1996

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LOYOLA UNIVERSITY CHICAGO

THE LEADERSHIP ROLE OF THE PRINCIPAL
IN INTEGRATING COMPUTERS
IN THE ELEMENTARY SCHOOL INSTRUCTIONAL PROGRAM

A DISSERTATION SUBMITTED TO
THE FACULTY OF THE GRADUATE SCHOOL
IN CANDIDACY FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

DEPARTMENT OF EDUCATIONAL LEADERSHIP AND POLICY STUDIES

BY

ANN SMITH GANIER JACKSON

CHICAGO, ILLINOIS
JANUARY, 1996
DEDICATION

In Loving Memory of

Nelson M. Ganier
ACKNOWLEDGMENTS

I wish to thank the large number of people who helped bring the completion of this study to a reality. To the members of my doctoral committee: Dr. Max Bailey, my director, for his helpful comments, suggestions, unending patience, and good counsel; Dr. Todd Hoover, for his interest, suggestions, and support of the timely curriculum topic; and Dr. Phil Carlin, for his diligence, confidence and encouragement throughout my stay at Loyola.

With heartfelt gratitude, I wish to express my thanks to the members of the central office administration and district superintendents of the Chicago Public Schools, for giving permission to involve the schools in this research project; to my fellow principal colleagues for their participation, support and encouragement in the development of this study; and the computer laboratory teachers and classroom teachers for taking the time from their busy schedules to complete the questionnaires.

My appreciation is extended to Dr. Gene Hall and Dr. Barry Posner for permission to use questionnaires developed from their extensive research.

To my many friends, thank you for your kind words of support and assistance.
Finally, to my father and mother, Otho and Helen Smith, for their unending confidence and encouragement, my daughter, Denise Ganier Baumann, my sons, Mark and Nicholas Ganier, for their assistance, quite reassurance, and joy, and my husband, Russell Jackson for his assistance and patience throughout the time devoted to this dissertation, I am eternally grateful.
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CHAPTER I
INTRODUCTION

**Background of the Problem**

As one tours a school building today, most classrooms have the same chairs, desks, stacks of standardized textbooks, chalkboards, bulletin boards, and piles of pens and pencils. Taking a little closer look, an observer might note such technology as an overhead projector or a television with a VCR, a radio or tape recorder. These are a teacher's tools, a set of tools of the trade, accumulated sometimes gratefully, and sometimes reluctantly, in at least the last 200 years (Dockterman, 1991).

More recently, classrooms designated as computer laboratories with 10, 20, or more rows of computers are proudly displayed as evidence of school reform, school improvement, or entry into the information age; one may even see several computers tucked in the corner or the back of individual classrooms.

A recent survey (Technology in Public Schools, 1993), tells us that schools spent almost $2.5 billion dollars on technology in the 1993-94 school year. The number of computers in schools increased 77% from 1990 to 1994. Almost 50% of elementary schools and 80% of middle schools and senior high schools have more than 20 computers. The
ratio of students to computers was 125:1 in 1984; it's now 14:1 and dropping. These numbers give a sense of an expanding technological base in schools. Yet, the question remains, why are so many computers sitting idle in classrooms and computer laboratories across the country?

While school acquisition of computers has spread swiftly and widely, with a plethora of published books and articles and a multitude of businesses developed around technology in education, its impact on the curriculum as described in the literature is minimal and cloudy. Most administrators, teachers, and students view computers as convenient "learning tools", not educational advances (Lipson, 1981).

McGhee (1982) notes that computers are frequently employed by schools to "fix" a certain problem or "make a minor adjustment" in the curriculum ... they use computers to provide drill and practice for students who need remediation, to challenge or entertain the brighter student, or to provide a break in a monotonous day ... they may use computer time to replace some of the busywork students usually receive or to supplement a concept the student has already learned in a textbook or class. Sometimes, but rarely, the machines are used for introducing new knowledge, allowing students to extend their learning, or acquire new skills.

The overall picture suggests, at best, that computer
use is a marginal activity in schools with wide variation in administrator, teacher and student use (Cuban, 1994). Some believe the use of technology in schools is the greatest breakthrough in the history of education while others believe its primary purpose is to position the school in a political correct stance. Pincus notes that most technological innovations are adopted, but not integrated as part of the learning environment. Using computers in education is a complex innovation which encompasses more than just bringing in the hardware and software (Pincus, 1974).

If new technologies are to become central to the educational process, significant change is essential. The implementation process of using computers in the instructional program represents a dramatic challenge for administrators and teachers. It asks for new roles and tasks for the development and management of integrated technological infrastructures within school systems; and if technology is to bring substantive change, administrators and teachers will have to develop new roles, learn new skills, and practice new patterns of behavior--and the new ways must be sustained. Integration of computers in the learning environment should be viewed as a process in change, an encounter between an existing school system and an innovation consisting of many important, complex variables (Bentzen, 1974; Goodlad, 1980; Huberman & Miles,
This study looked at two critical variables cited in the literature for keeping a school moving toward a more effective use of technology: the leadership and concerns of the principal as a change facilitator and teacher concerns as users of technology, both as product and process. This study was undertaken with the hope that if attention is given to the individuals faced with integrating technology, technology will endure and find a home in the classroom as an effective part of the learning environment.

**Statement of the Problem**

The central problem for this study was to discover the effect of the principal's leadership role in the developmental concerns of teachers integrating computers in the educational program. Three issues were deemed critical to this study. The author had to (a) determine to what extent principals engaged in selected leadership practices identified with getting extraordinary things accomplished in an organization; (b) examine principal and teacher location in the change process; (c) determine the relationship between principal leadership practices and teacher concerns.

A hypothesis was posited that in the integration of technology in education, the principal's leadership role is a significant factor in influencing teacher developmental progress in that process. The hypothesis was translated into six research questions.
Research Questions

1. What pattern of leadership practices will teachers and principals express about principals engaged in the implementation process?

2. Are there significant differences in the perceptions of leadership among computer laboratory teachers, classroom teachers and principals?

3. What pattern of specific concerns will principals express about the role of a change facilitator?

4. What pattern of specific concerns will computer laboratory teachers and classroom teachers express about using computers in the instructional program?

5. Are there significant differences in the Stages of Concern among the computer laboratory teachers, classroom teachers and principals?

6. What is the relationship between principal leadership practices and the level of teacher concern?

Definitions of Terms

The following terms and acronyms are relevant to this study:

1. **Concern** - A highly complex, dynamic and developmental state of emotion and thought that people have in relation to a given change or innovation, a "gestalt of psychological activity" as defined by Hall, Newlove, George, Rutherford, & Hord (1991, p.5). It is used in this study to reflect the degree of attention given to the issue of
implementation of computers in the instructional program by principals and teachers.

2. **CBAM - Concerns-Based Adoption Model** - A multi-dimension model to assess the "complex process of change as it occurs through the adoption of innovations by individuals within formal organizations" developed by researchers Hall et al. (1986 p.4). Implicit assumptions in the CBAM Model are:

   a) Change is a process that takes time and is achieved in stages.

   b) The individual must be the primary target.

   c) Change is highly personal.

   d) Stages of change involve both perceptions and feelings of individuals concerning the innovation as well as their skill in its use (Hall, et al., 1986).

3. **Change Facilitator Stages of Concern (CFSOC)** - A set of seven, distinctive stages of innovation-related and facilitator role concerns which are developmentally sequenced from unrelated concerns to self, task and impact concern. In this study it is used to measure the principal's stage of focused attention on leading the implementation of computers in the instructional program (Hall, et al., 1991).

4. **ESEA Chapter 1 - Title I of the Hawkins-Stafford Act** (1988), amendment of the Elementary and Secondary Education Act (ESEA) of 1965, reauthorization to the
Education Consolidation and Improvement Act (ECIA) of 1981, now Public Law 100-297 provides compensatory educational and related services to educationally disadvantaged students who attend public and nonpublic schools in low-income areas (Roberts, 1987).

5. **Innovation Adoption** - A change that is adopted and supported because it is considered to be a practical advance in accomplishing the goals of the organization.

6. **Leadership** - Defined by Packard (1971) as "the art of getting others to want to do something you are convinced should be done" (p. 170). An observable, learnable set of practices and behaviors that get others involved and moving as a group towards effectively accomplishing the extraordinary (Kouzer & Posner, 1988). In this study, integrating computers in the instructional program is considered an extraordinary accomplishment.

7. **Stages of Concern, SOC** - A set of seven distinctive stages of innovation user related concerns that developmentally occur in teachers as they implement an innovation (Hall, et al., 1986). In this study it is used to measure the success level of integrating computers in the instructional program ranging from unconcern to self, task and impact concerns for students.

8. **Technology in Education** - In Schurman (1994) "Using the power of computers in tandem with other learning resources such as textbooks, discussion groups and
television" (p. 28).

**Population of the Study**

Twenty-five schools, using Chapter I ESEA funds to provide supplemental educational services to disadvantaged schools participated in this study. The schools used the funds to provide instruction for students in the middle grades in a computer laboratory environment to improve student academic achievement. Classroom teachers send selected students to the computer laboratory teachers for instruction. Collaboration, planning and resource sharing are encouraged between the computer laboratory teachers and sending teachers.

Subjects in this study were categorized by traditional role groups of principal (P), Computer laboratory teacher (LT), and classroom teacher (CT) to enable the author to examine the results based on role group response to change.

**Limitations of the Study**

The ability to generalize the results of this study is limited by the sample size and selected sample population.

