals view constraints positively

(4) McCleary & Thompson's work on effective principals depicts an effective principal as those that are able and aggressive strategists 39

Drake and Roe40, Estler41, and Walker42 are examples of researchers who have emphasized the complexity and problem based structure of the role of the principal today. As stated by Blome and James societal pressures, state and federal mandates, and administrivia have significant impact on the principalship43. Conflicting community expectations, school board,

37 A. Blumberg & W. Greenfield, The Effective Principal, (Boston: Allyn & Bacon, 1980).


43 A.C. Blome, & M.E. James, The Principal As Instructional Leader: An Evolving Role. (NASSP Bulletin, 69, 481, 1985), 48-54.
superintendent and teacher demands place the principal in a "challenging position". Wohlstetter and Briggs delineated four emerging roles that principals are assuming in the school based management movement. The instructional leadership role that has been touted so long as a primary function, is being redefined and broadened to include: Designer of Involvement Structures (creating decision making teams, providing involvement in school specific issues, etc), Motivator/Coach (supporting an environment that is based on trust and encourages risk-taking, collaboration, sharing information and facilitating participation), Facilitator of Change (principals encourage staff development and provide tangible materials, money, equipment and intangible resources (time, opportunities), and liaison to the Outside World (principals access, share and connect with other schools and educators at all levels to solicit materials, ideas, research and free up teachers to focus on teaching and learning).44

Duttweiler and Hord consolidated the job factors that they analyzed as being important to be effective administrators and they are represented below. Although keeping up-to-date is one of the ten factors, the skill of dealing with change is not truly considered as a necessary skill by these authors.45

1. Student interaction and social control
2. Administration and planning
3. Personnel management
4. Observation and feedback
5. Instructional management

44 P. Wohlstetter, and Briggs, *The Principal’s Role in School-Based Management*, (Principal, 74, November, 1994) 14-17.

6. Policy development
7. Parent and community relations
8. Coping with disorder
9. School system interaction
10. Keeping up-to-date

The perspective of Lipham and Hoeh\(^{46}\) contradicts that of Knezevich\(^{47}\) in which they viewed the principal as an executive or administrator and the position of principal as being a constellation of several positions. Lipham and Hoen saw a distinction between leadership and administration. In their view, leadership was that behavior that brought change to a system. Administration was merely involved with maintaining organizational structures. The evolving principalship indicated from the literature reviewed holds a position central to change and critical in school culture development.

**THE ROLE OF THE PRINCIPAL IN THE CHANGE PROCESS**

Research noted previously has focused on the powerful role that the building principal fills in his or her managerial duties. Ownership of the perceived need for change is central to the success of the implemented change. School improvement on the part of the educational building leader, the principal, must guide the implementation of change and be motivated by


dissatisfaction with the current system. The ten characteristics of effective administrators listed in the previous section by Duttweiler and Hord do not mention the skill of dealing with change specifically, but it is assumed in the listing of keeping current. Sarason further discussed the process of change regarding the principalship as two-fold: namely, systemic for the district and specific for an individual building. It is evident that principals are not trained in handling change and with minimal previous experience, conflicts and problems inevitably arise. The principal’s view of their role is reflective of how much they govern their actions rather than external factors.48

Nicholson and Tracy emphasized the importance of providing initial time and resources to the principal to facilitate their internalization of the change in order to work effectively with staff. It is pointed out that he/she must demonstrate the technical skills in the knowledge and use of the innovation, as well as the human relations skills in dealing with system concerns about how the innovation will affect them.49 Bailey further pointed out that the more supportive the principal is perceived to be of the change, the higher percentage of goals will be achieved in the change process. He defined the major emphasis of the principal’s role in not only giving support morally to teachers, but also creating an organizational environment that supports and sustains innovation.

Examples of principal behaviors that would support change efforts are:

1. Participating in training sessions with staff.
2. Validating the importance of the change by committing time with change participants
3. Finding resources for change

4. Providing recognition for those involved
5. Planning special events for participants in change implementation\textsuperscript{50}

Schools have five major resources to manage, namely, people, money, facilities, time, and information. The use of the computer and technology can assist in managing these resources. "Any organization, certainly including the school, requires information to function effectively."\textsuperscript{51} The single most important resource that educational administrators have at their disposal to identify future needs, establish valid perspectives, and guide decision making is information. Technology enables schools to manage and leverage information in a positive, reflective manner.

Recently, the literature reporting computer use by school building principals has given both perspectives of extensive and minimal use. Canning and Polin noted, "Very few principals reported that they themselves used a computer".\textsuperscript{52} This is further alliterated by Gustafson when he states that, "Administrators seem unaware of the potential of computers to assist in their administrative responsibilities".\textsuperscript{53} The utilization of microcomputers as noted by Walters finds many principals ignorant of and unprepared to capitalize on the

\textsuperscript{50} G. W. Bailey, \textit{Organizational Effectiveness and the Capacity to Change}, (Outcomes 6 Winter, 1987), 18-22.


potential benefits offered by technology and, specifically, by computers. The literature indicates that principals have not availed themselves of the full potential of technology. They have not increase administrative efficiency or enhance the educational process. 54 On the other hand, Kinzer et al. found that the computer is being accepted more in school management and stated:

"It is clear that using microcomputers in the management of a local school is a well-established trend in the United States. One significant indicator can be seen in the growing presence of advertisement in professional journals and magazines for software to be used to help manage local school operations." 55

Others report a similar acceptance of technology in the school office for administrative purposes. Some allude to the fact that technology has been in the office as long as it has been in most schools for instructional purposes. Frankel in 1987 and Crawford during the same year noted administrators attempting to utilize technology in one of three ways: either as paradigm pioneers, recalcitrants (those that will have nothing to do with computers), or as pragmatists (those that see the benefits and are beginning to use them in their offices). 56 Mecklenburger noted that information processing tools are much


more proficient than people at two tasks: the storage and retrieval of information. These capabilities according to Mecklenburger are the keys to making schools more productive and education more exciting.  

The three generic functions of the computer that make it functional in the school office are word processing, data base management, and spreadsheet applications. Touchton in 1987 noted that the basic applications do not vary from small to large district but rather, only the number of applications changes relative to enrollment size. The literature further refers to other computer applications that may be used in the schools less frequently than the three basic application areas. Among them are: instructional management, computer management of instruction; computer scored examinations; computer assisted examinations; accessing information from data banks; guidance of students; management of the plant (eg. energy); computerized home dialing of attendance and food service operations.

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TECHNOLOGIES IMPACT ON SCHOOL OFFICE APPLICATIONS AND THE PRINCIPALSHIP

The utilization of technology in a myriad of settings educationally has deluged us with an exponentially expanding pyramid of options and opportunities. Sorting through this sea of alternatives can be exasperating and counterproductive if not explored with a clear end in mind. It should be noted that prior to 1950, a musical greeting card with a microchip inside which is now commonly available for $3 - 5 from Hallmark™, displayed more computer technology than was available in the world. ⁶⁰ Historically, in 1978 when Dan Bricklin was involved with designing VisiCalc for spreadsheet analysis of case studies for his MBA at Harvard, Steve Wozniak was designing a terminal that later became the first Apple™ computer and heralded the micro-computer revolution.⁶¹ Through these humble beginnings, the impact of technology, and especially computers, began in American society. Previous to these two breakthroughs, the use of mainframe computers was unheard of at individual elementary buildings.

H.A. Simon addressed the impact of the computer in the office setting even before the advent of the microcomputer. ⁶² He closely tied ergonomically

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man and machine working together. He felt that effective use could be made of technology as a tool to assist in decision making and enhanced performance. Utilizing technology to develop, process and manipulate information has been heralded as the focus of how technology will change the world of education by Bank and Williams. This information technology has grown in the last 30 years in contrast to the agrarian society transforming into an industrial society which was a longer process. As John Naisbitt noted in his book *Megatrends*, the United States has shifted from an industrial society to an information society. This shift to information has been embraced by the business world, and they have figuratively created superhighways with technology, while we have been formulating dirt roads in the field of education. According to Marchand & Horton, it is apparent that in business, the computer and technology is so interlocked that its removal would significantly inhibit the business world.

Bosch believed that it is critical for school administrators in the information age to possess computing capabilities. She stated,

"The ability of school administrators to raise their productivity and increase the computing capabilities of their schools is critical in the

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Canning and Poilin noted that the computer will influence both the definition of educational issues and the decisions that are made about them by school administrators and classroom instructors. Ironically, public education and school administrators appear to be far behind the business community in the area of technology utilization as related in an early study by Cutts et al.

While many school district business offices have been converted to electronic offices, most building-level school offices are just beginning to make the change. Coffin reported that school building principals have not kept abreast with computer technology and are, therefore, unable to provide support and leadership in their schools in this area.

Bird noted that microcomputers in the school had many possible applications and that they could facilitate curriculum design, scheduling,

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budgeting accounting, and assist with the assignment of students to classes. He further listed pupil records, student grades, and reports as possible administrative applications of microcomputers. Further, touted as benefits of microcomputers was their capacity, speed accuracy, and their ability to deal with complex problems. Madron further noted that by the 1990's, microcomputers will be as common as calculators in business. He envisioned three general applications for microcomputers: test and data management, communications, and data collection and control. Further, he felt that the important question facing educational systems was how they planned for the effective use of their computer systems. As we look at the principalship, it was felt that computers could help school building principals perform their tasks. Success of administrators was projected in the future to be based upon their ability to process information, and that computers would become a major tool for principals to manage information.

Identifying potential areas of need and guiding decision making is a general theme in the literature which focuses on the information as being the “single most important resource that educational administrators have at their disposal”.

As Cooper and Forrer envisioned computer technology assisting in the

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routinized work of school administrators, they saw the choice as not being whether or not to use this technology, but rather when and in what context it is to be used. The computer’s ease in handling routine tasks, and its capability to reduce the amount of time needed to accomplish given tasks are assets that administrators perceived as assets to the principalship. These implications were immediately felt in the school office with extensive time savings. As we look toward the demands of the reform movement, the need for quality information increased exponentially. Computer based information systems provide for and manage the requisite information in meaningful, educational, method. Mojkowski stated that the “new technology will be a significant impetus and support for accomplishing school improvement and revitalizing the way principals think about their own work”. He further stated that perceptionally, the principal knows that quality information is crucial to school improvement, effective leadership and efficient management. Lindelow asked the key question for the building level administrator; ‘How can I bring my school smoothly into the information age?’

Studies also found that few principals were making full use of the computer in such a way to maximize its full potential and improve their personal


work situations. Larry Cooper found that principals who were using computers primarily used them for correspondence and communication purposes. Record-keeping tasks were of second importance to the principals he surveyed, and later in 1989, Cooper reported that few schools were truly using the full potential of computer technology to increase administrative efficiency and to enhance the educational process.\footnote{L.G. Cooper, "Are you making effective administrative use of computers?", \textit{NASSP Bulletin}, 73, 516, 1989). 93-94.} Many building principals treated computers as just one more innovation to implement in the mid 80's according to Mojkowski. It was commonplace to leave a computer lab where students were learning computer tool skills and to pass the principal's office where the manual typewriter and three-by-five cards were in evidence.\footnote{C. Mojkowski, "The principal and technology: Beyond automation to revitalization", \textit{Educational Leadership}, 43, 1986, 45-48.} Carey found the same sentiment when he quoted a principal as saying, "Computers are great, let's use them, but please, don't ask me to personally deal with them".\footnote{W.M. Carey, Reactions to an elementary school's computerized office management system. In A. Bank & R. Williams (Eds.), \textit{Informational Systems and School Improvement}, (New York: Teachers College Press, 1987), 97-102.} Crawford also studied the impact of computers on the principal and he discover that principals were realizing that the same little microcomputer that the third graders were playing educational games on could provide a surprising amount of help with administrative tasks as well. 

According to Crawford, principals approach the use of computers in one of three ways. The first group he called the adventurers. The adventurers used computers widely for several years to help with administrative tasks in their schools. The second group he called the recalcitrants. The recalcitrants will
have nothing to do with computers. Between these groups are what he called the pragmatists. The pragmatists are the largest group who took a while to recognize the benefits and are now beginning to use computers in their offices.\textsuperscript{81}

The issue for the building principal according to Mecklenburger was to use technology effectively. He stated; "Information processing tools are much more proficient that people at two tasks: the storage and retrieval of information. These capabilities are the keys to making schools more productive and education more exciting".\textsuperscript{82} Therefore, at this stage in the chronology of utilization of technology by the principal, word processing and data storage, retrieval and manipulation were the main uses of technology. This alluded to efficiency is a common rationale for the use of computers in schools to more efficiently deal with paperwork and information requirements of the position of the principal. This should allow the principal to be freed up to concentrate on their instructional leadership roles in the school building. Saving time has been an issue from the early 80's as is evidenced by the research by Spunk & Atkinson, and a search of the literature finds that multiple authors agreed that technology should save the administrator's time.\textsuperscript{83} The three basic applications, word processing, data base management and spreadsheet


\textsuperscript{82} J.A. Mecklenburger, "Technology in the 1990's: Ten secrets for success", \textit{Principal}, 69,2, 1989. 6-8

utilization, were noted by a variety of authors from Bosch 84 to Serfass85. Data base systems have been utilized for the following commonly accepted school administrative uses: Student records, staff and personnel records, inventory and property records, student scheduling, grade reporting and analysis, attendance, library records, student transportation, athletic records, discipline records, and special education applications. Spreadsheets on the other hand were used according to Machett, Frank, and Abrams primarily in the areas of financial management and budgeting. Analyzing data and having the ability to calculate basic statistical information made the electronic spreadsheet more productive in addressing the question, “What if . . . ? “86

Other computer applications noted in the literature revolved around management issues (energy, food service, computerized home dialing, etc.) student guidance, and instructional management. McCorduck and Russell noted that computers are transforming the way an increasingly information based society works, and, thus, the pressure on the school from many segments of society and from within the schools themselves to make effective use of computers can only grow stronger.87


SUMMARY OF LITERATURE REVIEW

The review of literature attempted to define technology, change, and the principalship. Elements of the change process were investigated, and the role of the principal was expanded to develop an understanding of the need for leadership by the principal. Further, the impact of technology currently reported in the literature in the basic areas of word processing, data base management, and spreadsheet analysis was explored and delineated. Insight into the need for an analysis of the utilization of technology by principals personally can be drawn from the various areas explored as well as Naisbitt's explanation of third level, unanticipated, new functions for technology based on it's potentials. The next chapter will address the data collected from high end user: principals who have personally integrated technology into their professional repertoire of resources. The intent to explore the way technology has assisted, changed and possibly revolutionized their performance of their administrative, managerial, and leadership responsibilities will be the focus. The question:

What are some of the changes since the emergence of technology on the principalship and what are some of the effects of technology on the principalship in the following areas: communication, management skills, instructional leadership in the utilization of technology in schools and unexpected outcomes.

will be addressed in greater depth through an analysis of data collected through
interviews. Analysis will focus on discerning similarities, differences, and unique responses. Naisbitt’s three stages of change will be utilized to provide a framework for the matrix used with each question.
CHAPTER III

PRESENTATION AND ANALYSIS OF DATA

The purpose of this study is to determine the impact technology has had on the elementary principalship, with an emphasis on computers as a focus of this technology. Central to this purpose was to ascertain the level at which technology was becoming an integral management tool, as well as to analyze the practice of principals as they personally work to integrate technology into their management style. The value of this research is to provide an analysis of the practice of elementary principals in the integrative utilization of technology in four main areas:

• Communication
• Management skills
• Instructional leadership in the utilization of technology in schools
• Unexpected outcomes

An in-depth analysis of the collected data generated a data base on the changing elementary principalship in respect to technology and how this technology relates to this change process. The study provides specific
strategies for elementary principals as they incorporate technology into the educational setting both personally and in their schools through an analysis of their individual learning profiles in their acquisition of skills utilizing technology.

The following research questions were formulated prior to the screening questionnaire and interview process:

What technology do you personally used as the principal in this school?

Why was this technology selected for use?

How is the introduction and utilization of this technology reflected in your management skills in the areas of attendance, data analysis, financial management, discipline, and personal time management?

How is the introduction and utilization of this technology reflected in your instructional leadership in the utilization of technology?

What perceived changes have resulted with the personal integration of technology for you as principal?

From your experience, what are the implications for the use of technology for the principalship?

What can you, as principal, do now that was not possible before this technology was created?

Describe the course of your growth in the utilization and application of technology? What are some of the benchmarks in this learning process?

My overall purpose of this study is to determine the impact that technology has had on your work. What have we not discussed that is relevant to your work?
An initial questionnaire was sent to a total of 310 elementary principals in Cook, DuPage, and Lake counties, resulting in 259 responses by the elementary principals. After the initial questionnaire was analyzed, the pool of available candidates for in-depth study was determined. This group was also narrowed based on the perception of the reviewer of the scope and depth of the integration of technology. Of the 259 responses, 12 exhibited a sufficient level of technological utilization, financial backing, educational excellence, agreed to participate in the study and were confirmed by technology specialists as viable participants.

This chapter is divided into five major sections. The first section concerns profile information from the initial questionnaire respondents about their utilization of computers, e-mail, internet, hand-held computers, laptop computers, their recognized school academic excellence, and financial operating expenditure per pupil.

The second section profiles the information regarding the selected principals who were interviewed. This in-depth information focuses on the respondents and their respective schools. It contains school size, low-income and limited English proficiency, ethnic demographics, attendance, mobility, school and class size, pupil-teacher, average district administrator salary, operating expenditure per pupil, IGAP information in reading, math, and writing, and if their district had a technology plan in place. Graphs and tables are used to represent data to help in analysis.

The third section reviews the information gleaned from each respondent during the interview regarding each question to enable themes and categories to emerge in each of the four areas. In this section, each question is individually analyzed. Graphs and figures are utilized where appropriate to display data.
The fourth section reflects on the four main areas for analysis as noted in the narrative in chapter 1. They are

• Communication
• Management skills
• Instructional leadership in the utilization of technology in schools
• Unexpected outcomes

Also, this section explores the changes that have been initiated by these elementary principals in the utilization of technology and analyzes them utilizing Naisbitt's three levels of change. The intent of this final section is to delineate third level changes that were not anticipated through the introduction of technology, as well as document first and second level changes.

The fifth section is concerned with the problems and pitfalls identified with the implementation of the utilization of technology by the elementary principal. Difficulties are cited by principals as they attempted to incorporate technology into their respective professional bailiwicks.
As reported earlier, there was a total of 259 surveys returned from the initial questionnaire. Of these, 100% of the principals noted that they had computers. This pervasive influx of computers into the elementary principalship is noteworthy. Previous studies in 1988 and 1990 noted in the research chapter indicated that the computer was not a pervasive instrument for the principal to use personally five years ago as it is currently. Further, 52% displayed laptop computers for their use. The change from a fixed-location desktop computer to a laptop is significant since a laptop would provide mobility and a more varied usage pattern than a fixed-location computer. This change is represented in Figure 1. The graph represents the number of stationary vs laptop computers utilized by elementary principals responding to the survey.

**FIGURE 1.** N=259. This graph expresses the number of laptop vs stationary computers for those surveyed.
The graph presented in Figure 1 not only demonstrates the acceptance of computers by principals for their personal use, it also represents a trend to laptop computer utilization by the principals. The mobility provided through a laptop computer would indicate a possible vision of utilization extending beyond an office area to meetings in other locations, working at home, and bringing the technology to where the action is taking place. The mobile office for the principal is a departure from the functions of the principal which were portrayed in the past. The principal's office has conjured up a variety of images, many of which have a person looming behind a desk in an identified area. Now, with communication devices being mobile, office space is not necessarily a geographic location, but rather, where the person is with the technological tools.

The second part of this initial survey solicited input as to the availability of e-mail and internet. The results indicate that three times as many schools have local area networks with e-mail addresses than have internet access. The graph in Figure 2 represents the number of networks currently in place in schools. LAN stands for local area network, and WAN stands for wide area network.

FIGURE 2. N=259 72% had networks in buildings.
This WAN (Wide Area Network) and internet access is indicative of the goals of districts as they come to grips with the needs of the communication age. Having access to a computer network is significant from three perspectives. First, having e-mail at the local level through a local area network indicates a level of sophistication regarding technology. Having a network demonstrates that communication through technology is facilitated and valued.

Second, it indicates that wiring has been done in the schools and that communication using alternative methods such as e-mail has been explored and deemed valuable by decision makers. The State of Illinois estimated that 37% of all the classrooms are 50 years old or older. The wiring needs and requirements in 1950 were quite different than they are now, and establishes a primitive level of electrical wiring with no wiring for data communication in these rooms.

The third perspective is that the wiring for internet and WANs indicates a possible cutting edge mentality and a paradigm shift to look at future needs in the district. The access to internet demonstrates a level of proficiency currently that exists in these schools. The significance of connectivity is discussed by Thornburg in his book *Education in the Communication Age* and has global implications on the education community. Currently, this level of connectivity is at 18% for the elementary principals surveyed.

As stated earlier, the pie graph in Figure 2 on page 51 represents levels of communication that are available in different districts. Over one fourth of those surveyed had no network capabilities and were, in a sense, blind to what

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was transpiring in many educational settings. It would be analogous to a family
with a rotary dial phone still in place in their home. The rotary phone would
serve a function, yet would be extremely limited and antiquated. This seeking
out alternative communication methods is demonstrative of a vision and path for
buildings and districts focused on the future. As noted in the graph, over one
half of those responding had local area networks in place, yet two-thirds of
those responding did not have access to the outside world through wide area
networks. Although locally they can communicate via e-mail, the availability of
sending messages to colleagues, colleges, universities and governmental
agencies is nonexistent due to the lack of a gateway to the internet. The
utilization of a LAN (Local Area Network) and not a WAN (Wide Area Network)
inhibits collaboration on a global or regional level and severely restricts the
utilization of technology to influence change through collaboration. Although
the origin of the internet was originally for defense purposes as was the
interstate highway system, it has been adopted by the science and university
communities as a means to eliminate distances, time limitations, and to provide
for open, frequent exchange of information.

The graph in Figure 3 represents the affiliation of users currently logging
on to the World Wide Web. The total number surveyed was 3537. Data from
November, 1994, as demonstrated in Figure 3, indicates that the field of
education utilizes the Wide World Web more than any other group. It is
interesting to note further that the original purpose of creating this
communication network was for military and governmental purposes which now
only utilizes it 8 percent of the time. This information highway was first
proposed during the late 1960's following the development of an interstate
highway system. The intent was to allow the government to exchange information for national defense through a super computer network. Since the internet has a free interchange of information as an infrastructural statement, the internet provides an open vehicle for quick collaboration and communication.

![AFFILIATION Chart]

**FIGURE 3.** The data are made available through the Second Annual WWW User Survey accessed from: www-survey@cc.gatech.edu. The survey data are from November, 1994.

The graph in Figure 4 represents the educational level of the users currently logging on to the World Wide Web. The total number of respondents to this survey was 3537 individuals. The educational level of users is reflected in this figure and illustrates that the majority of users have college and higher educational levels.
FIGURE 4. The data are made available through the Second Annual WWW User Survey accessed from: www.survey@cc.gatech.edu. The survey data are from Nov. 1994.

The graph in Figure 4 shows a possible positive connection between educational advancement with the utilization of this resource. This information presents a picture that reflects concerns that many educators have expressed regarding the access to information and the exclusion of those that do not have the educational opportunities to provide and foster that access.

The surveyed principals demonstrated a general awareness of technology but were limited in their utilization of this resource. Screening of the respondents created a number of elementary principals who displayed knowledge of and personally utilized technology. The initial survey's intent was to generate basic information and to identify elementary principals who utilized technology for inclusion into the selected principals who were to make up the study. Criteria in three other areas were addressed. The first was if they had received recognition as a National Elementary School (now termed a Blue
Ribbon School). This qualifier was established to solicit participants in the study whose schools had recognized expertise in elementary education. The second was that their districts had a per pupil cost in excess of $4500.00. This amount was utilized as a cut off funding level to assure minimal financial resources to support technology. The third area that was addressed was a willingness on the part of the respondent to participate in the survey. Individual elementary principals meeting all these criteria and passing the final review by technology experts established the survey group.
SECTION 2

INTERVIEWED PRINCIPALS PROFILE INFORMATION

The selection of school principals was done through a filtering system which was designed to find personal high-end technology users who were leaders of a recognized, successful, educational setting. Recognized national educational excellence, a higher level of financial resources than $4500, a sufficient level of technological utilization and a willingness to participate were the qualifiers utilized. Twelve elementary principals met these criteria.

The issue of size, staff-student ratios, and general demographics provides a snapshot of similarities and differences existing in these twelve schools. Below is a graph of the student populations in the schools studied.

**FIGURE 5.** The number of pupils in each school was gleaned from the state of Illinois Goal Assessment Program Data, 1994.
The average school population is 420 students with the high being 628 and the low being 188. The mean for this group is 378. The demographic information regarding school size indicates that the population of a school among the surveyed principals has little impact on the level of utilization of technology by the elementary principal.

The next figure represents the supervision ratio between teachers and students.