The questionnaires used in this study were of a self-report form. Role groups were asked to rate the leadership practices of the principal and to rate their concerns related to using computers in instruction. Self-report data are limited to the opinions of the subjects and willingness to answer the questions honestly.
Significance of the Study

The problem of the integration of technology in the educational environment is a significant one. Many observers of education see technology as the solution to a variety of educational ills, from improving the rate of basic literacy, involving apathetic students, reconstructing the teacher-learner environment to providing the basis on which American productivity might be restored (Kerr, 1991). Intelligent integration of technology into existing curricula is critical to assessment of effectiveness. Identification of various dimensions of implementation and analysis of how principals can successfully engage teachers in the integration process can contribute to the development of guidelines to assist administrators faced with this complex challenge of change.

Summary of the Study

The research and literature described in Chapter II of this study describe the complexity and challenge of integrating technology in the school environment for both principals and teachers--principals as technology leaders and teachers as users of technology to effectively impact student achievement. Leadership, technology, and curriculum research recommend attention to various and different variables for assessing and creating effective use of technology. Two models were used in this study to define and examine two constructs of technology implementation; the
leadership model of Kouzes and Posner and the concerns based adoption model of Hall, George, Loucks and Rutherford.

The principal, computer laboratory teachers, and classroom teachers of randomly selected Chicago Public Schools using computers in Chapter I computer laboratories filled out a survey instrument on leadership and concerns in implementing technology as an innovation. The description and analysis of the data is presented in Chapter IV of this study.

Analysis of the data indicates that there is a strong relationship between leadership and concerns. Principals move developmentally in facilitating concerns and leadership practices for effectively integrating technology which affect teacher developmental concerns. The implications of the results of the study indicate a need for professional development for principals in the area of technology integration as both product and process in the schools.
CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

The context of the principal's role in implementing educational technology contains two diverse elements, the technology itself as products in schools and technology as process--using the power of computers in tandem with other resources in the learning and teaching environment in the pursuit of school improvement. Technology itself is concrete while the implementation process is abstract and intangible; computers are a modern phenomenon, while implementation has been an issue since the beginning of public schools; technology has been the subject of much study while the implementation has been chiefly ignored or confused with other aspects of the change process (Fullan & Pomfret, 1977). Many of the difficulties with implementing technology arise from both the nature of technology itself and from its questionable effectiveness in the classroom. The implications for school principals are nothing short of mind-boggling as schools are becoming more and more a part of the information age. Principals may feel even more helpless and isolated than teachers when asked to make decisions about technology (Becker, 1993; Finkel, 1990;
Wiburg, 1994). This chapter focuses on the review of three areas of literature pertinent to this study: computer technology, principal leadership and teacher concerns as dimensions in the integration of computers in the instructional program.

Technology in Schools

Historical Overview of Computers in American Schools

Historically, computers in education have had several significant precedents which may be thought of as phases, or "revolutions" identified by Ashby (1967) and Eisele and Eisele (1990).

The first revolution removed learners from the family into organized schools, the second occurred with the use of written language as a means of instruction. The third major change came about through the invention of printing machines. The fourth revolution began with the relatively modern developments in the field of electronics.... The fifth revolution is at hand, and many believe it is based upon progress made in at least three important areas: improvements in communications technology, developments in computer technology, and creation of a new scientific basis for education, the technology of human performance (p. 18-19).

The first computer brought into a precollege setting was in 1964 by a teacher at a private school in Connecticut who convinced one of the leading computer companies to donate a machine to the mathematics department for teaching computer programming to secondary-level students (Roberts, Carter, Friel, and Miller, 1988). It was not until the advent of the much less expensive microcomputer that any inroads were made below the secondary level or to subject areas other than mathematics. Dublin (1986) found that the
first microcomputer was introduced in an advertisement in Popular Mechanics magazine in 1975, named the Altair 8800, and came as a kit you assembled yourself. Three microcomputers were introduced two years later in 1977; the Apple II, Tandy Radio Shack TRS-80, and the Commodore PET which changed computer history forever. Although people in the computer business thought of them as toys, millions of people used them in homes, businesses and in schools for many purposes such as word processing and data processing.

From 1978 to about 1982, the inclusion of computers in schools was primarily a grass-roots movement, often led by a single teacher (Roberts et al., 1988). Between 1981 and 1986, the number of schools acquiring computers for instructional use grew from about 18 percent to almost 96 percent (Roberts, 1987).

The Office of Technology Assessment (1988) reported that there were between 1.2 and 2.1 million computers in public schools alone -- that schools spent at least one-fifth of the school budget on computers and their associated software, training, and extra staffing as they do on all books and other instructional materials combined (Becker, 1987).

As computer hardware has developed so has the software. Application software is available for almost any conceivable use that can be addressed: direct instructional use, instructional support use, administrative support use,
personal use, and authoring systems to name a few.

Integrated instructional systems, also commonly known as Integrated Learning Systems (ILS) provided a significant impact on the field of education. These systems have been purchased by an increasing number of school districts for an ever-growing number of reasons. The systems are computer based, using a network of multiple microcomputers. They include a management system that collects and records the results of student performance and includes courseware that spans several grade levels. Such a massive acquisition of hardware and software by schools is unprecedented in the history of adoption of any new technology according to Becker (1986).

Birnbaum (1985) noted that the acquisition of computers in schools seems to exist in four evolutionary stages. At first, they were viewed as an experimental rarity; secondly, as an exotic tool or toy; thirdly, quantitative acquirement; and lastly, their absence is more noticeable than presence.

Blankenbaker (1991-92) reported that technology has permeated our industrial society, altering every facet of it. Education is struggling to reflect the larger system within which it resides. The education system is adapting--recreating learning environments that more adequately reflect the image of the larger system in which it resides, albeit slowly, but surely.

Blankenbaker (1991-92) further reported that many
schools still view technology as an unwanted and unnecessary appendage. Yet, there is evidence that education is adapting and beginning to model the macrosystem of an information society. One of the earliest clues is seen in educators' recognition of the importance of higher order thinking skills--information connections.

More and more we hear of interdisciplinary learning, team teaching, and integrated learning systems--subtle changes within our classroom that more closely model the connective nature of information. Cooperative learning, collaborative team projects and workstations reflect information clustering. Whole language and portfolio assessments are being emphasized reflecting the expansion of information as it is used. Information tends to flatten hierarchial structures and empowers all who have access to it. Reform and restructuring of education reflect the impact of technology.

Greenfield (1987) found that all efforts to reform and improve education depend ultimately on the quality of the day-to-day job performances of education professionals. With the technological resources of automation and information, Zuboff (1990) concluded that the workplace is in a profound transition, whether you are a teacher, principal, factory worker, lawyer, or retail clerk, or whatever, the job is about change. Similarly, Ignazio (1994) predicts:
The changes that technology has brought to the workplace in non-educational jobs will begin affecting education in the next two to five years. Teachers who remain in their current roles will be at-risk in an environment in which machines can provide higher student-achievement outcomes than flesh-and-blood teachers for a fraction of the cost. This same technological change will provide great opportunities for teachers who yearn to grow and who welcome new ways in which they can serve and enrich the lives of young people (p. 52).

Automation, basically, is the replacement of human labor by machine labor. As computers get faster, smarter, cheaper, and smaller, they will take over more and more low-level human tasks. Principals and teachers who narrowly define their job as delivering the curriculum and getting students to score at or above average on standardized tests are most in jeopardy.

Bright (1987) notes more and more, the focus is on the development of human resources through computers rather than on the cost of obtaining the needed power. Today, software is being created to extend the capabilities of the users instead of trying to make the user fit the software’s limitations. He stated, "Building computer use into the schools in ways that are consistent with extending the people's capabilities is the biggest challenge today" (p. 5).

Hawkins and MacMillan (1993) concluded from their survey that if one person in the district had the most influence on technology purchasing and use decisions, it was the school principal (96% of schools and 80% of districts
reported involvement of the principal in purchasing
decisions...the principal appears to be the gatekeeper for
technology).

The Principal as Gatekeeper

Many questions and concerns are raised when
implementing computers in schools (i.e., purposes of
computer use, monitoring the instruction on computer use,
acquiring and maintaining software, evaluation of and
effectiveness of the software, teacher education, housing
and security of equipment, resolution of conflicts of
scheduling of use, electrical system capability, repair and
maintenance of the equipment).

An overriding conclusion from studies by McGee (1984)
and Britt (1983) indicated the principal had the strongest
influence on determining the access most students have to
computers. The principal had to be actively involved beyond
being a supporter or advocate of technology. The role was
one of hard work and active decision making, not
cheerleading. Active decision-making, involvement in
problem identification, scheduling computer use, arranging
inservice training, acquiring resources, establishing
conditions favorable to computer implementation,
establishing clear, operational goals, and using several
different means to encourage teachers to use computers were
among the many tasks listed in the study.

Wiburg (1991) in a case study of three schools in San
Diego County that were successfully integrating technology and teaching found that the principal was a common denominator, a user of technology who could articulate a vision for using technology in education. Firestone (1989) outlined several leadership functions necessary for successful integration: providing and selling the vision to the faculty and community; obtaining resources such as time, knowledge, materials, and facilities; providing recognition and encouragement for teachers making the transition to teach with technology; and monitoring the effort by regularly meeting with teachers.

Principals and Technology

Historical Perspective of the Role of the Principal

A historical perspective on the development of the image of the principal as a leader of teachers in the integration of technology—a leader of student-centered classrooms where technology is an important resource for student learning (Bailey, 1991) will set the stage of this study that examined the dimensions of the principal's behavior that reflects conformity to this conception.