![Pupil-teacher ratio](image)

**FIGURE 6.** Pupil-teacher ratio information for schools included in the study as gleaned from the state of Illinois Goal Assessment Program Data, 1994.

The average pupil-teacher ratio for the schools studied was 17.2 to 1. According to the Illinois State School Report Card statistics, 17.2 to 1 is below the state average of 19.9 to 1 for elementary schools. The significance of this number can be related to the research which states that the lower the student adult ratio, the more productive the educational opportunities afforded to
students. It can be extrapolated that the pupil-teacher ratio, adult to student, is actually lower with the inclusion of non-certified staff such as teacher aides, teaching assistants, and associate teachers. All of the schools of the interviewed principals had assistants for the classroom teacher which, in turn, decreased this ratio during key instructional periods such as whole language, mathematics and science. The additional staffing is not reflected in the IGAP information or Figure 6.

A further analysis of background data can be done regarding racial/ethnic populations of each school. In the state of Illinois 65.2% of an elementary school population is white while 34.8% of students are non-white (20.7% Black, 11% Hispanic, 2.9% Asian/Pacific Islander, and .1% Native American). When these statewide statistics are compared in the chart on the following page in Figure 7 which represents the populations of the schools studied, one basic difference emerges. The average white student population for the schools studied was 80.79% with the mean being 86%. This is approximately 15 to 20 percent higher than the state average. The greatest ethnic diversity existed where the ratio of whites to non-whites was 56 to 44 while the least diversity existed where the ratio was 94 to 6. Upon further investigation, it was found that the school with a 56 to 44 white to non-white ratio had been involved in boundary changes for the last school year which created this ethnic mix. This population was significantly different from the previous demographic make up of the building according to the principal.

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89 Tennessee study on Class size and significance change, 1990, 3.
90 IGAP information from the State of Illinois, 1994, 2.
As the general and specific characteristics of the schools were further studied, the low income statistics and limited English proficiencies (LEP) demographics were analyzed. The low income and LEP demographics are displayed in Figure 8. Low income students are defined as students who are from families receiving public aid, living in institutions for neglected or delinquent children, being supported in foster homes with public funds or eligible to receive free or reduced-priced lunches. Limited English proficiency students are those students who have been found to be eligible for bilingual education according to state guidelines.

In studying the graph in Figure 8 on the following page, it is evident that the majority of schools have fewer students who come from homes with limited English proficiencies in which income may play a significant role in educational issues.
The income level of families is further reflected in the data presented next regarding the operating educational expenditures per pupil. As dictated through the federal constitution and historical precedent, the state is responsible for monitoring and providing an education for students within their boundaries and, further, the local communities are the main source of resources for local schools.\textsuperscript{91} Even with the tax cap in Illinois, the local tax payer tends to be the primary source of income and the decision maker regarding what portion of the community resources will be focused on educational issues through voting. This funding is translated into per pupil expenditures and is represented in Figure 9.

\textsuperscript{91} 10th Amendment of the U.S.Constitution delegates to the States all powers not addressed by the Constitution under the reserve clause. Education therefore is considered a state responsibility.
FIGURE 9. Operating expenditures per student information for schools included in the study was gleaned from the state of IGAP Data, 1994.

According to the Governor’s office as of April, 1995, the state commitment to education is 33% with Governor Edgar proposing to raise funding from the state to 36%. The funding level can be further reflected upon with a reference to the current Illinois level of funding compared to that in the early 70’s. Under Governor Walker, the funding level was slightly over 50%. 92

As noted in Figure 9, the communities’ ability to finance educational opportunities has a significant impact on the educational opportunities afforded students and staff alike. The operating expenditure per student data presented in Figure 9 reflect an average expenditure of $6,966 funding level behind each pupil. An average expenditure of approximately $7000 is contrasted with the state minimum of approximately $2500 and an average of $5,129. This higher expenditure level provides resources that can be expended on technology to a degree that is not present in less wealthy districts. School 4 appears to be close

92 The State of Illinois in turn allows the local communities to put forth local effort regarding education to complement state levels of funding.
to the state average because the school is located in a newly consolidated
district and reflects funding that is lower that all the other 11 schools.

The last area presented is student mobility. It is evident that a lower
mobility rate is attained by the schools included in this survey than is common
for the state (18.8%). This lower mobility rate reflects an educational program
for students that has continuity and a familiarity for most families and children.
Student mobility is graphed in Figure 10.

FIGURE 10. The student mobility rate is based on
the number of students who enroll in or leave a
school during the school year. Students may be
counted more than once. IGAP Data, 1994.

As noted previously, the average student mobility rate for the state is
18.8%. No school interviewed reached or exceeded the state average. The
average was 8.6 % in the included schools with two thirds of the sample being
below 10%. The lowest was 3 % mobility and the highest was 16.8 %. The
schools that had higher rates, namely S7 and S10, exhibited small pockets of
mobility that according to the interviewed principals were not the norm for the
communities, but rather were aberrant to the community at large.

These characteristics; high per-pupil expenditures, low mobility, low limited English proficiency students, low number of students qualifying for low income status, and a low pupil-teacher ratio establish a pattern for success educationally. These characteristics are indicative of communities where a commitment to educational excellence flourishes, is valued and expected.

The next figure represents the results of IGAP testing in each of these schools. The third grade was used as a benchmark level.

**FIGURE 11.** The IGAP scores in reading and math were obtained from the state of Illinois Goal Assessment Program Data, 1994.

All schools scored above state averages (reading 255 and math 271). Nine of the twelve schools scored over 300 in both reading and math. Further analysis of the IGAP information that was obtained from each interviewed school revealed the continuing trend to perform better than the state in writing
as well. The state average for the area of writing of 18.7 was again eclipsed with an average score of 21.6 for the schools included.

The significance of the data when taken in toto displays school systems with significant commitments above the norm to education and communities where factors that impact education negatively are minimized. Of the schools interviewed, all but one had a technology plan in place, and that district was in the process of creating one.
SECTION 3
INDIVIDUAL QUESTION ANALYSIS

QUESTION #1. What technology do you personally use as the principal in this school?

An analysis of the technology utilized by the elementary principals interviewed yielded the following results that are displayed in Figure 12.

FIGURE 12. This chart represents the variety of technologies that the elementary principals interviewed noted they used.

100% of the principals utilized computers personally and 75% had laptops. A total of 91% of them had voice mail as well as e-mail and 100% had
one or the other. 41% of the principals had cellular phones with 50% being able to be reached through pagers. The final segment noted was fax machines. Of those interviewed, 50% utilized this technology for a variety of purposes. Some of this information emerged through a discussion of other questions and is consolidated both here and in Question Two in order to focus the analysis in these areas.

The responses to this question focused on computers and, specifically, which type each elementary principal utilized. The technology utilization demographic study provided valuable base line information and created a perspective for comparison. Upon further explanation and exploration with the interviewed principals, the areas of communication and time management surfaced as being impacted positively by the utilization of technology. These two areas were noted by both Doud and Thompson as important for the principalship. The sixth in a series of research studies initially launched in 1928, James Doud's ten year study of the principalship was based on data collected in 1988 for the years 1978 through 1988 inclusive. The study was reported in 1989. As James Doud noted in this study, there have been extraordinary changes that have taken place in the principalship in the ten years prior to 1988. Many of these changes can be linked to technology.

Scott Thompson in his guidelines notes that one of the skills needed by principals is the skill of procuring, apportioning, and evaluating resources. Which computer to purchase and use, how to obtain appropriate funding and


94 Scott D. Thompson, Principals For Our Changing Schools, (Fairfax, Virginia: National Policy Board for Educational Administration, 1992)13.3 & 16.3.
evaluating what type of computer best meets the needs of the principal were all questions addressed by each principal as they incorporated technology and computers into their work day. As the types of technology in place that the elementary principal utilized were discussed, commonalities regarding the issue of choice, communication, and time management surfaced. The Macintosh platform was clearly the preferential choice of the principals interviewed. This choice seemed to be related to ease of use, user-friendly software, an established apple base in the classroom, and a general ambiance of individualism which this machine fostered or created. This preference for Macintosh surfaced in each interview as platforms and other options were ascertained. Although four had alternative platforms utilized and preferred at the central office, when probed further, the elementary principals noted that they chose Mac. The twelve interviewed elementary principals noted that they chose the Mac equipment for one or more of five basic reasons:

1. It was easy to self-educate themselves on the Mac because of windows / graphic interface function being available in early versions.
2. The platform offered user-friendly software that was powerful, yet simple to operate for generic functions.
3. The Mac offered more memory, speed and other options for a lower cost.
4. Instructional leadership was facilitated and provided a common platform in the building by adopting the Mac platform which was the same that was being used in the classroom and library resource center.
5. The availability of multi-tasking and print spooling gave more flexibility to the user.

There was not a clear cut decision process in the case in all technology purchases. Ownership of the decision on the type of computer demonstrated a personal choice and commitment by the principal rather than a determination made by the district. The process of choice being responsive to user needs and preferences is reflective of Michael Fullan's work on effective change. He
stresses the importance of input and commitment by those affected by the change for it to be effective. 95

The interviewed elementary principals saw the personal computer as a tool that would facilitate their utilization of time in a more efficient manner in their professional responsibilities. They had a vested personal interest in the type of unit purchased and its capabilities. A different common platform for computers was brought to the building level by the principal's initiative in the decision making process while other equipment had a distinct district preference. When asked regarding other technology being utilized in the office, voice mail, fax machines, e-mail, Local Area Networks, dictating machines, internet, pagers and cellular phones were listed. These other technologies were purchased with minimal principal input.

Two common elements for integrating these technologies into the elementary principal's role were better communication and the goal of productive utilization and management of personal time. The communication enhancements intertwined time management with technology infusion in many ways. Principals found ways to utilize previous time blocks that had been unusable. For instance, driving home in their cars, leaving voice messages over week-ends for staff and others, faxing and receiving information to put closure on needs and problems more quickly, and soliciting assistance using e-mail from others over great distances. All the principals interviewed saw a greater efficiency in the utilization of time and a higher level of communication. This increase in efficiency was directly attributed to the computer and technology. While discussing this issue, the principals displayed an energetic,

95 Michael Fullan, Successful School Improvement. (Open University Press; Melbourne, Australia, 1992), 67.
positive manner with the following caveat. Those coming into educational administration at the elementary principalship need to have a working knowledge of technology and how it can assist in the myriad of tasks and roles that a principal needs to exhibit competency. The elementary principals interviewed viewed technology as an integral part of their work day. As Stephen Covey has pointed out, there are only 168 hours in a week and how this time is utilized is determined by each individual.96 The elementary principals found that technology enabled them to enhance their utilization of this limited resource in more productive ways. Snippets of time that before were unavailable for use were now usable. Some noted that they were able to use travel time to and from work to leave phone messages for staff, call parents and interact with other administrators. Other interviewed principals noted instances that short amounts of time were utilized productively such as when they were waiting for appointments, waiting for meetings to start, and even outside on the playground.

Upon analysis utilizing Naisbitts' three levels of change, it became evident that the ease of transition into a common arena was not evidenced when IBM was introduced by the central office at the building level. The four principals who started out with IBM noted that as they integrated technology into the office it was not as fluid and easy as expected. They noted that Apple Ile applications such as AppleWorks had facilitated work in the office and in their personal job performance whereas IBM, WordPerfect, and Lotus were less user friendly and more difficult to learn to utilize. This first level change which should have been instrumental in leading to second level changes was caught in a

loop. Staff and principal did not see the IBM as user friendly or usable and, in turn, they recycled this first level change process and introduced the Mac. An established base of user friendliness had been generated through the introduction of the Apple and Apple IIe in the elementary classrooms in these districts. The Macintosh platform was then utilized for word processing and record keeping with programs like ClarisWorks©, MacWrite©, FileMaker Pro©, MacSchool©, etc..

The second level changes began with word processing and type setting functions and options. Principals noted that word processing was an area where the influence of the computer was immediately felt. Different sized and styled fonts led the way to a variety of extensions onto the electronic writing desk. The book, The Mac Is Not a Typewriter, typified the second level changes that were brought about through the use of the computer. This book discussed the enhancements that computers brought to the typing function. Word processing on a computer demonstrated that although the computer could be utilized to perform the same functions as a typewriter, it was also enabled the user to do much more in an integrated fashion. A revolution was taking place in the office place according to The Mac Is Not A Typewriter, and secretaries were picking up the guns of this revolution, computers! The elementary principals interviewed verified the impact the computer has not only had on their own work but also directly on their school offices. Clarification of options, spell checking, and thesaurus options were touted as characteristics of the machines that would facilitate the work of word processing and document creation. Typing was only a small portion of the total product development.

At the same time, architronics and ergonomics began to be discussed regarding the impact that machines and, specifically, computers, had on the work place. Principals noted their sensitivity to health and environmental issues that are impacted by technology being used in an educational setting. Eight of the principals interviewed noted various health concerns relating to computers for themselves, staff and students. Carpel tunnel syndrome, white fingers, tendinitis, neck and back pain, and vision problems surfaced as concerns. People issues and new applications surfaced as computers were used. One of the applications was the spreadsheet which enabled school leaders to project and analyze “what if” type scenarios in a quick, accurate fashion. They also noted the added benefit that timely, accurate budgeting and accounting created through the utilization of technology. All the principals noted the positive impact that the computer has had on their school improvement planning process for the state. This encompassed not only the storage and retrieval of data, but also the reporting of this information in a form compatible with state guidelines. Word processing facilitated document creation and dissemination. The cycle to prepare a copy with proofing, bring it to a printer, proof read the copy before printing, and then waiting for it to be printed was eliminated in many cases. The computer provided a printing station when connected to a high quality printer that eliminated many of the other time intensive steps. Observation cycles began to reflect this quicker turn around time, and the modeling of using technology by the principal enhanced its importance in the building among staff. Further, graphics could be added directly into a word processing document. Clip art became electronic and pictures could be created to add to any document. Data base applications began at student data base information and expanded to staff and community at large. These were mainly
first and second level changes and could have been anticipated. They contributed to more productive time management utilization as well as more fluid communication.

Laptops brought about a third level change that was unanticipated. The principals who had laptops noted a greater mobility and the ability to use technology in different ways than were initially anticipated. Principals could bring a laptop computer into the classroom and perform all the necessary components of the evaluation cycle right in the teacher's room. For some of the functions that an elementary principal performed the office had become portable.

This third level change impacted the roles of secretary, principal, and teacher in a variety of ways. Obviously, the impact on time allocation regarding the secretary was crucial at critical times of the evaluation process. The secretary now had time to prepare other reports, enter budget information in a more timely fashion, or perform other asunder tasks that before many secretaries took home to do. The principals who had laptops all preferred to do the word processing regarding the evaluation process personally in all cases except one. That principal who preferred to keep the secretary involved with the written evaluation noted that he utilized the secretary as a proof reader and communicated with her by sharing document files electronically. Only one of the principals noted that he had developed an electronic data base for comments, etc. The building secretary was afforded more quality time because of the shift of word processing efforts and elimination of repetition. All of the principals felt the realignment of word processing responsibilities allowed the secretary to communicate and deal more effectively with other issues such as parents on the phone or in person, and being of assistance to staff and
teachers. Another interesting side light was the impact on confidentiality. Literally, in all but one case, no one had access to the confidential individual information regarding performance on a given employee but the evaluator or the evaluatee and only they knew the substance of the observations or evaluations. The removal of office personnel from the evaluative loop raised the collegial confidentiality level to a professional level. The acceptance of the word processing component of the evolution by the principal also relieved a situation where secretaries were the keepers of multiple confidential layers regarding school personnel. Now, the confidentiality was between the evaluator and teacher evaluated.

Another unanticipated benefit in the evaluation process was next to immediate feedback. The principals who utilized laptops noted that they were able to meet with the teachers they evaluated closely following their observations and were able to complete the observation - evaluation cycle in a smaller time frame. Immediate feedback was possible and enabled the principal to provide a quick completion and closure to jobs that before had spanned longer periods of time.
QUESTION #2. Why was this technology selected for use?

This question focuses on what technologies are being used by the principal, the decision making process that was used to arrive at these selections, and a reflection on the positive and negative aspects regarding this decision. Graphs and data analysis focus on these areas.

The decision process as noted in the analysis of Question One was focused on platform familiarity, an established apple base in the building and an ease in self-training. Four of the principals reported that the decision to utilize the Macintosh platform at the building level was sanctioned at the central office following building input even though a different platform was preferred by the central office. The remainder of the decisions regarding what platform to use in each building relied on building input and were coordinated at the district level through administrative teams, technology teams or other similar groups.

The districts, although some central offices favored IBM, chose the Mac platform in the schools. This decision to select the Macintosh platform at the school level was for a variety of reasons as noted in Question One. It was related from the participating principals that those in the district office and the authors of the technology plans in place considered the leadership role of the principal and the possible negative impact of two platforms existing in an elementary school as important factors in the decision equation. Following a processing model for decision making, the final selection of computers at the building level followed two basic patterns as noted in the following chart in Figure 13.
Although more decisions were made at the district level, all reflected the strong influence of the building principals (site input) in each selection. Non-compatibility was accepted and decisions were relinquished by the central office for what would be utilized at the building level. Four of the interviewed principals noted that with substantiated and documented reasons for alternative systems at the building level, the districts purchased what was desired at the building level as long as there was a continuity maintained at the building level district wide. Two of the remaining eight principals noted the need for a system that could be easily picked up following breaks and vacation periods. The need for a short relearning curve was due to the nature of elementary school and the impact of the agrarian calender. The agrarian calender created times when the professionals and students would not necessarily have contact with the technology and thereby created a relearning component to elementary schools.
in the technology area. The perception of all the interviewed principals was that the Macintosh eliminated or greatly reduced this relearning cycle because of the user friendly interface.

While ten of the elementary principals interviewed saw the ease of use as a key factor in staying with this platform, they also admitted that had limited exposure to the IBM windows® interface and the advancements in user friendly programs for the IBM. The commitment to the Apple environment made by the educational community was strong in the early 70’s and this affinity and familiarity appear to have influenced the maintenance of the Macintosh as a platform of choice in ten out of the twelve principals interviewed. Four of the interviewed principals noted their early experience with AppleWorks and other educational management programs on the Apple platform. When the discussion of the graphic interface format brought up the Lisa and Xerox interface models, no knowledge was expressed regarding how the graphic interface related to their choice. Only one of the interviewed principals knew about the Lisa or this early attempt at a graphical interface. He knew that the Lisa was the first computer produced by Apple that had a graphic interface, similar to the Macintosh today. He further noted it was patterned after a beta version of a new graphic interface that Xerox was trying to develop for technology that later became the interface for the Macintosh.

Although three of the districts supplied grants and alternative funding options for the buildings, they all supported purchases in each office at the building level with district funding which allowed purchasing to reflect the principal’s personal style and office needs. This level of involvement is quite different from the decisions regarding fax machines, cellular phones and other technologies which were made through an analysis of machinery and service
through the central office. Selection of these other resources was based on what was the best purchase relative to perceived need for the dollar invested at the district level. These technologies were then applied to the building level for utilization and integration into the individual office technology and expectations were developed for application. The other technologies utilized by the principal are noted in the graph in Figure 12. The computer, followed by voice mail and e-mail, were the three predominant forms of technology being used in the office by the elementary principals. The cellular phone and pagers were used to facilitate communication and access as were fax machines. Some of these technologies were incorporated to facilitate mobility and still retain old paradigms that necessitated immediate access to the principal such as in critical and potentially volatile scenarios. Examples such as emergencies, accidents, lost children, bus problems, and access to the principal by the superintendent when the principal was out of the office were expressed by the interviewed principals.

Principals, if they were on the committees or involved in the decision as part of administrative councils, had input into the district level purchases. In many cases, such as voice mail or e-mail, the systems were dictated by the central office or a specific department. In many cases, the decision emanated from the Superintendent's office, the business manager's office, or the district technology office.

Only two of the elementary principals interviewed that had e-mail knew that there were different software packages that could sort mail or present more user friendly menus for utilization. Unix based PINE© or other similar programs which operate under VT100 emulation are archaic in many ways and cumbersome for the casual user. When asked, no principal was cognizant of the
reference to VT100 emulation or what it meant. When informed that it referred to a standard established by Western Union for "glass teletypes" that replaced Teletype machines, many voiced a need for shared knowledge to advance the level of sophistication on the part of administrators. The VT100 emulation default which refers to DEC's version of the terminal is truly archaic and limited to text in a video audio explosion. The commercial version of Eudora© 2.1 offers the capability to package listserv messages, yet only one person knew of it, and no one used it to handle electronic mail. This lack of sophistication and expertise translates to a limiting of the utilization of e-mail and a curtailing of access to listservs. Also, because of this lack of electronic ability to sort incoming mail, principals noted the negative impact on their time allocations for an inordinate amount of time was spent culling through messages on a daily basis.

Selection of voice mail was done at the central office and the principals were in serviced in system. It was interesting to note that training and support were not based on adult learning theory, and little continuing educational opportunities availed themselves in these districts. Three utilized the systems minimally and learned as time permitted and/or they felt inclined. Pressure to learn systems stemmed from direct supervisory input and was fostered by repeated introduction. All but one system were set up with a stutter tone indicating messages while one had no indication if a message was present without checking the voice mail box. One school modified its voice mail system so that the initial contact was with a person who then recommended the voice mail option. The modification eliminated the impersonal nature of voice

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98 D. Thornburg, Education in the Communication Age, (Starsong Publications, San Carlos, CA, 1994), 60.
mail while retaining the access to individuals when they are not available and was done at the principal’s discretion.

Types of Fax machines were also determined at the central office usually upon the recommendation of the business manager. The fax machines were installed in the buildings to facilitate communication. The graph in Figure 12 demonstrates the various technologies that are used by the elementary principal. Many of these technologies, just by their nature, are third level change fulcrums according to Naisbitt. Others, like the fax, created such a diverse paradigm shift that when they first entered the market place they failed to be accepted and had to be reintroduced at a later date. Paradigms and established conditions can impact innovations and retard change efforts. Platform familiarity and acceptable changes (paradigms) were demonstrated as directly impacting the selection process.
QUESTION #3. How is the introduction and utilization of this technology reflected in her/his management skills (attendance, data analysis, financial management, discipline, and personal time management)?

All of the elementary principals interviewed noted that technology facilitated their management skills. All had computerized attendance systems. Discipline functions were presented as an option by all of the principals but with clarifying questions only three of the twelve principals noted that the discipline application was on a data base versus utilizing a word processing function when needed. The lack of data base application over word processing was due to the age of the students involved in elementary school and the nature of discipline matters. Financial management reports and applications were available through the central offices in all cases, but were not available electronically in some situations at the building level. Ten of the principals had access to the financial management system in some way on their personal computer system. Four of these utilized a program called Quicken©; the two that did not have access to the financial systems stated that this lack of access was because of platform capability issues. All the principals noted the enhancement of data analysis especially in regard to financial issues, IGAP and SIP planning. The issue of personal time management was pervasive in all the interviews. All affirmed that they were able to spend more time analyzing and speculating on data rather than collecting and collating information.

Discipline records, bus records, attendance, School Improvement Plan information, IGAP results and student data base information, including report
card information, were discussed as being available on the computer systems in the office and available for the principal. MacSchool (a global program that offers a myriad of supportive reports and what if type analyses), FileMaker Pro, Quicken, Bradey Portfolio, Learner Profile and other types of software packages were utilized to facilitate the management of data. More productive time management was referenced by all principals as a critical issue that technology helped facilitate. Tasks that before took three to four hours are now done in a matter of minutes.

One of the ongoing processes facilitated by time management is that more time can be spent on the improvement of the instructional process through access and sharing of information. Each principal interviewed noted that the impact of technology is reflected in his/her school improvement plan and IGAP programs. All the principals articulated a perception that utilizing laptops and, in general, computer technology provided timely, succinct information from which to base decisions. For example, one principal noted that in a discussion regarding a building policy on retention, ideas were able to be shared readily in a readable, professional manner because of the word processor and information was accessed utilizing internet to find the current research base for this topic.

Eleven of the principals noted the relative ease at which staff evaluation and observation cycles were completed. Half the principals noted utilizing a laptop during the evaluation process (and one used a computer in the classroom before he obtained his laptop) and being able to collect more data in a cleaner fashion with immediate turn around if needed. One principal reflected on how the laptop played an indispensable role in his leadership in a variety of ways including working at school as well as at home.
Redefining the utilization of time by the principal has taken place. Voice mail eliminates most of the telephone tag that previously wasted a principal's time. Technology also allows the principal to access messages and reply while riding in a car in transit to work, or following a meeting. The portability of communication enables the principal easy access to answers quickly and efficiently. Fax machines also redefine limits. Records can be immediately obtained from other schools facilitating decisions regarding new student's educational needs. Faxing of reports and communications to other offices, the district office, homes, and the state board of education were all noted by principals as positive facets of this technology. One principal noted that previously, documents to be proofed had to be mailed and it would take 7 to 10 days turn around time. With the use of technology, they are faxed and replied to in a matter of minutes. Technology allows the principal to utilize snippets of time during the day to get at things and, thereby, creates flexibility with future time allocations. All the principals noted that personal time management was enhanced through the utilization of technology, and especially the computer. The ability to manage time effectively and to process information more quickly directly impacts the principal's ability to be proactive, plan ahead, and analyze information. As noted, financial information, data bases such as IGAP, and other pertinent information can be scrutinized efficiently, quickly, and repeatedly by the principal.
QUESTION #4. How are the introduction and utilization of this technology reflected in your instructional leadership in the utilization of technology?