Since the days of the one-room school, and until very recently, the pendulum reflecting the organization of American large city schools has been moving away from site-based authority toward centralized control. Today's pendulum appears to be swinging back to school-based management—returning power to the principal.
1920s - 1930s. In the time of "the little red schoolhouse," the teacher did it all—taught the children, kept order, bought the chalk, and stoked the stove. The elementary school principal emerged on the scene during the first half of the nineteenth century. As communities grew, classrooms were combined and the need for coordination was recognized in the appointment of "head teachers", "principal teachers", or "headmasters". Duties of the "principal teachers" were largely limited to discipline, routine administrative acts, and grading of pupils in the various rooms. They were expected to continue to carry out regular teaching assignments in addition to performing the limited administrative duties. Teachers were very much in charge of what was taught in the classroom and the "principal" was the "presiding teacher" (Gross & Herriott, 1965).

As the city schools and teaching staffs grew in the 1920s the administrative responsibilities of principals in large city schools gradually changed from routine and clerical duties to overall management of the schools. The principal became the "presiding officer" of the faculty with the responsibility of organizing the curriculum, guiding teachers toward effective methods and supervising the actual teaching process "in an effective yet democratic manner" with support of their development "in every possible way" (Cubberley, 1923; Johnson, 1925).

A major impetus toward the concept of professional
leadership by the elementary principalship came with the formation of the National Association of Elementary School Principals in 1921. The studies and publications of the Association from the outset stressed the responsibility of the principal to provide leadership to the staff (Pierce, 1935). Principals were urged to place greater emphasis on leadership of the instructional program and less on the routine and housekeeping facets of their work. They were encouraged to work closely with their staffs to improve the quality of teaching and the curriculum.

Principals' relationships with teachers evolved from 'presiding teachers' to 'presiding officers' as organizers and guides (Beck & Murphy, 1993).

As schools became larger in the 30s, burgeoning bureaucracies began forming, interest and research in business principles influenced the school organization, and in the process, authority began to flow from the classroom toward centralized administration. Decisions about what to teach moved from the classroom teacher to subject-matter department heads and into the principal's office which became subjected to the authority of district curriculum coordinators and the central office administrators of subject matter. Principals were responsible for the internal management of the school, expected to carry out supervisory policies and coordinate learning activities on decisions made and directed by the centralized
administration. They became line officers directly responsible to the central administration for carrying out its administrative and instructional policies. Pierce (1935) found that

principals were urged by central administrators to keep teachers working ‘in unison’ on ‘the same general plan.’ They were encouraged to maintain a uniformity of progress throughout their schools. Courses of study insuring continuity of materials, and teaching manuals specifying details of method, were to be followed closely. Principals were expected to know what each class was doing at any hour. Inspection and examinations were the chief devices of principals in maintaining this lock-step progress (p. 214).

The principalship was well established from an administrative point of view in the 30s. Principals’ associations and publications were very much concerned with the administrative phases of the principal’s work. In spite of the administrative emphasis some principals were aware of, and exploited the opportunity to provide professional leadership to their schools. National association publications discussed research studies on new and improved practices in classroom organization and methods of teaching, and the principals themselves were expected to introduce these new ideas into their own schools (Gross & Herriott, 1965; Beck & Murphy, 1993).

The principals related to their teachers primarily as authority figures, trainers and supervisors (Beck & Murphy, 1993). It was during this era that the concept of the principal as academic leader of the school community was forged. It was a period marked by the presence of great
schools with great principals, the "golden age" of the New York City public high schools (Hanford, 1994).

1940s. That a principal's major obligation is to provide professional leadership to school staff has been a prominent theme in the literature for decades. In The Teacher and Educational Administration, Reavis and Judd (1942) stated: "The tendency at present in most town and city school systems is to regard the principal as the intellectual leader of his school and to hold him responsible for the professional improvement of his teachers" (p. 333).

Henry J. Otto, an authority in the field of Elementary School Leadership in the 1948 yearbook of the Department of Elementary School Principals of the National Education Association stressed the staff leadership conception of the principal's role. Excerpts from his statements reflect the dominant theme of the chapter:

Supervision was to be no longer direction and inspection. Supervision was to become leadership in the inservice professional development of classroom teachers.... Organization for supervision thus becomes the organization for the inservice professional development of teachers; the chief function of supervision becomes "teacher development"; and the techniques of supervision consist largely of teacher education procedures....

The future role of the elementary-school principal will not be that merely of a line officer responsible for the entire program and all the individuals in his school. The future role of the principal will be primarily that of coordinator, consultant and staff education leader. He will take an active part in teacher education. His chief function will be to help identify problems, to coordinate the various phases of
the school program, to consult with individual and groups of teachers regarding their problems... (p. 271).

The principal’s relationship with teachers became one of the sharer of responsibility, facilitator of group leadership, and supervisor of group-directed activities (Beck & Murphy, 1993).

1950s. The decade of the 1950s was one of great change in the field of administration. Academic and political spheres began to merge the boundaries between schools and the outside world with a demand for restructured school systems following the '1954 Brown vs. Board of Education' decision. The educational literature suggests that the principal of this decade was viewed as having two distinct roles in the educational processes within the school.

One role was built on the concept of the principal as an 'administrator', grounded in the administrative theory movement of organizations which began in the late 40s. Principals were expected to administer their schools by making applications of insights derived from empirical and theoretical work done in the field of educational administration (Campbell, 1981). Enns (1988) suggested that one role of the principal is that of line officer, assuming the role of directing the work of teachers and other subordinates. One role was built on the minute details of educational practice. Principals were responsible for planning school activities and were ultimately responsible
for the implementation of the plans.

The second role was that of an instructional leader, assuming the role of guiding the work of teachers. It is in the second role that the principal is viewed to be a leader. Campbell (1968) drew a clear distinction between the two roles. He stated that

...unless you have helped an organization modify its purpose, modify its program, or modify its procedure,... you are not leading. Unless you have somehow been able, not just personally, but through the whole organization, to get some shift in purpose, or in program or procedure, you are not leading; you are maintaining an organization (p. 191).

Tension developed between theory and practice in this decade. Authors wrote of principals as persons who communicate pedagogical theories to faculty, support them as they implement these theories with great concern for concepts of excellence in instructional techniques (e.g., Bain, 1952; Witty, 1955). Administration became synonymous with educational leadership (Woodruff, 1958; Yeager, 1954).

The concept of the educational leadership of the principal is exemplified in the literature in this statement by Spain, Drummond and Goodlad (1956)

There is no greater test of leadership on the part of a principal than his or her positive influence on the professional growth of teachers (Reavis, et al., 1953, p. 303). Whether the school becomes a challenging educational enterprise or a dull and dreary place for children depends not so much upon what is there at the outset of his or her effort as upon the quality of leadership he or she provides for the staff (pp. 69-70).

In the decade of the 50s the principals' relationships
with teachers were viewed as theoretically based, supportive, democratic, the instructional leader and link between the classroom and the scientific study of education. They were practically viewed as the director of methodology and curricula (Beck & Murphy, 1993).

1960s. The principal of the sixties was firmly entrenched in a well developed bureaucratic conception of the principalship with clearly defined bases of power and responsibility (Campbell, 1987). Writers in this decade argued that principals were responsible for their teachers' morale and performance and were expected to act in ways of promoting both (Beck & Murphy, 1993).

In a study of effective leadership, Gross and Herriott (1965) confirmed that principals were able to reduce the reluctance of teachers to accept professional leadership by inviting them to help in decision making. Dreeben and Gross (1965) presented empirical evidence to support the idea of close supervision of teachers for pedagogical problems when new ideas were introduced into the school program through directives from the central administration.

During the 60s the relationship of the principal with teachers was one of builder of morale and dispenser of pedagogical knowledge (Beck & Murphy, 1993).

1970s-1980s: The Effective Schools Movement. The image of the principal as the professional leader of the school was further developed in the effective school research
literature of the 70's and 80's (Brookover et al., 1979; Edmonds, 1979; Weber, 1971) in the search for "good and effective" schools. The first generation of studies of schools defined the attributes of effective schools. Strong instructional leadership was identified as a major variable among five correlates present in "good schools". The effective schools referent for instructional leadership were the actions undertaken by the principal with the intention of developing a productive and satisfying working environment for teachers and desirable learning conditions and outcomes for children.

Attributes of effective principals were prevalent in such studies as Blumberg and Greenfield (1980) that focused on the personal qualities of effective principals. One personal quality was identified as the inclination and ability to see the school and the activities of teaching and learning as they are and how they might be in terms of what is possible in a given school situation. To see feelingly, and be able to establish goals or objectives for individual and group action, which defines not what we are but rather what we seek to be or do defined the concept of vision for schools (Colton, 1985). The concept of visionary leadership helped answer the "why" questions of effective leadership.

Studies of visionary leadership found that leaders that understood the key elements of vision, were able to develop long-range visions of what must be done in the short range,
to see from the beginning to the end and were able to communicate that vision in compelling ways (Sashkin, 1986).

The second generation of the effective schools movement focused on the creation of effective schools using the five identified correlates. This body of research contributed to the 'how' of creating effective schools focusing on instructional leadership. A basic model predicated on change theory for implementing an effective school evolved from a four-year large scale innovation study, Project SHAL, which began in 1980 (Achilles, 1987). From Achilles (1987) the activities of principals as instructional leaders consisted of the following behavioral descriptors following a centralized district commitment to a change:

**Level I - Planning and Program Design (Getting Started)**

- Establishes goals and sets norms; uses a vision of an excellent school to guide actions.
- Develops activities consistent with the purposes of education.
- Refocuses his/her efforts on instruction.
- Remakes schedule to support learning blocks, teacher planning time, etc.
- Fosters open communication, decision-making and problem-solving channels. Visits classrooms.
- Establishes structure.
- Focuses faculty meetings on solving problems.
- Plans academic emphasis; plans reward structures.
- Initiates community awareness/involvement.

**Level II - Implementation (Moving Ahead)**

- Emphasizes climate, high expectations, basic skills, assessment, pupil achievement (and focuses staff interest on these).
- Plans well and moves from problem to program orientation.
- Is highly visible (school grounds, hallways, classrooms, and community).
- Schedules instructional supervision sessions; plans
instructional events into the schedule. Provides ongoing support to staff while focusing on school goals. Strives to achieve school norms and sense of community. Knows school, pupils, parents, staff, and neighborhood: Treats parents/students/staff and others with respect. Transmits the vision of an excellent school to pupils, staff, parents.

Level III-Institutionalization and Renewal

Coordinates instructional programs; emphasizes achievement; sets personal and school-wide goals and objectives. Transmits well-defined goals to faculty, parents, and community. Plans and schedules to make optimal use of resources. Accepts responsibility for what goes on at school. Emphasizes teacher inservice in specific concept areas and classroom management techniques. Keeps abreast of research for implementation as needed. Takes assertive, dominant role in decisions about selecting instructional materials and in program and evaluation. Collegial atmosphere. Monitors the instructional process/program. Refines standards of performance for teachers, pupils, and self (p. 27).

The behavioral descriptors of effort by principals at each level of a change effort were similar to other lists of effective schools research (e.g., Mackenzie, 1983; Purkey & Smith, 1983).

The relationship of principals with teachers was evolving as partners in a nonbureaucratic system in the 70s with principals serving as instructional leaders, facilitating, monitoring and guiding personal and professional development in the 80s. The principal of the eighties was asked to be visionary, to lead the schools toward realizing the vision.
The Principal as Technology Leader

While early research on technology integration stressed the importance of teachers in the technology implementation process, equal importance and attention to the principal's role has been suggested in the research of the 90s.

The challenge for principals in the 90s is quite complex. Bailey (1991) suggested that the implications for school principals as technology leaders in the information age was nothing short of mind-boggling as schools become more and more a part of the information age. They must lead the transition from the bureaucratic model of schooling, with its emphasis on minimal levels of education for many, to a post-industrial model, with the goal of educating all students well--while at the same time completely changing the way they themselves operate.

One definition of leadership for technology has been designing the process through which decisions concerning technology and instruction can be made (Hertzke, 1992). A true leader's task is to encourage people to learn and grow, to prize their contributions, and to cherish their independence and autonomy (Curio, 1990). Behaviors which draw staff into decision-making processes, which reflect trust in their competence to carry out delegated tasks, which encourage open discussion and reflect operation as a team, mark a successful leader. Planning and staff development activities are two processes that provide
opportunities for principals to demonstrate leadership behaviors.

**Planning as a Process.** Research and practice (CTP, 1991; Mahmood & Hirt, 1992) have shown that effective plans are tied to school-wide efforts for educational improvement. The process of forming a collaborative team of teachers, administrators, and community members who look at the school's mission, its educational strengths and weaknesses, and then identify specific solutions, has a significant positive impact on the process of technology integration. A plan that addresses why existing technology has not been well utilized; how learning resource management could be improved; who would be responsible for what aspects of the plan in the future; and how the school could evaluate their progress toward technology integration provides powerful support for the effective use of technology.

A combination of the following suggested variables, with a technology integration plan as a significant factor was suggested in the research of Mahmood and Hirt (1992); 1) upper management encouragement; 2) teachers' training and background; 3) teachers' overall attitude toward computers; 3) teachers' attitudes toward limited use of computers; 4) use of computers on the job; and 5) use of computers at home.

**Staff Development as a Process.** The integration of technology in schools challenge both principals and teachers
to embrace the computer as a way to create classrooms and curriculum that actively involved students in their own learning process in a cooperative environment.

Teachers who are high implementors of technology expressed dissatisfaction with the quality of staff development (Honey, 1990). The problem with staff development is compounded when integrating technology because of rapid changes in hardware and software. Both the California Technology Project (1991) and the U.S. Office of Technology Assessment (1988) suggest that staff development is a continuous process and must be available to educators at a local site. The process of developing a staff development plan is in itself an effective staff development strategy for supporting technology integration (Wiburg, 1994).

Gemberling and others (1987) use inservice training models for getting teachers started using technology and providing continuing support. One district reported beginning with teacher utilities, commercial software programs that help make their work easier--anything that will show them that technology will help them immediately and without much effort. A second district started with the area teachers cited as problem areas and found software that would address the problem. A third district attracted teachers by using media specialist to provide basic computer literacy, then began to link the implementation of
technology to the district's mission and goals. The district links the whole philosophy of technology to teaching as a profession.

Continuing support is provided by on-going district wide training, on-site sessions as well as district sessions. Training topics range from software previews in different curriculum areas, requested workshops, publishing of computer newsletters to keep teachers informed, district teacher education centers that provide graduate credit and recertification, daytime classes are provided with substitute service provided for teachers, cable TV for inservice, teachers teaching teachers, and five-year district plans for training.

Another model for moving staff toward the use of technology in their work was suggested by Don Knezek (1991-92). The model suggests: (1) Communicate a clear expectation of technology use by all staff, such as "it is the expectation that each employee will appropriately use modern technology-based tools in the execution of assigned duties." (2) Ensure opportunities for success in meeting the expectations such as an infrastructure that includes adequate and appropriate a) access to technology, b) staff development and training, c) on-site context-sensitive support, d) communications, and e) planning and evaluation using applied implementation such as microteaching and peer observation. (3) Assess the degree to which expectations
are met. Have a specific assessment category in the evaluation process with legitimate measures of technology use. (4) Respond to the assessment results in a meaningful way to staff and one that is supportive of the purpose. Some suggested positive responses were higher levels of access to technology, leadership responsibility, public recognition, increased autonomy, responsibility for experimentation, support to attend conferences, or salary supplements. In order to see more significant results leadership must demonstrate that technology use is valued.

Overall, the literature suggests that principals must be instructional leaders, not just building managers and they must make continuous improvement an integral part of the educational system.

Moen (1989) identified the following attributes of administrators practicing process-oriented leadership:

1. Understands how the work of his/her group supports the mission.

2. Has constancy of purpose, persistence in accord with the mission.

3. Focuses on the customer, internal and external.

4. Is coach and counsel, not judge.

5. Removes obstacles to pride and joy in work and learning.

6. Understands variation (in people and systems).

7. Works to improve the system.
8. Creates an atmosphere of trust and support.

Forgives a mistake.

9. Is a good listener (continues to learn).

10. Understands the needs of the student.

Vision-Involvement-Persistence Model (VIP)

The skills needed by principals in the 80s were not unlike those demonstrated by successful corporate leaders who have been able to reform and revitalize companies by building consensus and creating shared visions of what needed to be done.

Kouzes and Posner (1987) in their studies of case analyses and survey questionnaires of managers who were leading others to outstanding accomplishments found five leadership practices and ten behaviors common to people who were bringing people together to accomplish the extraordinary in organizations.

Leadership was viewed as an active process where leaders acted as learners with a willingness to change from the status quo. They primarily recognized good ideas, supported those ideas, and challenged the system in order to get new products, processes, and services adopted. They were usually early adopters of innovation.

The leaders created and communicated a vision and were able to inspire others with belief and enthusiasm to create an organized movement to achieve the vision.

Leaders built coalitions of supporters and
collaborators who felt empowered to use their energies to produce extraordinary results. This was found to be the most significant practice by Kouzes and Posner (1987).

Leaders modeled the way by planning in detail and paying attention to what they believed was most important, being consistent and persistent (Kouzes & Posner, 1987).

Leaders celebrated small milestones as encouragement to their followers and themselves as they moved towards accomplishing their visions (Kouzes & Posner, 1987). These leadership behaviors were practiced at varying levels.

Educational researchers such as Leithwood and Montgomery (1986) also identified levels of behavior in their research—each with different consequences for principal effectiveness. They found that what principals do at level one for example, is not necessarily ineffective, only less effective than the other levels. Levels of principal behavior suggests that as they come to view their jobs in more complex ways they become more effective, operating at higher levels of leadership practices. Principals operating at high levels of leadership practices have a clear sense of what needs to be accomplished and take more active roles in planning, prodding, encouraging, advising, participating, checking, stimulating, monitoring, and evaluating change efforts. They assume more direct roles in obtaining and providing the necessary material and psychological support for successful change efforts (Hall &
Principals must change from implementors to initiators, from a focus on process to a concern for outcomes, from risk avoiders and conflict managers to risk takers, and they must adopt leadership strategies that are in harmony with the school organizations they seek to create. Their base of influence must be professional expertise and moral imperative rather than line authority. They must learn to lead by empowering rather than controlling, they must be a support function for teaching rather than a mechanism for the control of teaching. They will have to lead with as much heart as head (Bolin, 1989; Lightfoot, 1983). The developing technologies require that principals demonstrate educational leadership by becoming the head learner in the organization (Barth, 1990). Succinctly, technology leadership requires relentless effort, steadfastness, competence, planning, attention to detail, and encouragement (Kouzes & Posner, 1987).