A common theme for all interviewed principals was the utilization of technology in their instructional leadership. Four of the interviewed principals noted that a technology facilitator or computer district resource person was utilized for staff training, general teacher and staff assistance, and trouble shooting on a more regular basis. The other eight noted that they, themselves, or staff members who had learned more than their counterparts, were used as trainers and resources. The majority of the interviewed principals depend on expanding the technology expertise of their staff through internal staff resources. The four principals that have a district resource in this area provide assistance to students, as well as teachers, and provide parent information nights and meetings on a regular basis. Two of the four had technology facilitators established in their schools by housing resource staff members that serviced the whole district at certain grade levels. These two principals stated that by having these resource personnel in the building, they were able to receive faster and more comprehensive service.

Further clarification of instructional leadership in technology brought about the emergence of seven general areas that reflected how technology was being utilized. The seven general areas which surfaced facilitated technological change in these schools. They were heterogeneous grouping, performance-
based assessment, authentic and multidisciplinary tasks, collaborative work, interactive modes of instruction, student exploration, and teacher as facilitator. Seven of the principals noted examples of how students worked in groups of various age levels, ethnic diversity, or ability in common projects and tasks. These tasks and projects were evaluated in a variety of ways. Some exhibited typical computer assisted instruction management formats which were part of the computer programs. For example, often a given number of questions were answered correctly and the student participant teams were ranked. More performance-based assessment was involved in student originated, open-ended projects such as research into how to build a deck on a house, or a three dimensional example of a pyramid. Final presentations were made primarily to peer groups, and principals involved noted that the students were very sophisticated in their presentations.

Interactive modes of instruction and alternative sources of information and collaboration were shared, also. Principals noted a variety of instances where classrooms or groups of students were involved in exploring interactive modes of instruction using technology. Some form of internet utilization was present in five of the schools in order to access resources for ongoing projects. Electronically talking to farmers about what it takes to farm productively, participating in National Geographic Programs such as Acid Rain, tracking monarch butterflies as they migrate from Mexico, talking to scientists at different locations regarding questions about their branch of science, exploring the south polar region through an ozone project, studying wolf releases in Yellowstone and a nature preserve in France, and exploring groups projects such as Jason were just a few of the interactive experiences to which the students were exposed. Stand alone software which simulated environments and enabled
students in both small groups and also as full classes to study cities, planets, genetics, or areas of the world in a collaborative manner in which a knowledge base was created through trial and error and problem solving. The five principals noted their availability to assist teachers and students whenever possible in using technology in the educational process.

Examples of ways related by those interviewed in which principals help focus on technology were as simple as assisting students send e-mail messages to the superintendent, or a Valentine's Day wish to President Clinton at the White House (e-mail address - president@whitehouse.gov). Four of those interviewed noted that involvement with students in a direct way with technology was used to foster computer and technology utilization by classroom teachers. Logo®, word processing, goal setting with students, and making laptop computers available to the staff for meeting and conference notes are some of the other methods mentioned where one-to-one and small group interventions were facilitated. Two of the elementary principals interviewed took students out of class to work in the lab with them and also worked at introducing the teacher to this setting in a mentoring model. Three principals noted that project based learning was also encouraged through the use of technology with studies of topics such as Antarctica, the Kobe earthquake, and Mayan Quest.

Knowing where to go on the internet opened the door to learning and knowledge, and five principals in this study reported that they facilitated instruction in this area. One principal who had been involved with technology in the 70's reflected on her work with Seymour Papert's dreams in his book, Mindstorms, and the Logo® language. A caution from this principal was that educators need to continue to look for Mindstorms, not what she called
"reinforcement storms." She noted that many of the applications today still reflect early efforts in programming and are predominately drill, practice, and reinforcement. According to this principal, educators need to incorporate higher order thinking skills, problem solving, and critical analysis skills with the utilization of technology in the classroom to bring about Mindstorms, as Papert viewed the technological revolution's impact. Her apprehension of the wide span of difference between what computers can do and what we as educators will do with them was related.

Modeling the use of technology was an ever present method of reinforcing the integration of technology by the principal. Included in the modeling process was the utilization of word processing by the principals. Also noted was that at the actual site of evaluation and supervision, seven of those interviewed utilized the computer. Those not using the technology at the site of the teacher evaluation process, the classroom, used it at a more central location because of a lack of portability. A focus for the principals interviewed was the function of modeling and providing assistance to staff as a mentor and leader. The interviewed principals voiced their support of and ability to meet the state model of instructional leadership and the mandate to spend adequate time as instructional leader.

As related earlier, one of the reasons why the principals surveyed chose Macintosh for their own personal use was to establish a common computer platform in their respective buildings and enhance their instructional leadership in the utilization of technology. Having the same computer platform enabled them to review software, demonstrate utilization in a variety of situations, and created a common language between all educators in a building regarding technology. All twelve principals related that modeling and the utilization of
technology by the principal sent a strong statement to staff regarding the importance of technology to the principal. The principals interviewed noted that by sharing and demonstrating different uses of technology, they were able to create a setting where teachers are willing to try new educational applications incorporating technology.

Two principals raised the issue of plagiarism and creativity. In David Thornburg's latest book, he includes a scenario where one student had the utilization of technology and internet to assist with a report on the collision of Shoemaker-Levy 9 with Jupiter. Described in his book are two reports created by students regarding this event. One with the advantage of using technology and the internet and the other without. He notes the possibility of including over one hundred photographs downloaded from the Space Telescope Science Institute and NASA and the availability to 'cut and paste' a myriad of comments and discussions from scientists around the world. The issue that both principals see as instructional leader and Thornburg notes in his book is that in a world where vast quantities of information can be downloaded by anyone with a modem, the learner needs to be assisted to be a synthesizer of information and how to be selective. The responsibility of educators becomes one of teaching the learner to be selective and critical of what is of value. The result, as Thornburg and the two principals see it, is that if learners aren't taught to be selective, everyday will be a great day for shovelware! 99 It will be a day when the program that can access the most will be the most profitable, rather than a learner creatively evaluating needs and information. The concern for quality versus quantity is a central issue for conversation according to two of the principals.

Another principal voiced her concern for the writing process. Children could become better plagiarizers rather than original thinkers. She noted the need to backward map for skill building to insure that writing skills are valued and taught, while exposing students to new information resources. This third level change and the concern it raises for principals as instructional leaders is crucial. As she noted, cut and paste is not critical thinking.

A concern about how technology, and, specifically, computers, was going to be used in education was voiced by six of the other principals, however, their point of view was more hopeful than cautionary. These principals saw technology as a backbone to the educational process which would enable educators to raise the level of instruction by teachers. The question of inservice training for teachers was raised, and all the principals were confident that individual mentoring and tutoring, combined with inservice training needed to be in place to strengthen the use of technology effectively for learner growth and development. Some of the emphasis in this area by five of the principals focused on how the roles of teachers and students would change, and how to provide support and an opportunity for students to become more responsible for their own learning. The teachers would take on the role of facilitator.

Building and personal goals were related as positive focal points by the twelve elementary principals interviewed regarding technology. They stated that for systemic change to take place regarding technology, the utilization of technology had to be a goal for all. This common goal then led to a variety of staff inservice, exposure, and educational opportunities in each school setting. For example, one school hosted periodic breakfasts at the learning resource center at which new books and software were displayed and modeled. At three
other schools, money was allocated for staff participation in technology conferences. In a different scenario, teachers were provided an opportunity during the day to learn more about technology and how it could impact their classrooms. A fourth mode of alternative educational opportunities provided teachers with the ability to design their own inservice package that would reflect personal needs and levels of expertise.

The principals further cited the School Improvement Plan as facilitating the inclusion of technology into their settings educationally. Through assessment and portfolio development, schools were beginning to explore options electronically. One school in Palatine had a complete portfolio available for each student on the Gradey's Electronic Portfolio System. The thrust for greater accountability was seen by one principal as a mandate that can be used to leverage a focus on technology to assist the teacher. She noted that everyone needed to make a decision, either to get on the technology bus or not. In her school, she wanted everyone to make the decision to become computer literate, to get on the bus. Changes such as the electronic portfolio are third level changes. At four other schools, hyperstudio was being used to enhance the record keeping process instructionally through electronic displays of student work. Two other schools had data bases that generated reports for parents reflecting old report card formats electronically.

An unexpected result of greater utilization of technology was the level of expertise expected from new staff members once a school had a core group in place. As one principal stated, technology becomes a way of life. New staff members are looked at not only in the conventional areas of whole language and National Council of Teachers of Mathematics (NCTM) standards knowledge, but a level of technological knowledge as well. A familiarity with
technology was noted as a critical piece of a candidate's credential package. Questions such as, How do you use technology? How do you see it being used by students? What are your goals in technology? How do you use it personally? How do you see it being used in the instructional setting? What is your experience in technology? were commonplace concerns with the principals interviewed. Ten of those interviewed noted the importance of technological preparation of teachers, and the two principals that did not noted that they could see this trend emerging.

Another area that is perceived as a priority by the interviewed principals is staff support, training, and ongoing support. Their perspective was based on andragogy rather than pedagogy. Mutual planning, a design sequenced in terms of readiness, activities based on inquiry and experiential techniques with immediate applications permeated the perspectives of the principals. Increasing self-directiveness and realizing that teacher-learners are a rich resource for learning, the principals used terms such as mutually respectful, collaboration, and informality to describe the efforts needed to be an instructional leader regarding technology. The interviewed principals noted that the principal's role in instructional leadership in the area of technology is seen from the perspective that he will provide support in three areas: hardware, software, and people resources. One principal noted that the principal will answer every question and solve every problem the best he can and if he is unable, he will find someone who can. Eight of the principals noted emerging cores of teachers and staff members that were committed to learning how technology can assist them in the educational process.

The principals interviewed noted that the success of instructional leadership in the area of technology can be measured in different ways. Some
see it as a numbers game; the more people they go to or come to them for assistance indicates how they are developing as an instructional leader in regards to technology. Ten of the principals interviewed noted that their success as instructional leaders in the utilization of technology is measured by an ongoing utilization and growth toward a technology goal over a three to five year time period.

A desire to be personally ready for technological change and to have the staff prepared appears to drive the instructional leadership for all of these principals. The principals interviewed thought that they had been personally involved with guiding schools in the integration of technology. They also reiterated that a principal who was not heavily involved with technology would also have a building not heavily involved in technology. The elementary principal, as instructional leader, was perceived as a catalyst for change in the area of technology. The instructional leadership of the interviewed principals was an integral factor in facilitating the integration of technology into their schools. One of the principals noted that the ease of leapfrogging from new technological ideas to other ideas, and the mapping of knowledge was being connected as never before. These new connections were positively influenced through a commitment to technology.
QUESTION #5 What perceived changes have resulted with the personal integration of technology for you as the principal?

QUESTION #6 What are the implications for the use of technology for the principalship?

The reporting of responses and analysis of responses from questions five and six are grouped together since answers from the interviewed principals were combined during the interview process.

All twelve principals noted the positive impact that technology has had on them in regards to personal learning and job performance. They saw the tools of technology providing them opportunities to explore and manage their time in a positive manner. As they discussed the integration of technology they also noted their incredulity at the ability to do a comparable job without the assistance of technology. All of the principals noted the impact on their personal lives as positive. Their personal integration of technology was reflected in various statements ranging from the ability to access work sites from home at odd hours, to the utilization of drive time in communicating with parents and colleagues. These results are discussed in the following presentation relative to this question.

Greater efficiency, time management, and a general change in the manner that the principals do their job were all attributed to technology integration. A level of comfort using the computers, different applications, and voice mail were cited by eight of the principals as changes that resulted with the personal integration of technology. These same principals noted that technology was, "a very natural part of my job, and I make an assumption that it will be there.”

Reliance on the attributes that technology brings to the principalship in
management and organizing information was discussed by all interviewed principals. Timely dissemination of information to parents was presented as a consequence of integrating technology into the principalship by all interviewed principals. Parents were brought closer to the act of student learning through technology and reporting mechanisms that were facilitated through technology. All of the principals noted that the time saved by incorporating technology allowed them to address one or all of the following:

1. Enabling principals to probe deeper and generate a higher quality solution to a task.

2. Facilitating the consolidation of resources so they are readily available.

3. Decentralizing of systems which enables planning on a site level.

4. Storing more information more easily and being able to access it faster.

5. Exploring other resources through technology in the school, district, state and world.

6. Creating an excitement for continued learning among staff in the building.

7. Allowing greater mobility to the principals enabling them to decide where they will work on what aspect of their professional responsibilities at what time.