Teachers and Technology

Teacher Use of Technology

As an innovation to date, school use of the acquired hardware and software is clouded. Few studies or schools have analyzed the amount of education, encouragement, incentives, and continuing on-the-job support needed by teachers to integrate the use of computers in the curriculum effectively.
A close inspection of various surveys reveals that individual students who use computers in schools (and not all do) spend, about four percent of all instructional time with computers, or a little more than one hour a week (Cuban, 1994).

An extensive evaluation of integrated Learning Systems (Sherry, 1990), found in general, that while the systems were viewed positively by the vast majority of students, teachers, and administrators, they were not used effectively. A standard practice of using an ILS in a computer laboratory setting tended to isolate the system from the rest of the school and created a perception that it was separate from the school’s curriculum plan. Teachers were often told to send their classes (or selected students) to the ILS lab for "additional" work in a curriculum area. In most of the schools little attempt was made to coordinate the students’ ILS activities with the rest of their instructional life. Sherry suggested that the computer lab needed to be "demystified", that classroom teachers needed to play an integral role in its use and that the ILS should be viewed as an educational resource that schools can use in planning their overall instructional strategies.

New-integrated learning systems are getting ever more effective in accomplishing basic "teacher" tasks. An ILS classroom with digitized sound, music, animation, graphics, video, and speech recognition is becoming far more
interactive and engaging. Students have no problem in an ILS classroom if they get extensive computer time each day.

In order to maximize the effectiveness of an ILS, teachers must be given the time and training necessary to understand how to take advantage of its strengths. They need training in how to coordinate the use of the ILS with regular classroom instruction. Sherry (1990) suggested a minimum amount of training necessary to give teachers expertise and confidence to come close to exploiting the full potential of the technology is an initial training session of one to two full weeks, with at least three to four days of follow-up training annually thereafter.

In a 1989 national survey of school and teacher practices, Becker suggested that, in general, teachers are using technology for rote purposes and not in support of real problem-solving. This study showed that only three percent of mathematics teachers used graphing programs with their students five times or more in a school year and one percent of science teachers used computer based software with that frequency.

Word processing programs ranked first, drill-and-practice programs second, and tutorial programs third in a study of accomplished teachers integrating computers into classroom practice (Sheingold & Hadley, 1990). Six hundred of the "accomplished" technology-using teachers reported that it took at least five to six years of
sustained time and effort to achieve competency in using the computer as a multipurpose tool in their teaching and they often had to overcome multiple barriers of inadequate amounts of hardware and time to plan and carry out computer-based lessons. Personal enthusiasm and motivation of the individual teachers, planning time for technology enhancement as part of the school day, and a school structure and culture that encouraged experimentation were cited as key factors associated with successful integration for these teachers (Sheingold & Hadley, 1990).

Becker (1993) developed an "exemplary computer-user" index to determine how teachers use computers in teaching practices and found only five percent of all computer-using teachers in his survey could be recognized as exemplary users. The indices reflected the teacher's goals for using computers, their reliance on computers, the frequency of use by students to accomplish tasks, and the breadth of their students' use of a variety of computer applications.

More importantly, Becker (1993) identified five characteristics of the teaching environment which distinguished the five percent exemplary computer-using teachers: (1) the existence of a social network of computer using teachers at the same school; (2) sustained use of computers at the school for "consequential" activities--that is, where computer are used to accomplish a goal other than learning (e.g., writing and publishing); (3) organized
support for computer-using teachers in the form of staff development activities and a full-time computer coordinator role; (4) leadership concerned about equity of access to computers across categories of students rather than providing essentially minimal access to every student; (5) where computers are used, smaller class sizes and a more favorable student-to-computer ratio. Becker argues that all of the environmental issues are alterable by administrative practices that would make exemplary practices of teachers using computers more likely.

Sheingold and Hadley's (1990) findings concurred with Becker. In their study of experienced and accomplished teachers integrating computers into their teaching found three factors that contributed to their achievement that stand out: First, the teachers are motivated and committed to their students' learning and to their own development as teachers. Second, they experience support and collegiality in their schools and districts; and third, they had access to sufficient quantities of technology. The three factors act in combination to develop their expertise to use the technology in new ways. The teachers' willingness to learn and change appears to be a critical element in this process.

Teacher Thoughts and Practices. Several recent studies have reported that the roots of the problem of technology's uneven impact on classrooms goes deeper than most technologists, administrators and critics are willing to
Crandall, Eiseman and Louis (1986) note that the environment and the teachers who teach there have been thoroughly described in the literature (e.g., Jackson, 1984; Lieberman, 1984; Lortie, 1975; and Sarason, 1971). They site some of the aspects of what Huberman (1984) calls "classroom press" that exert major influences on teachers that are pertinent when looking at the problem of integrating technology:

* **The press for immediacy and concreteness.** Teachers engage in a huge number of interchanges - an estimated 200,000 per year. Most of these are spontaneous and require action.

* **The press for multidimensionality and simultaneity.** Teachers are confronted with the need to carry on a range of operations simultaneously, including providing materials, presenting content, eliciting responses, assessing progress, attending to emotional needs, and controlling behavior.

* **The press for adapting to ever-changing conditions.** Schools are reactive partly because they must deal with unstable input. Individual and groups behaviors change from year to year, and outcomes cannot be tied decisively to particular treatments. Techniques that work with one student fail with the next, or may work one day but not the next.

* **The press for personal involvement with students.** Teachers discover that they need to develop and maintain personal relationships, that for most children and adolescents, meaningful interaction is a precursor to academic learning.

This "classroom press" has several effects on teachers:

* **Teachers focus on the short term.** They place a heavy emphasis on "having a successful day" (Lortie, 1975).

* **Teachers are isolated from adults.** The opportunity to interact meaningfully with colleagues is limited by teachers’ schedules and responsibilities, and also by the norms that
prevail in most teachers' lounges, which function as places for tension release.

* Teachers run out of energy by the end of the school day. At the end of the week, they are tired; at the end of the year, they are exhausted.

* Teachers rarely engage in sustained reflection about teaching: Given all the above characteristics, teachers tend to function intuitively (Huberman, 1983). Since they neither are taught how to reflect, nor are rewarded for doing so, they rarely spend time reasoning about how they carry out their jobs (pp. 28-29).

Some implications of the above generalizations are illustrated in Kerr's (1991) study of how educational technology is thought of and used by teachers in the field. He examined the general place of technology in teachers' thinking about their craft, and the changes in classroom organization and practice that flow from incorporating technology.

First, the teachers saw themselves as teachers first and as users of educational technology a distant second. Cultural beliefs about what teaching is, how learning occurs, what knowledge is proper in schools, and the teacher-student (not student-machine) relationship are the sometimes transparent variables that permeate the school environments making them less vulnerable to electronic technologies (Cuban, 1994). Teachers see and use technology as supplementary to their roles as teachers.

Second, the age-graded school profoundly shapes what teachers do and do not do in classrooms. The press of classroom life lends itself to the more traditional approach to teaching: very structured classrooms with high levels of

discipline, content driven rather than process driven, closely followed textbooks, and classroom lectures as the major means of teaching (Cuban, 1994; Honey & Moeller, 1990).

Among the teachers in Kerr's (1991) study, technology did allow classrooms to be physically transformed in ways that were obvious and dramatic. The changes included a decrease in the amount of frontal instruction and a move toward more project activities and independent learning. Teachers noted that these changes allowed them to work more intensely with the students who most needed extra help, and that their need to manage behavior problems also decreased. Technology seems to facilitate a shift in classroom organization toward a more individualized plan.

Kerr (1991) and others found that teachers accommodate slowly to the new possibilities that technology presents, which may in fact lead to new perceptions about teaching and about their roles as teachers. The realizations that there are new ways of doing things, and that technology can make a contribution to out-of-class professional activity does not come easily or rapidly as one may expect. When they do appear, they become parts of an integrated vision of classroom life. When this happens classrooms are restructured to feature the teacher in a more complex and more demanding role than before, as organizer, encourager, director of and participant in classroom activities.
Moursand (1992) cited the difficulties involved in a teacher learning to make comfortable use of even a single piece of software such as a word processor in a typical classroom. Using the example of the differences between a skilled secretary learning to use a word processor to handle correspondence versus a teacher learning to use a word processor as both an aid to instruction and an object of instruction, Moursand noted these differences: The secretary is likely to be a skilled typist using a single computer that no one else uses; teachers have to deal with their personal questions as they make use of the word processors and a full range of questions that occur as their students use word processors and may have to deal with several models of hardware and software being used by students every hour. Such nuances are overlooked by technology enthusiasts as well as educational leaders.

Honey and Moeller (1990) found that teacher beliefs about teaching range from process-centered to more traditional approaches to teaching in their study of teachers' beliefs and technology integration. Teachers with progressive, more process-centered beliefs about teaching such as instilling a sense of curiosity and desire to learn in their students tend to be drawn toward using technology more than teachers with traditional approaches to teaching, who generally see technology as disruptive to their teaching environment.
It is becoming more and more evident that integrating technology in schools is not simply incorporating it, or making it fit into the existing structure. Kinnaman (1994) concludes that successfully integrating technology implies and requires basic changes in our traditional model of schooling.

The Change Process. The integration of technology in the school curriculum does not occur by happenstance. It requires adoption, implementation and institutionalization as a goal and cannot be taken for granted. Sergiovanni (1991) summarized four units of change identified in the literature on school improvement:

(1) engineering the social and political context within which the school exists in an effort to provide the necessary support and momentum for change (i.e., Baldridge, 1991; Gaynor, 1975);

(2) the development of favorable school climates that provide the necessary interpersonal support for change (i.e., focus on the concept of school culture that emphasizes the development of values and norms that include proposed changes (Likert, 1967; Sergiovanni & Corbally, 1984);

(3) attending to the individual, needs, dispositions, stages of concern for the proposed change, and the driving, and restraining forces that pull and tug, causing resistance to change (Bennis, Benne, & Chin, 1969; Reddin, 1970); and
finally,

(4) engineering the work context as a means to program and structure teacher behavior to ensure that the school improvement effort is implemented properly (Hunter, 1984). Sergiovanni (1991) concludes that all four of the concerns are important, and one alone is not an adequate model for school improvement. When each of these concerns are brought together, a systems view begins to emerge--providing a dynamic, integrative, and powerful view of change.

The Teacher as the Unit of Change

Using computers in the work flow of teaching is directly linked to changes in teaching behaviors which means changes in the attitudes and beliefs of individual teachers and the faculty as a whole.

Assessing teachers' perceived needs and demonstrating how technology can assist in meeting those needs is critical to successful integration. Teachers' attitude toward their students and their job could improve through the implementation of technology. Teachers may find the time to provide more individualized instruction to students if the technology frees them to do other things, they enjoy using the new educational tool, or they are providing learning environments not possible without technology (Poirot, 1992).

In as much, attitudes tend to be characteristic of behavioral outcomes, concerns of teachers reflect effective outcomes which provide helpful insights to assessment and
evaluation of technology in education. The success of technological implementation may very well hinge on establishing an environment conducive to teacher acceptance of the technology and adoption of the tool at a personal level (Poirot, 1992).

Whenever a new technology is introduced, teachers have legitimate concerns: How does this affect my daily routine? Will this replace me as a teacher? How will I learn about this new device? Is it right for the student? What will others think of me as a teacher? My students are more at ease with computers, who will it affect my authority over the students? Such questions reflect concerns that are normal and deserve attention. Principals react similarly when faced with the prospects of change; as do superintendents, professors, parents and all individuals involved with changes that affect them, their work, their relationships with others. These human concerns require attention and adequate resolution to increase comfort with and confidence in the use of technology (Sergiovanni, 1991).

**Concern Based Adoption Model (CBAM)**

Researchers for some time have been interested in the concerns of teachers (Bentzen, 1974; Huberman & Miles, 1984; Lortie, 1975) and how these concerns focus their attention on a limited range of issues relating to change. Gabriel (1957) and Fuller (1969) proposed a developmental conceptualization of the concerns of teachers as they
progressed and changed through teacher education programs. Her pioneering research demonstrated that teacher concerns moved from initial concerns about the self to concerns about the task and lastly to concerns about the impact of their teaching on students.

Building on this pioneering work on concerns of teachers and principal concerns as change facilitators (Hall & Dossett, 1973; Hall & Loucks, 1978; Hall et al., 1991; Hord, Rutherford, Huling-Austin, 1987) led to the development of the "concerns-based adoption model" which describes the changing feelings of people as they learn about an innovation or proposed change, prepare to use it, use it, and modify its use. The "concerns-based adoption model" emphasized the individual adopter of an innovation and the innovation itself as the focus of reference.

Definite categories of innovation adopter/facilitator concerns developed with a logical progression, as users became increasingly skilled in using an innovation emerged from studies at the Inter-Institutional Program of the Research and Development Center for Teacher Education (Hall et al., 1979). Seven stages of concern in the model were proposed as follows:

1. Awareness I am not concerned about it.
2. Informational I would like to know more about it.
3. Personal How will using it affect me?
4. Management I seem to be spending all my time getting material ready.
5. Consequence  How is my use affecting kids?
6. Collaboration I am concerned about relating what I am doing with what other teachers are doing.
7. Refocusing I have some ideas about something that would work even better.

Hall (1991) defined concern as a composite representation of the feelings, preoccupation, thought and consideration given to a particular issue or task. Hall further explained that there are different kinds of concerns, depending upon personal make-up, knowledge, and experiences. Each person perceives and mentally contends with a given issue differently. The issue may be interpreted as an outside threat to one's well-being, or it may be seen as rewarding. There may be an overwhelming feeling of confusion and lack of information about what "it" is. They may be ruminations about the effects. The demand to consider the issue may be self-imposed in the form of a goal or objective that we wish to reach, or the demand may come from external pressure. In response to the demand, our minds explore ways, means, actions, risks, and rewards in relation to the demand. All in all, the mental activity composed of questioning, analyzing, and re-analyzing, considering alternative actions and reactions, and anticipating consequences is concern.

The developers of the CBAM model found that concerns seem to follow a general kind of development that takes place as changes are adopted and used. The progression of
concerns seem to follow a developmental pattern. For example, in the early stages of technology use efforts, teachers are likely to have self concerns that center on learning more about technology use itself and how it will affect them personally (i.e., teacher applications). Once these concerns are resolved, they tend to focus on the management of problems they are likely to face as they begin to use computers with students (i.e., how to schedule use). Next, their attention shifts to the impact the change may have on their students and to collaboration with other teachers in an effort to implement the change and to improve its effects.

The developmental movement through the stages of concern, that is, earlier concerns must first be resolved (lowered in intensity) before later concerns emerge suggests that timely provision of affective experiences and cognitive resources can help facilitate the development of later level concerns. Whether and what speed later level concerns develop depends on the individual, the innovation and the environmental context.

Sergiovani (1991) concluded that the principals and others who are interested in promoting change use the concern-based model for evaluating individuals with respect to change concerns and developing strategies to address the different levels.

Attention given to the developmental concerns of
teachers and principals has proven a viable construct for determining needed interventions to facilitate the change effort at the individual level. The concerns construct is a promising framework that provides data on critical teacher and principal concerns as they may attend to integrating technology.

**Use of the Literature Review**

In this study, the work done by Kouzes and Posner on the construct of leadership for accomplishing the extraordinary in an organization and the work done by Hall and others on the construct of facilitator and teacher concerns were used to assess the significance of the leadership role of the principal in the era of schooling for the information age of comprehension and communication and its impact on the developmental concerns of teachers as they use technology in the instructional program.

There was active participation by staff and administration in the acquisition of computers for use in the supplemental instructional program for Chapter I students as a means to improve academic achievement and school improvement.

The methods used in this study to collect, analyze and present the data are detailed in subsequent chapters. The last chapter presents conclusions and recommendations for further study.
CHAPTER III

METHODOLOGY

Introduction

The literature generated on integrating technology in the schools indicate parallel concerns for understanding and developing more capable leaders and teachers in moving schools toward more effective use of technology. Successful implementation appears to be a complex and perhaps unmeasurable variable. In order to maximize technology effectiveness, how to improve the implementation process becomes a salient issue. For this reason the author selected one key dimension of the Concerns-Based-Adoption Model (CBAM), teacher concern and change facilitator concern, to assess the personal dimension of the teacher change and principal change process as it relates to the leadership of the principal and five key dimensions of the Vision-Involvement-Persistence Model (VIP) to assess leadership.

Successful implementation of computers is determined by the developmental level of teacher intense concerns for the impact of computer use for students and principal facilitating impact concerns for teachers. The development of impact concerns is a function of the principal's
leadership practices and ability to: 1) Innovate, experiment and explore ways to improve the organization; 2) Envision the future and enlist the support of the staff; 3) Foster collaboration and empower staff; 4) Model the way by focusing on key priorities and planning small, achievable project steps to a larger goal; and 5) Recognize and celebrate contributions and accomplishments of the improvement efforts. It is interesting to ask: In the context of urban schools, what is the relationship between leadership practices of principals and the implementation process? What kind of leadership behavior is more effective for the process?

This study was designed to explore these questions. Fundamentally, it is a survey involving 22 Chicago Public Elementary Schools using computers in a laboratory environment, purchased with ESEA Chapter I Funds. Based on leadership and concerns theory, the variable--leadership practices--is described by the LPI (Leadership Practices Inventory) developed by Kouzes and Posner (1988) and the variable--concerns--is described by SoC (Stages of Concern Questionnaire) and the CFSoC (Change Facilitator Stages of Concern Questionnaire) developed by Hall et al. (1979, 1991). Since this study was an ex post facto study, there was no manipulation of variables. It is believed that the findings from this study not only increases the understanding of organizational behavior in the local schools, but also
contributes to general change theory and the professional development of principals and teachers in the process of school improvement.

Research Questions

This study was guided by the following research questions:

1. What pattern of leadership practices will teachers and principals express about principals engaged in the implementation process of integrating computers in the instructional program.

2. Are there significant differences in the perceptions of leadership practices among the three role groups: computer laboratory teachers, classroom teachers and principals?

3. What pattern of specific concerns will principals express about the role of change facilitator?

4. What pattern of specific concerns will computer laboratory teachers and classroom teachers express about using computers in the instructional program?

5. Are there significant differences in the Stages of Concern among the three role groups?

6. What is the relationship between leadership practices and the stages of concern?

Subjects

The sample for this study was drawn from a large midwestern urban school district. Twenty-five elementary
schools, with integrated computer learning systems in computer laboratory instructional environments, servicing students in grades four through eight comprised the population of this study.