Each principal saw the benefits of enhancing his/her repertoire of tools with technology. Comments conveyed a feeling that affirmed the principals interviewed were comfortable with an integration of technology into their work day and that they depended on it being there in the future. They looked forward to continued growth, and advances. They perceived their learning curve with technology being a J curve in structure. These principals saw pagers, e-mail, voice mail, internet, cellular phones, and other communication enhancements as attributes to doing a more professional job. It was viewed as
being important to be able to utilize their time in their cars better by phoning parents and leaving voice mail messages. They spoke of pager systems that they had established with their office staff and families to signify different levels of need and emergencies. Also noted previously was an ability to communicate and not play phone tag by utilizing voice mail and e-mail. The flexibility of being able to work at 10 PM after their children had gone to bed by hooking up via modem with their computer system at work was perceived as a constructive attribute of technology. Eleven of the principals spoke of being able to access information on week-ends from home. All of these principals were not leaving work early, but on the contrary, were putting in 10 to 12 hour days. They were managing their work load by extending it into the evening and week-ends through the utilization of technology. They were extending their real office into a virtual office.

The principals appeared to be always on call. The high tech infusion into the principalship meant that not only they could do a better job, it also meant it was more difficult to get away from their job. The interviewed principals noted the growth of added responsibilities in their jobs with no additional time to do these tasks. Time management and the ability to cut back on the time to finish a task through the utilization of technology was key to addressing these new as well as old responsibilities. The twelve principals found that technology has allowed them to do more in less time and to control their work patterns to fit better with their life styles. As principal, the stress level appeared to be high due to the transformational leadership styles in the principalship, and the added time committed to collaboration, systemic change, and synergistic efforts. Seven voiced a concern regarding keeping a balanced perspective of work vs home and personal aspirations. Two of the twelve had their doctorates while
three had their course work done and had not started on their dissertations. As these three discussed the issue of personal goals and learning, they had made no firm commitment as to when to start their dissertations. Insufficient time was a common comment, even though the three principals had stated that the computer gave them more time at work. Theory Z is in evidence in that it was very easy to look to do more for the organization and explore more options with technology, thereby, giving away snippets of time that before were personal due to circumstances. In the past, riding to and from work in the car were times for personal contemplation and relaxation, not to catch up on phone calls. Focusing on a lesson during an observation, participating in a discussion at a meeting, or eating lunch at a quiet restaurant would not be interrupted by pagers and message machines. The inclination to access voice mail and e-mail at various times during the day or on weekends was nonexistent because that option was not present before. Technology has brought to the elementary principal tools they never considered before, but the price may be not pursuing their personal goals and aspirations away from the workplace. This apprehension was voiced by five of the principals. Just as ergonomics was addressed when machines were introduced into the workplace, close scrutiny of the utilization of technology by the principal was noted as important by nine of the interviewed principals to keep added pressure, stress and exhaustion from invading the principal's workplace along with the technology. Perceived changes brought about by technology that have impacted the elementary principal according to those interviewed are pervasive and challenging.

All the principals interviewed felt that being technologically literate was a requisite for the job of principal today. Success was directly linked to
technology in the minds of those interviewed. Discussions of eight of the interviewed principals focused on curriculum issues and unexpected outcomes, the third and fourth area of this study. Utilizing not only computers and internet as integral technologies, they also explored the use of fax machines, video cameras, e-mail, and telephones. Many implications were discussed extending from shared archeological digs in Arizona and Illinois, integrating technology to faxed pen pal letters with California, and video communications between classrooms and cities. Regarding supervision and evaluation, the computer was a key. One participant also discussed how the utilization of Camera Man® created an atmosphere conducive to self reflection and peer involvement in reviewing videos of staff. Another noted the exploration of the concept of creating instructionally an electronic school museum on the internet.

The facets of time saving and data storage also were commented on again. Discussion regarding time focused not only on having more time available and a better utilization of the snippets of time that are available on a daily basis, but also on time allocation according to goals and expectations. Being able to take those ten or twenty minute blocks of time during the day that before were unusable and stringing them together in a meaningful manner become an easier with technology. The common consensus of those interviewed linked computer storage and space with the immediate access of information. These were some of the anticipated and unanticipated changes with the infusion of technology.

The most global implication is the pervasive way technology had invaded the principal's professional responsibilities. Counting and sorting of data, accessing tables of information, and manipulating files are some of the terms utilized during interviews to describe how they were personally utilizing
utilized during interviews to describe how they were personally utilizing technology. State reports for school improvement, demographic reports, and truancy were some of the ways mentioned that all the interviewed principals processed information for the state of Illinois utilizing technology. The factor of successful principals being communicators was reiterated by all principals and the different tools that had become available through technology to facilitate this communication need were noted. Cost and the systemic pervasive nature of technology as it is integrated into schools brought about more long term visioning, planning and budgeting. Three of the principals shared their feelings that the visioning and planning that is discussed in transformational leadership by Peter Senge and Demming's TQM was facilitated by and a natural outgrowth of the integration of technology into the principalship. These three noted that they were able to track and see trends quickly and more accurately by using technology. The principals noted that while a level of excitement had entered the principalship with technology, terms such as fun and frustration could share the same sentence as they reflected on technology.

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QUESTION # 7. What can the principal do now that was not possible before this technology was created?

The investigation of this question displayed many second level changes. A refinement of the communication process was mentioned by all concerned as well as the ability to analyze data more readily and easily. What if questions were mentioned by many of the principals regarding how the data were analyzed. Principals noted that a scenario could be tried out in order to test a hypothesis very easily using technology. This electronic what if ability was contrasted to time intensive, pencil and paper experiences. One of the principals noted that he viewed his position from the perspective of a producer. A direct correlation was seen between his level of productivity and increasing personal utilization of technology.

Also noted were uses for the basic software applications that were presented and discussed earlier. Communication that is more immediate and more frequent is possible through a blending of technologies. Faxing material in a variety of application settings ranging from newsletters sent to parents, through medical records with doctor offices to reports sent to the district office and the state board of education, was noted as a time saver and a positive communication enhancement. Also, it was noted that turn around time in written communication had decreased which created a less interrupted flow of information.

The computer itself was being utilized in a variety of ways to create opportunities for better communication. Staff bulletins, meeting notes and other applications were discussed, as well as communication with newsletters to the
building community at large. One school was merging a data base for the area available through the United States Postal Service with a newsletter for the community which enabled the principal to communicate with the 80% of his/her community that had no children in school on a personal basis.

Another facet of second level change that was discussed was pagers and cellular phones. These two forms of technology facilitated creating a safer environment as well as one where the principal could leave the office area and still be available when needed for emergencies or to handle issues as they arose. The cellular phone and car phones created a double edged perspective. On one hand, it made principals more accessible and enabled them to utilize time that before was not available in their cars, and at other times they were away from the phone. The negative side of this more immediate communication was that it became an expectation. Given the shorter turn around time in communicating, it became an expectation and, therefore, created more stress and turned the work day into a longer period. Voice mail was also mentioned as an asset in leaving messages for staff and others, thereby eliminating phone tag. On the flip side of this access, the frustration of speaking to voice mail systems was presented by three principals, and one had taken action to make the voice mail system a secondary resource at the building level by enabling all phones to be answered by a person first.

The third level changes were less common but interesting. Many of these involved instructional leadership. A story that was shared regarding turkeys illustrates the access to information that is now available for the teacher and student through the principal's instructional leadership of others. The concept of networks and try to keep people thinking in terms of networking, is a third level change that principal's foster. Following is the shared story:
"We can now hook people together in new and different ways, technology makes that possible when it was not possible before. For example, a class was exploring the history of our country and the discussion turned to holidays and Thanksgiving. Turkeys then became the focus of the discussion and a student asked if turkeys are stupid or smart. The class then put it on internet, and they received a variety of responses. They received messages from turkey farmers, people that studied the turkeys, people who compared wild and domesticated turkeys, and just people with opinions! It was, in a sense, frivolous information but, as goofy as it was, when it came back to the class, they asked, "What else can we do?" Another teacher, who was doing a literature unit came upon the topic of witches in one of the stories. They then put this topic on internet and got an unpublished short story directly from an author. This would not have been possible before."

A key issue that was voiced and demonstrated by the principals involved was a confidence level that they experienced and saw demonstrated by teachers and students alike. There was a higher confidence level displayed by the technology user in his gaining control of his quest for knowledge. The principals experienced it, and they saw it displayed by their staff, and in turn the students their staffs taught. The principals noted that the learner gains a higher level of confidence as he/she gains control over his/her own learning and quest for personal development. This change was not anticipated through the introduction of technology and to four of the principals presented significant, real changes to instruction in their schools. The confidence displayed by principal, staff, and students created an attitude of positive belief in the capabilities of all to pursue knowledge on a personal level. Also noted was the building of a base of knowledge in the school community. Shared knowledge was a focal point of the knowledge being imparted to students and staff alike.
A secondary attribute of time saving has brought mixed results. On one hand, principals voiced an ability to use time more efficiently and effectively than before the advent of technology, but they also noted and alluded to higher expectations and added responsibilities being placed on the principal. The Newsweek article regarding exhaustion and stress notes that the high-tech revolution has created an environment where the worker can never really get away from it all. The worker is always on call. Noted in the study was that personal computers were in 37% of the households in the United States. Further, it is anticipated that 6% of the households will have Fax machines by 1996, and that cellular phones and beepers are becoming pervasive in our society. The addition of technology enables one employee to do the work of 1.3 people, with less time off. Stress and exhaustion need to be conscientious concerns for principals as they expand their use of and infuse technology into their jobs.\footnote{L. Hancock, et al., “Breaking Point,” Newsweek. 6 March 1995, 56-62.} This concern was articulated by many principals and reinforced through current literature as noted in Newsweek.
QUESTION #8. Describe the course of your growth in the utilization and application of technology? What are some of the benchmarks in this learning process?

All the principals noted that self-learning was an important component of their integration of technology into the principalship at the elementary level. Seven noted that expedient situations thrust them into the self-learning mode because there was no one else available. The self-reliant, self-learning characteristic of principals indicated the solitary nature of the elementary principalship and the need to share and communicate. Another factor in the reliance on the self-taught cycle was presented by the principals regarding the cost of instruction. This cost was not only discussed in light of dollar expenditures but also in terms of time allocations. For example, the access of trainers at times when four of the principals were available was noted as a deterrent to group instruction. Further, two of the principals noted the lack of adequate courses for their needs. Additionally, five of the interviewed principals noted video based or computer tutorial programs focused on self-instruction as being available for assistance and meeting their needs. Courses that were available focused on specifics and of the eight that said they had taken courses, they noted that courses were of four basic types: application specific, general overview, computer language specific, or tailored to specific needs through a university. Four of the interviewed principals noted that the district had provided training for the administrators regarding technology. This minimal level of support is inadequate from the central office/district.
An analysis of the responses to this question focuses on the unique individual learning format that each principal experienced as he/she integrated technology into his/her responsibilities. The following graph represents the number of years that the interviewed principals have used technology. Although one had used technology while at the university and noted using punch cards for input (showing 25 years of involvement), the majority have been involved with technology following the advent of the microcomputer. The number of years using technology is less than 15 for all with six principals being between 10 and 15 years.

**FIGURE 14.** This graph represents the reported number of years that the interviewed principals have been utilizing technology.

The graph in Figure 14 represents the length of time that each principal has been involved with technology. It also demonstrates the common commitment to enhancing their personal repertoire of skills with technology and
their belief in the benefit of technology. All of the principals surveyed noted that a large portion of their instruction was through self-exploration rather than courses. Some noted that they became involved with technology during their masters and doctoral work (four such responses) but for the most part, they attributed their growth to self perseverance and choice. One principal summed up the opinions by others by stating;

"Learning time vs time management in the day presents disconcerting problems. It is difficult, but I carve out blocks of time (as administrators we don't get closure on most of the things that we do so you need to take time to read and reflect) . . . otherwise the position becomes a vicious cycle . . . the computer and technology enables me to do more things in less time. It is important to take time to grow professionally in the present to be more effective in the future (give something up at present to gain long term results)."

It was assumed by the all the principals interviewed that the extra time spent on learning how to use technology would benefit their position exponentially in the future. As this perspective was explored further regarding upgrading systems and software the response was that the time used to learn a new system or new software was well spent when looked at from the prospect of future applications. It was noted by one principal that even though she had learned how to work on an IBM and now had a Macintosh, the benefit from this previous knowledge even though it was another platform gave her a basis on which to build. This valued, developing knowledge base philosophy was further illustrated by another principal who used VisiCalc® even though it no longer exists as a spreadsheet and the transition to ClarisWorks®. The transfer to other spreadsheet applications is easy and prior knowledge is valuable.