The technology was purchased with Chapter I funds secured through the federally funded Elementary and Secondary Act (ESEA). This act provides supplementary educational and supportive service funds to meet the needs of children identified as below grade level in reading and mathematics achievement. Schools qualifying for Chapter I funds are ranked according to "need" by the Department of Government Funded Programs. Three factors determine need: (1) the number of children receiving free and reduced price lunches, (2) the number of families receiving public assistance, and (3) the poverty level of families in the school based on census figures.

All of the schools in this study were similar in organizational structures, facilities, resources, curriculum and student assessment following the guidelines established by the Grants and Technical Assistance Department of the school system's central office.

Also, all schools in this study had selected the implementation of computers in the instructional program as a viable means towards improving the learning achievement of the school. Computers were used in a laboratory organizational model, staffed with a certified teacher.
Students using the laboratory were selected by the staff according to the federal Chapter I guidelines. The students leave their regular classroom one period each day to participate in instruction with the computer laboratory teacher. Classroom teachers and the computer laboratory teachers are encouraged to coordinate and collaborate their instructional programs, for maximum impact on student achievement according to the Chapter I guidelines.

**Procedures**

The author of this study contacted the Central Office Administration of the school system and received approval for a special project study.

The principal, computer laboratory teacher and five classroom teachers with students using the computer laboratory were selected to complete a survey instrument. The instruments used were self-administered questionnaires which were delivered and collected as individual and sealed packages from each participant in each school.

There were 175 participants in the sample population: 25 principals, 25 computer laboratory teachers, and 150 classroom teachers. Twenty-two principals, 22 computer laboratory teachers, and 90 classroom teachers responded to the survey resulting in a 77% rate of return.

**Survey Instruments**

Four questionnaires were used by the author to measure leadership and concerns stages of innovation implementation:
(1) Leadership Practices Inventory - Self (LPI); (2) Leadership Practices Inventory - Others (LPI) (Kouzes & Posner, 1988); (3) Change Facilitator Stages of Concern Questionnaire (CFSoCQ) (Hall, et al., 1991); and 4) Stages of Concern Questionnaire (SoCQ) (Hall, et al., 1986). Permission to use the questionnaire was requested and granted by the authors.

Assessment of Leadership

The Leadership Practices Inventory - Self (LPI) based on the Kouzes-Posner Leadership model was used to measure the practices and behaviors principals used to lead staff to implement the instructional use of computers for improvement of student learning.

The Leadership Practices Inventory - Other was used to measure anonymously the teachers’ perceptions of the leadership practices of the principals. The combined Self and Other assessments were used to provide a clear picture of how the principals were functioning as leaders for technology implementation.

Kouzes and Posner (1988) developed the Leadership Practices Inventory to empirically measure the conceptual framework of leaders’ personal best experiences--time when they had accomplished something extraordinary in an organization. It is a behavior rating scale designed in two forms--Self and Other--which differ only in whether the behavior is the respondents (Self) or that of another
specific person (other). It consists of 30 descriptive statements about various leadership behaviors and activities measured on a five-point likert scale, measuring five dimensions of leadership. A higher value represented greater use of a behavior: (1) rarely or never does what is described in the statement, (2) once in a while does what is described, (3) sometimes does what is described, (4) fairly often does what is described, and (5) very frequently, if not always does what is described in the statement. Some statements of leadership practices include: "I get others to feel a sense of ownership for the projects they work on." "I look for innovative ways we can improve what we do in this organization." "I describe to others the kind of future I would like for us to create together." Each of the five dimensions of leadership was represented by six items on the questionnaire.

A description of the five dimensions of exemplary leadership as presented by Kouzes and Posner (1987) follows:

1) Challenging the Process. Leaders are pioneers--people who seek out new opportunities and are willing to change the status quo. They innovate, experiment and explore ways to improve the organization. They treat mistakes as learning experiences. Leaders also stay prepared to meet whatever challenges may confront them. To Challenge the Process involves:
* Searching for Opportunities
* Experimenting and Taking Risks

2) Inspiring a Shared Vision. Leaders look toward and beyond the horizon. They envision the future with a positive and hopeful outlook. Leaders are expressive and attract followers through their genuineness and skillful communications. They show others how mutual interests can be met through commitment to a common
purpose. To inspire a Shared Vision involves:
* Envisioning the Future
* Enlisting the Support of Others

3) Enabling Others to Act. Leaders infuse people with spirit-developing relationships based on mutual trust. They stress collaborative goals. They actively involve others in planning, giving them discretion to make their own decisions. Leaders ensure that people feel strong and capable. Enabling Others to Act involve:
* Fostering Collaboration
* Strengthening Others

4) Modeling the Way. Leaders are clear about their values and beliefs. They keep people and projects on course by behaving consistently with these values and modeling how they expect others to act. Leaders also plan and break projects down into achievable steps, creating opportunities for small wins. They make it easier for others to achieve goals for focusing on key priorities. Modeling the Way involves:
* Setting an Example
* Planning Small Wins

5) Encouraging the Heart. Leaders encourage people to persist in their efforts by linking recognition with accomplishments, visibly recognizing contributions to the common vision. They let others know that their efforts are appreciated and express pride in their accomplishments. Leaders find ways to celebrate achievements. They nurture a team spirit which enables people to sustain continued efforts. Encouraging the Heart involves:
* Recognizing Contributions
* Celebrating Accomplishments (pp. 6-7)

A reliability study of the LPI indicated internal reliabilities from .77 to .90 with reliabilities ranging from .70 to .84 on the LPI-Self and .81 to .91 on the LPI-Other. Test-retest reliability averages were .94 (Posner & Kouzes, 1988). Various other analyses performed by Posner and Kouzes suggest the LPI has sound psychometric properties.
Assessment of Concern

The Change Facilitators Stages of Concern Questionnaire (CFSoCQ) (Hall, et al., 1991) was used to measure the kind and degree of attention principal's focused on technology and the facilitation of the integration process.

The Stages of Concern Questionnaire (SoCQ) (Hall, et al., 1986) was used to measure the kind and degree of attention computer laboratory teachers and classroom teachers focused on the integration of computers effectively into the instructional program.

Hall, et al. (1991) developed the Change Facilitator Stages of Concern Questionnaire to empirically measure the feeling, preoccupations, thoughts, and considerations one has about a particular issue or task. Hall labeled the composite representation, a gestalt of psychological activity, concern. The concept of concerns is a way to represent different affective, motivational and personal concerns one has as developmental growth occurs during the implementation process of innovations (Fuller, 1969).

The 35-item instrument developed (CFSoCQ) supports Hall's hypothesis that "change facilitators" have similar concerns as front-line users of educational innovations. The frame of reference shifts from innovator user to innovation facilitator. The instrument distinguishes between concerns that specifically target the innovation and concerns that target the role of change facilitator.
Seven stages of concern are represented by 35 statements of concern about an innovation. Each stage of concern is represented by five statements. The innovation for this study was identified as the principal's concern about involvement with leadership and computer technology in the instructional program.

Principals responded to statements of concern on a Likert scale with values ranging from 0 to 7 (This statement seems irrelevant to me, indicative of a very low concern, to this statement is very true of me at this time, indicative of a very high concern.) according to how they perceived the item as a description of a concern at the time of taking the survey. Sample statements of concern are: "I am preoccupied with things other than this innovation; I want to know what priority my superiors want me to give to this innovation; I would like to determine how to enhance my facilitation skills."

The identified Stages of Concern for facilitators are: Awareness (0), Informational (1), Personal (2), Management (3), Consequence (4), Collaboration (5), and Refocusing (6).

The seven Stages fall into three categories, Self Concerns, Task Concerns, and Client Impact Concerns. A description of the stages presented by Hall, Newlove, George, Rutherford and Hord (1991) is as follows:

Concerns About Self

Stage 0 Awareness. Change facilitation in relation to the innovation is not an area of intense concern. The
person's attention is focused elsewhere.

Stage 1 Informational. There is interest in learning more about the innovation. The concern is not self-oriented or necessarily facilitation oriented. The focus is on the need/desire to know more about the innovation, its characteristics, its use and effects.

Stage 2 Personal. Uncertainty about one's ability and role in facilitating use of the innovation is indicated. Doubts about one's adequacy to be an effective change facilitator and questions about institutional support and rewards for doing the job are included. Lack of confidence in oneself or in the support to be received from superiors, nonuser, and users are a part of this stage.

Concerns About Tasks

Stage 3 Management. The time, logistics, available resources and energy involved in facilitating others in use of the innovation are the focus. Attention is on the "how to do its" of change facilitation, decreasing the difficulty of managing the change process, and the potential of overloading staff.

Concerns About Impact

Stage 4 Consequence. Attention is on improving one's own style of change facilitation and increasing positive innovation effects. Increasing the effectiveness of users and analyzing the effects on clients are the focus. Expanding his/her facility and style for facilitating change is also the focus.

Stage 5 Collaboration. Coordinating with other change facilitators and/or administrators to increase one's capacity in facilitating use of the innovation is the focus. Improving coordination and communication for increased effectiveness of the innovation are the focuses. Issues related to involving other leaders in support of and facilitating use of the innovation for increased impact are indicated.

Stage 6 Refocusing. Ideas about alternatives to the innovation are a focus. Thoughts and opinions oriented towards increasing benefits to clients are based on substantive questions about the maximum effectiveness of the present innovative thrust. Thought is being given to alternative forms or possible replacement of the innovation (p. 12).
Stages 1 and 6, by definition are weighted and target the innovation. And concomitantly, the change facilitator role is targeted in Stages 2 through 5.