The next figure, number 15, shows the growth vehicles for the interviewed principals in learning about technology.
FIGURE 15. This graph represents the means which respondents noted that they learned to use technology. This method of growth is predominantly focused on computers, with secondary consideration to voice mail, pagers, etc.

All the principals responded that they predominantly focused on self instruction and growth. This self reliance is interesting reflecting back on their responses to the advantage of learners controlling their own learning and gaining a confidence level in the learning process. When asked if there was training through the district, those that had experienced training at this level expressed a general dissatisfaction with the depth and appropriateness. The four principals indicated that the instruction was generally shallow, loosely based on adult learner theory, or negatively received by the principals. Self instruction was the dominant model for learning about computers and technology.

One variance from self instruction was a principal who noted that the instruction through the district was positive and profitable. As this difference was explored further, it was stated that a new system was installed for
administrative use by the administrators which many were unfamiliar with. A regular schedule was established, during the work day with input from district administrators, and that the topics for small group tutoring was established by the individual learners in the group.

The discussion of training branched out into a discussion of district and superintendent support. The support from the superintendent's office was reported to be minimal. There was a definite attitude that the superintendents did not support technology training for principals and superintendents were perceived as being technologically illiterate. The perceived lack of technological savvy on the part of the district superintendent was displayed through various comments made by those interviewed ranging from a blunt, deliberate statement to one reflective of a lack of input from the superintendent when asked questions regarding technology to statements alluding to passive support at best. It was stated by one of the principals that, “Superintendents don't have the personal skills for technology, so they can't utilize it (sic) and therefore don't provide leadership in technology.”

Another area of expected training that was lacking was organizational. Each principal was asked to relate to training opportunities he/she had been offered or participated in from professional organizations to which he/she belonged. None responded positively regarding training opportunities from these organizations. Not only did their professional organizations, such as the National Association of Elementary School Principals or the Illinois Principal's Association, not offer training, but neither did curriculum organizations such as the Association for Supervision and Curriculum Development or the Illinois Association for Supervision and Curriculum Development. It appears that, although it is perceived as a component or skill that a principal should have as
reflected in the National Policy Board for Educational Administration document, Principals for Our Changing Schools, Knowledge and Skill Base, technology training is not approached as a focal point for principal's ongoing training through the state or nationally.\(^\text{102}\) One principal noted that technology courses offered through the local Educational Service Consortium (ESC) were found to be meaningful and helpful. Although these courses offered at ESC's were not directed specifically at the principal, the focus on training for educational purposes was easily translated to the administrative setting. One of the principals also noted a Eisenhower Technology Grant for administrators that was received through the Illinois Association of School Boards in the amount of $2000. This alternative source of funding which could have been utilized for training was used for the purchase of hardware and did not reflect any training component.

Other benchmarks that the principals discussed focus on platforms and transitions from large mainframes, punch cards and computer courses to micros, hard drives and video self instruction modules. It was evident that each principal saw a priority in continuous training to keep up to date and the need for quality blocks of time for this process. These blocks of time and the funding sometimes come from the professional work day and other times from personal after work hours. One principal noted that a benchmark for him in his accessing and growth in technology was his check book. To him the biggest benchmark was when his savings account hit $0!

\(^{102}\) Scott D. Thompson, Principals for Our Changing Schools, Knowledge and Skill Base, (Fairfax, Virginia: National Policy Board for Educational Administration, 1992).
QUESTION # 9. My overall purpose of this study is to determine the impact that technology has had on your work. What have we not discussed that is relevant to your work?

There was a variety of issues raised in response to this question by the principals. Nine of the principals noted they had explored the internet personally. These nine were also cautions regarding how to create opportunities for students to use this resource and control access to appropriate material only. All of the principals noted that they found technology to be useful in completing tasks and addressing diverse needs in the elementary school culture today. Seven of the principals discussed their confidence level in leading changes in technology and the assuredness that they felt in this area.

One principal responded that because of his accomplishments with technology and the integration of it into his professional life, he feels very successful and gains satisfaction through this technology utilization. He notes that using technology as a tool enables him to be more effective, productive, and, in turn, he feels better about himself as an administrator and in his whole life. This principal noted that finding the successful tool that “makes you more effective in what you do and makes you a happy and pleasant individual which is often overlooked.”

Excitement, planning, and caution were also noted as ingredients in the technology picture. For some of the principals, planning is the key issue. As technology becomes more of a backbone in the educational process and a critical mass is reached in a school, the exponential expansion of the infusion
and integration of technology into the school will need to be addressed administratively. As Michael Fullan notes, one of the frustrations with change is that the end is usually not clear, but rather organizations have to proceed with a fuzzy view of the goal and what the future might be.

The principals that had access or were gaining access to the internet presented a variety of issues for discussion and reflection. Questions were posed rather than answers being shared. It was felt that the internet and the access to a common knowledge base were problems and issues principals should be discussing. Internet has access to unwholesome information that is easily accessible. Some of the information on the internet is suspect as to its validity and accuracy. Principals need to ask themselves the question how will the internet be monitored in schools? The school is looked to by the community to establish restrictions and form guidelines for the student community. It was noted by three interviewed principals who had Prodigy© and America On Line© for students that these services have fallen prey to text manipulation on internet; Wide World Web has access to home pages for Playboy© and other questionable resources for elementary schools. The three interviewed principals who have student access to Prodigy and America On Line are struggling with the issue of controlling resources over the internet.

Another concern that was posed as comments and questions at this time was communication among elementary principals regarding technology and changes. Networking using technology was suggested as a possible answer to this communication need in the near future. One of those interviewed noted that he and members of his staff have participated in chat rooms on Sunday evening utilizing America On Line in a very effective, collegial way. He further
stated that when he went to the principal's chat room on the same service, no one has ever been there when he had signed on. Two other principals noted that the utilization of listservs on the internet has helped them focus on current issues and keep abreast of current trends nationally. Communication and time are keys to the technology puzzle.

It was noted by a principal interviewed that when he went to “principal school,” they talked about management, but educational leadership was not defined as a school of thought. He stated; “a lack of instructional leadership is counterproductive to today's school cultures.” A principal needs to exhibit a hands-on approach to communication, staff relationships, leadership, and the principal must buy into technology changes as the core to how building administration operates in a school. Technology is more than data crunching; it is the tool for looking at school as a place of learning from a totally different perspective.
Many first and second level changes have taken place among the interviewed principals. As technology has evolved, they have been involved with the integration of technology into their professional careers. These initial forays into the utilization of technology were, at times, frustrating and time consuming, yet each respondent saw them as productive. Now, with the advent of laptops, internet, voice mail, e-mail and cellular technology, the expansion of technology into a myriad of applications for the principalship presents an ever expanding fulcrum of training and implementation. Taken in toto, most of the changes that the principals were currently involved in are third level changes according to Naisbitt. The users have discovered new uses for technology that were never considered before. The strongest emerging third wave of change involves communication and the access to information. These third level changes create issues, questions and considerations for the instructional leader that he/she has never faced before. Fluid access to information brings with it problems of what data should be available, at what rate and to whom. How the principal monitors or manages the information explosion in schools that is brought about by internet, World Wide Web, and technology are difficult questions with unclear answers.

A second area of third level changes that have surfaced is personal productivity and time management. The advent of inexpensive modems and
laptop computers have created an environment where the real location or space is relative for work to be accomplished and time can be utilized as never before. Evaluations can be done at home or at school. Conversations can be facilitated no matter where the educator is located with others with similar interest or need. The lack of geographic importance was exhibited in listservs joined by three principals on the internet and chat rooms use by one principal on America on Line.

The third area of change appears to be more systemic. Nine of the interviewed principals saw technology changing what school will be like in the future. The current perception of education no longer needs to be the acquisition of knowledge through conventional means. Technology provides various avenues to learn and develop strategies for learning. The principal, as instructional leader and primary change agent, facilitates and sustains this systemic change only through an in depth knowledge of and commitment to technology. As noted by those interviewed, these are the three main areas of third level changes that they have experienced. These are the ahahs, the unexpected outcomes that are also apt to change the face of education.

The review of the data collected from the matrix of the four areas can be synopsized as follows. Communication, both written and oral, has been enhanced and refined with the advent of technology. Car phones, word processors, desk top publishing, fax machines, listservs and e-mail are the predominant vehicles noted in the interviews that have facilitated better, quicker, more efficient communication. Management of time, data analysis and financial management are enhanced through technology. Time management becomes an issue both personally and professionally and needs to be reflected upon from a goal oriented perspective. A more efficient utilization of time does
not necessarily indicate that time is being used profitably. Data gathering and analysis are greatly enhanced through technology as is record keeping and sorting. The application of software, when coupled with a refinement of thoughtful time reallocation and a solid financial information base, produces the tools for productive decision making based on an integrated information base for the future. In regard to instructional leadership, the themes of adult training, school reform, new rubrics or standards for work evaluation, and censorship are some of the issues that emerged regarding technology and the access of information.

Unexpected outcomes are intertwined in all of the previous points. The interviewed principals noted technology has enabled the elementary principal to face the demands of a more complex and complicated job than was required ten to fifteen years ago. The ability to manage data and finances, access information and be mobile has provided the latitude for elementary principals to explore and develop opportunities that before were not possible.
PROBLEMS AND PITFALLS IDENTIFIED WITH THE IMPLEMENTATION OF THE UTILIZATION OF TECHNOLOGY BY ELEMENTARY PRINCIPALS

Five major problems surfaced in the analysis of interview results. They were 1) issues of time, 2) monetary and system support, 3) the change process, 4) proactive stance, and 5) communication among and between practitioners and researchers.

Time seems to be a critical issue from many perspectives. Creating a balance between training and day to day tasks was dealt with on an individual basis. Time spent personally must be balanced with time spent as instructional leader, sharing the information, skills, and ideas in which technology can assist. Also, with the access of information from any location, time that is needed for thoughtful contemplation and reflection may be easily committed to more immediate work priorities, and crisis management without analysis if they are within goal areas. For instance, principals noted time driving home may be used through technology for immediate, day to day operations but what are the ramifications and consequences for using travel time for work related issues? Technology speeds up the work process but it also creates an environment
where more can be perceived as better. Interviewed principals noted a lack of time, although they also stated that technology made more time available.

A second issue that surfaced was monetary and system support. Balancing the cost of new technology versus other escalating costs in an education system generates various problems, especially with site-based budgeting and allocations. The interviewed elementary principal noted that a commitment to technology is important and should be supported with policies, purchasing and training. Elementary principals noted a need to keep technology in perspective and represented in the curriculum as a tool for learning in the information age. Commitment from the central office for training of principals and financial support in schools were problem areas identified.

The third area of concern is the change process. Along with leading mandated movements such as the School Improvement Plan, the Illinois Goal Assessment Program, and Goals 2000, the elementary principal is faced with leading his staff in the utilization of technology through modeling, support, training and collaboration. Goal setting at a building and personal level needs a focus of technology, and can be facilitated only through a thorough understanding of the change process. As noted when interviewing the elementary principals, generating a critical number of teachers who are involved with technology facilitates bringing technology into play at an elementary school.

The fourth issue is one of perspective. If technology is in place and thriving in an elementary building, the principal supports and fosters this effort. A principal can no longer look at the day to day operations as the focus without jeopardizing the future. The interviewed principals displayed a proactive perspective where important aspects of future technology and computer
applications were addressed. The interviewed principals saw the utilization of data base programs, electronic reporting systems and financial analysis programs would enable the principal to address the needs in his/her building with a view to future applications.

The fifth area is communication among and between practitioners and researchers. It was evident that the elementary principals interviewed were frustrated by isolation and on a day to day basis committed to priorities that did not include conversation and communication with peers. The internet and World Wide Web can facilitate this communication. All of the elementary principals interviewed demonstrated in isolation individually many of the same themes that had developed at each site by each principal thereby duplicating the cost of time and effort that could have been allocated to other areas if collaborative efforts were available. The replication of effort appeared to be needless. Continual communication can hopefully be facilitated through technology.
CHAPTER IV

SUMMARY, CONCLUSIONS, RECOMMENDATIONS, AND SUGGESTIONS FOR FURTHER STUDY

The purpose of this study is to provide an analysis of the practice of selected elementary principals in the integrative utilization of technology in four main areas:

- Communication
- Management skills (eg. attendance, data analysis, financial management, discipline, personal time management)
- Instructional leadership in the utilization of technology in schools
- Unexpected outcomes

This chapter presents the results of this study and the conclusions yielded delineating the impact of technology on the elementary principalship. The summary, conclusions, recommendations, and suggestions for further study are presented in the sections which follow.
SUMMARY

This study was undertaken to interpret the impact of technology on the elementary principalship. The current literature was reviewed to establish a base of information from which to operate. The major themes presented were the change process and education, the principal's role in education, and technology's impact on the principalship. The views of various authors were utilized including Michael Fullan, John Naisbitt, Scott Thompson, Patrick McKeown, David Thornburg, and Kenneth Bennes. This base of knowledge was then utilized where appropriate to analyze the data from the interviews.

A survey was conducted of 310 elementary principals in Cook, DuPage and Lake Counties. A total of 259 responses was received. Criteria for selection of participants focused on the following areas:

- High-end user of technology
- Funding above $4500.00 per pupil
- Recognized excellence in instruction through award recognition for the school
- Willingness to participate in the study
- Confirmation by technology specialists of possible participants

Twenty-seven elementary principals met the basic requirements and after review to determine their personal level of utilization of technology, twelve were included in the research. They were interviewed with the following research questions. These questions brought out information and data relevant to the four main areas which provided the focus of this study.
What technology do you personally used as the principal in this school?

Why was this technology selected for use?

How is the introduction and utilization of this technology reflected in your management skills in the areas of attendance and data analysis?

How is the introduction and utilization of the technology reflected in your management skills in the areas of financial management and discipline?

How is the introduction and utilization of this technology reflected in your personal time management?

How is the introduction and utilization of this technology reflected in your instructional leadership in the utilization of technology?

What perceived changes have resulted with the personal integration of technology for you as principal?

What do you feel are the implications for the use of technology for the principalship?

What can you, as principal, do now that was not possible before this technology was created?

Describe the course of your growth in the utilization and application of technology? What are some of the benchmarks in this learning process?

My overall purpose of this study is to determine the impact that technology has had on your work. What have we not discussed that is relevant to your work?

These interviews were then analyzed in terms of similarities, differences, and unique responses. The interview information was also analyzed through a
matrix based on stages of change according to Naisbitt as well as from the aforementioned review of related literature. Naisbitt's three stages are:

**Stage 1** Least Resistance (in this stage, technology follows the path of "least resistance" into a ready market)

**Stage 2** User improves or replaces previous technologies with the new technology

**Stage 3** User discovers new functions for the technology, based on its potentials. (What can we do now that was not possible before?)
CONCLUSIONS

The analysis of data led to the emergence of the following conclusions.

• Technology has not resulted in substantive changes in the role of the principal.
• Principals have not utilized technology to reach third level changes or innovations to any great degree.
• Principals are generally isolated from colleagues in their efforts to bring about personal technological change.
• Principals demonstrated a personal confidence level utilizing technology in an instructional leadership role yet they did not extend this role beyond commonly held assumptions and expectations.
• Principals did not reflect or implement on higher order outcomes that could be accomplished through the utilization of technology.
• Limited third level changes and unexpected outcomes were found in the areas of time allocation and management, the ability to condense the teacher evaluation cycle and raise confidentiality, and in networking as a resource that could be used to reach outside of the school walls.
• Through portable technology location becomes irrelevant in many instances for the principal to accomplish his/her work.
• Communication is enhanced and facilitated through technology eliminating distances and time constraints.
• The principals developed more productive data management and analysis skills utilizing technology and developed alternative resources for information acquisition.
• An unexpected outcome of the study was the realization that many buildings had inadequate wiring to handle technology for both electrical as well as communication perspectives.

• Technology enables elementary principals to use their time more effectively yet this better time utilization calls for the elementary principal to develop a more sophisticated skill level in the gathering of information and the analysis of time utilization. Prioritizing what is important and relevant versus what is trivial busywork and time wasters becomes more important.

The elementary principals interviewed reflected a belief in the life long learner model and the value of more effective communication utilizing technology. Although they saw the internet as a formidable area of accomplishment, they voiced a belief that more effective communication would provide more effective leadership. They also saw technology as being a fulcrum in changing the role of the principal in elementary schools. Technology gave them more control over their time at work and home. The barriers between work and home became more transparent through technological access and mobility. Technology was viewed as a tool that would enable them to meet the challenges of the principalship in the future. Utilizing technology, they gained control and manageability of the change process and their changing schools.

Ironically, with a comprehensive knowledge of the process of change, the information age and communication age, the principals in this study were generally isolated in their efforts to bring about technological change. Principals appear to be utilizing time that before was reserved for more routine repetitive work or contemplative, relaxing endeavors. This time utilization did not insure that an elementary principal was doing a better job, only more than before.
Efforts to infuse technology into the elementary principals' role have been made on an individual basis only, even though it is known that to be effective as a long lasting change the infusion of technology into the educational setting should be systemic in nature.

In many elementary principals, there was an energy and excitement for learning that seemed to emerge from the integration of technology. Along with this was a frustration from struggling to do it on their own with little support from organizations, districts, or other resources. A loneliness was presented at times with individual elementary principals and on the other side an independence and self sufficiency.

The elementary principals tended not to be part of a larger community of learner principals. The twelve interviewed principals were within 45 minutes of each other and yet, had not been in contact with each other. All shared a common interest in technology and its application for the elementary principal.
On the completion of the study, the follow recommendations are made:

1. The isolation of elementary principals who are sophisticated users of technology must be minimized.

2. Elementary school principals should establish communications with the college university community in a collaborative manner. Principals need to formulate plans to eliminate their isolation and focus on professional development and interaction based on future goals and perspectives. Communication needs to be enhanced to share both their successes and their problems, not only on a geographic basis, but also on an interest basis. The college and university community can collaborate to utilize resources such as internet and World Wide Web to create global communication groups. State organizations should be mobilized, as well as regional elementary principal groups established to facilitate the need to discuss the implications of technology on the elementary principalship, the elementary school, and the learning process. Time needs to be committed for conversations to take place and that predisposes a commitment and support of this growth area by the superintendent, as well as their learning communities.

3. Elementary principals with a firm basis in technology should lead a systemic change in their organizations for the infusion of technology
into the elementary principalship. Training needs to come from three levels: local, state, and federal. Local school districts need to commit resources to outfit and train elementary principals in the utilization of technology and information regarding leadership, change, and the learning process. At the state level, governmental efforts need to include a focus on the elementary principalship as well as the efforts of organizations such as the IPA and IASCD. They need to provide training and application exercises in the utilization of technology to further goals established by these organizations, as well as those of the local school. The State Board of Education should support efforts to integrate technology into the training component for the School Improvement Plan, as well as other efforts. Principals need to be provided an opportunity to learn how to utilize technology to enhance the educational priorities of today and the future.

On a national level, efforts need to be made to facilitate the accentuating of the utilization of technology for the elementary principalship through various organizations and governmental agencies. Regional workshops and programs need to be generated to enhance an elementary principal’s ability to grow in the utilization of technology that will create support groups and establish ongoing internet connections.

4. The role of the elementary principal should be redefined in light of the changed roles technology has facilitated. The principal is enmeshed in historic responsibilities that need to be evaluated as to relevance and priorities. Technology facilitator, integrator, and modeler, the principal needs to be focused on implementing the utilization of
technology into the school setting in a way that will ensure its foundational establishment as a tool for the future. He needs to be afforded the support and opportunity to bring this component into the classroom as instructional leader and into the educational community at large.

5. Wiring needs to be upgraded in many buildings to reflect the needs of the information and communication age. Among the 12 school principals interviewed, the schools shared different levels of wiring and to be effective in integrating technology into the educational setting, a commitment must be made to funding the infra-structure of a technologically equipped building.

6. Elementary principals need to insure that the following are in place as instructional technology leaders.

A.) A formalized plan for involving the staff in training and exposure to new software and hardware needs to be developed.

B.) Technology should be integrated into the School Improvement Plan and the continual process of evaluating this plan.

C.) New staff members should be expected to have a knowledge base in computers and technology.

D.) Support should be imperative to the integration of technology into the instructional process.

E.) A critical mass of staff members should be created and nurtured to provide momentum for change regarding technology and computers.
SUGGESTIONS FOR FURTHER STUDY

1. A study contrasting the changes that have taken place in the elementary principalship due to technology would be beneficial. What is currently in practice with what the expectations were for principals 15 to 20 years ago would shed light on changing roles and responsibilities.

2. The infusion of technology at the elementary principalship has been done on an individual basis. A study needs to be made to analyze the best method of enabling principals to gain technological expertise. The format should be a study of principals who are currently using technology contrasted by those who do not. Analysis could look at efforts at different levels: university training, on site training by the district, state mandated training and national standards.

3. A study and comparison of elementary principals who are technologically literate and those who are neophytes could yield information regarding the level of application and the time allocation for various activities referenced to utilizing technology. It would also be of value to note the impact of a non-technology user in a technologically rich site regarding instructional leadership and perceptions of the staff.

4. An analysis of power structures and the impact of technology on the structure of a district may provide interesting information regarding trends and future applications.
5. A comparative study of public versus private elementary principals regarding their utilization of technology in terms of different application levels and specific alternative views of educational implementation.
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October 24, 1995

Dear «Principal 1st name»,

Thank you for assisting me in my dissertation research. I am looking forward to seeing you on the at . I’ve included the questions in this letter for your reference and to facilitate the interview process. This is a semi-structured interview with the ability to clarify and verify information. My intent as noted before is to search out information regarding how the elementary principal personally uses technology (including, but not limited to computers). This could include various other forms of electronic communication, calendar devices, presentation devices such as LCD plates, etc. The questions focus on four main areas, namely, communication, management skills, instructional leadership in the utilization of technology and unexpected outcomes. I would appreciate your gathering any artifacts that would reflect your utilization of technology for study also (electronic or hard copy). If you have information on disk, I will gladly supply you with replacement disks. Also, please include your building report card for demographic information. As I mentioned, I would like to record the interviews so that I may be sure to glean all the information possible from your responses. This will provide me with the ability to review your responses as necessary for accuracy, etc.

If you have any further questions at this time, please feel free to contact me at home (708-983-2620), school (708-998-5055) or over internet (roberts@wb.ncook.k12.il.us). Again, thanks for your willingness to share your time and expertise.

Sincerely,

Paul A. Roberts
What technology are you personally currently using?

☐ Computer

☐ E-Mail

☐ Internet

☐ Newton

☐ Laptop Computer

☐ Other _______________________

☐ Yes, I would be interested in participating further in the study of the impact of technology on the elementary principalship.

☐ No, I would not be interested in participating further in the study of the impact of technology on the elementary principalship.

☐ Check this box if your school has been awarded the National Exemplary School Award.

☐ Check this box if your district per pupil cost is over $4500.00.

Survey Returned by:
«Principal 1st name» «Principal last name»
«Address»
«City», «State» «Zip»
«Phone»
October 24, 1995

Dear «Principal 1st name» ,

Thank you for assisting me in my dissertation research. I am looking forward to seeing you on the at . I've included the questions in this letter for your reference and to facilitate the interview process. This is a semi-structured interview with the ability to clarify and verify information. My intent as noted before is to search out information regarding how the elementary principal personally uses technology (including, but not limited to computers). This could include various other forms of electronic communication, calendar devices, presentation devices such as LCD plates, etc. The questions focus on four main areas, namely, communication, management skills, instructional leadership in the utilization of technology and unexpected outcomes. I would appreciate your gathering any artifacts that would reflect your utilization of technology for study also (electronic or hard copy). If you have information on disk, I will gladly supply you with replacement disks. Also, please include your building report card for demographic information. As I mentioned, I would like to record the interviews so that I may be sure to glean all the information possible from your responses. This will provide me with the ability to review your responses as necessary for accuracy, etc.

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Sincerely,

Paul A. Roberts
INTERVIEW QUESTIONS

• What technology is personally being used by you as principal in this school? Why was this technology selected for use?

• How is the introduction and utilization of this technology reflected in your management skills (attendance and data analysis, financial management, discipline and personal time management)?

• How is the introduction and utilization of this technology reflected in your instructional leadership in the utilization of technology?

• What perceived changes have resulted with the personal integration of technology for you as principal?

• What do you feel are the implications for the use of technology for the principalship?

• What can you, as principal, do now that was not possible before this technology was created?

• Describe the course of your growth in the utilization and application of technology? What are some of the benchmarks in this learning process?

• My overall purpose of this study is to determine the impact that technology has had on your work as principal. What have we not discussed that is relevant to your work?
This dissertation submitted by Paul A. Roberts has been read and approved by the following committee:

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The final copies have been examined by the director of the dissertation, and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements of the degree of Doctor of Education.

________________________  _________________________
Date                      Director's Signature