Reliability and validity studies conducted by Hall and et al. (1980-81) of the CFSoC Questionnaire resulted in a measure that has independent scales and high internal reliability. The means, standard deviations and alpha coefficients for each of the five item scales in two separate studies produced essentially identical statistics of adequate internal reliability: Means of 8.40 to 24.77; SD’s of 5.93 to 7.18 and Alphas ranging from a low of .63 to a high of .86. Low intercorrelations on the scale scores ranged from a low -.21 to .67 indicating the scales were measuring different concepts.

Reliability studies conducted by Hall (1979) resulted in alpha coefficients of .64 to .83 on the seven Stages for internal consistency and test-retest correlations of .65 to .84.

The Stages of Concern Questionnaire (SoCQ) (Hall, et al., 1974) for the teacher users of computers in instruction was similar to the Facilitators Concerns Questionnaire. The frame of reference shifts to the innovation user. The data is measured on a Likert scale with values ranging from 0 to 7 according to how the teachers perceives the item as a description of the concern at the time of responding. Item examples are: "I would like to know how this innovation is
better than what we have now; Coordination of tasks and people is taking too much of my time; I am concerned about how the innovation affects students." Responses reflect values such as "this statement is very true of me at this time" to "this statement seems irrelevant to me."

A description of the Stages as presented by Hall et al. (1979) from the original concept by Hall et al. (1973) follows:

**Concerns About Self**

**Stage 0 Awareness.** Little concern about or involvement with the innovation is indicated.

**Stage 1 Informational.** A general awareness of the innovation and interest in learning more detail about it is indicated. The person seems to be unconcerned about herself/himself in relation to the innovation. There is interest in the substantive aspects of the innovation in a selfless manner such as general characteristics, effects, and requirements for use.

**Stage 2 Personal.** The person is uncertain about the demands of the innovation, her/his inadequacy to meet those demands, and her/his role with the innovation. This includes analysis of her/his role in relation to the reward structure of the organization, decision making, and consideration of potential conflicts with existing structures or personal commitment. Financial or status implications of the program for self and colleagues may be reflected also.

**Concerns With Tasks**

**Stage 3 Management.** Attention is focused on the processes and tasks of using the innovation and the best use of information and resources. Issues related to efficiency, organizing, managing, scheduling and time demands are utmost.

**Concerns With Impact**

**Stage 4 Consequence.** Attention focuses on impact of the innovation on students in her/his immediate sphere of influence. The focus is on relevance of the
innovation for students, evaluation of student outcomes, including performance and competencies, and changes needed to increase student outcomes.

Stage 5 Collaboration. The focus is on coordination and cooperation with others regarding use of the innovation.

Stage 6 Refocusing. The focus is on exploration of more universal benefits from the innovation, including the possibility of major changes or replacement with a more powerful alternative. The person has definite ideas about alternatives to the proposed or existing from of the innovation (p. 7).

Reliability studies have been conducted by Hall et al. (1979) in a number of different settings and contexts and have proven reliable and valid use for individual as well as group data. Raw score test-retest correlations ranged from .65 to .86 with four of the seven correlations above .90. Estimates of internal consistency (alpha-coefficients ranged from .64 and .83 with six of seven coefficients above .70.

Design and Statistical Procedures

Three analytic models for the study are presented in Figure 1, 2, and 3 respectively. For the first analytic model, the independent variables were the role group category principals (P), computer laboratory teachers (CLT), and classroom teachers (CT). The dependent measures consisted of scores on the five dimensions of the Leadership Practices Inventory Self and Others (LPI). For the second model the dependent measures consisted of scores on the seven Stages of Concerns Questionnaires (CFSoSQ and SoCQ) for the principals and teachers respectively. Finally, the analytic model consisted of the interaction of the
leadership and concerns variables for the role groups.

<table>
<thead>
<tr>
<th>Leadership Practices</th>
<th>Role Group</th>
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<td>CLT</td>
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<td></td>
<td>CT</td>
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<tr>
<td>Challenging</td>
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<td>Encouraging</td>
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**Figure 1. MANOVA: Design for Testing Leadership Perceptions by Role Group**

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<th>Concerns</th>
<th>Role Group</th>
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<td></td>
<td>CLT</td>
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<td>CT</td>
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<tr>
<td>Awareness</td>
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<tr>
<td>Informational</td>
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<td>Personal</td>
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<td>Management</td>
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<td>Consequence</td>
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<td>Collaboration</td>
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<td>Refocusing</td>
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**Figure 2. MANOVA: Design for Testing Concerns Stage by Role Group**

Testing the effect of the two independent variables in combination - testing the interaction effect.

**Figure 3. MANOVA: Design for Testing Leadership and Concerns Variables Interaction for Role Group**
Raw scores on all questionnaires were used for statistical procedures. Descriptive statistics and multivariate analyses of variance were used for the analysis of the data. The data was disaggregated by role group. To further explore the relationship between the variables, standardized percentile scores were used to develop profiles and assist with interpretation of the data.
CHAPTER IV
DATA PRESENTATION AND ANALYSIS

Introduction

The purpose of this study was to investigate the role of leadership in the implementation of computers in the instructional program in the elementary school. In order to maximize technology effectiveness, principal leadership behaviors, principal concerns, and teacher concerns were two critical constructs undertaken for study of the relationship between leadership and the involvement of teachers in the change process.

The data obtained in this study was used to answer the following questions:

1. What pattern of leadership practices will teachers and principals express about leadership integrating computers in the instructional program?

2. Are there significant differences in the perceptions of leadership practices among the three role groups: principals, computer laboratory teachers, and classroom teachers?

3. What pattern of specific concerns will principals express about the role of change facilitator?

4. What pattern of specific concerns will classroom
teachers and computer laboratory teachers express about using computers in the instruction program?

5. Are there significant differences in the Stages of Concern among the three subgroups?

6. What is the relationship between principal leadership practices and the teacher involvement dimension - Stages of Concern?

This chapter presents the data analysis and results in four sections: demographics and contextual data, leadership data, concerns data, and leadership/concerns interaction data.

Table 1 shows Multivariate Analysis (MANOVA) design for analyzing the interaction and main effects of the relationship between each of the five variables of leadership and the seven variables of concerns for principals (P), computer laboratory teachers (LT), and classroom teachers (CT).

Table 1

Model of MANOVA Design

<table>
<thead>
<tr>
<th>Dependent Variables (5)</th>
<th>Leadership Scores</th>
<th>Groups: 3 P/LT/CT</th>
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<tr>
<td>Dependent Variables (7)</td>
<td>Concerns Scores</td>
<td>Groups: 3 P/LT/CT</td>
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<table>
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<tr>
<th>Leadership Variable</th>
<th>Stage Variable</th>
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</thead>
<tbody>
<tr>
<td>Principal (P)</td>
<td>P M M CT</td>
</tr>
<tr>
<td>Laboratory Teacher (LT)</td>
<td>M M M</td>
</tr>
<tr>
<td>Classroom Teacher (CT)</td>
<td>M M M</td>
</tr>
</tbody>
</table>
The five dimensions of leadership examined in the MANOVA model were behaviors of 1) Challenging, 2) Inspiring, 3) Enabling, 4) Modeling, and 5) Encouraging. The dependent variables were the seven different Stages of Concern, Awareness (Stage 0), Informational (Stage 1), Personal (Stage 2), Management (Stage 3), Consequence (Stage 4), Collaboration (Stage 5), and Refocusing (Stage 6). Each leadership dimension was measured with the Leadership Practices Inventory (LPI-Self/Others) and each Stage of Concern was measured with the Stages of Concern Inventory (CFSoCQ/SoCQ). Mean sum scores were the unit of analysis in the MANOVA design.

Demographics and Contextual Data of Study Population

Percent of Role Experience

Figures 4, 5, 6, and 7 present the data reflecting the years of experience of the study of subjects in their respective roles of principal, classroom teacher or computer laboratory teacher.
Role Group Experience
Principals (n=22)

In general, a larger percentage of principals in this study had been in their respective roles more than ten years.

Role Group Experience
Lab Teacher (n=22)
In general, a larger percentage of computer laboratory teachers in this study had three to five years of experience as computer laboratory teachers.

Role Group Experience
Classroom Teachers (n=90)

Figure 6 Total years of experience in role of classroom teacher (n=90)

In general, the largest percentage of classroom teachers in this study had more than ten years of traditional classroom teaching experience.
A comparison figure of years of role experience show that the majority of the principals and classroom teachers in this study were experienced in their traditional roles for six or more years and the majority of the computer laboratory teachers were experienced in their respective role for less than six years.

Percent of Role Group Computer Implementation Experience

Figures 8 through 11 present data reflecting the years of experience of the study subjects with implementing computer use in the instructional program.
In general, more than half of the principals had one to five years of experience implementing computer use in the instructional program and slightly less than half had six or more years of experience.

Role Group Computer Implementation
Computer Laboratory Teachers (n=22)
In general, one half of the computer laboratory teachers had one to five years of experience implementing computer use in the instructional program and one half had experience of six or more years.

Role Group Computer Implementation
Classroom Teachers (n=90)

In general, more than half of the classroom teachers indicated they had been working with the staff in implementing computers in the instructional program for one to five years.
In summary, a comparison figure shows approximately half of all principals, computer laboratory teachers and classroom teachers in this study had been working with implementing computers in the instructional program for one to five years and slightly half of the respective groups had been working with implementing computers for six or more years.

**Self-Perception of Computer Use**

Figures 12 through 15 present data reflecting the self perception of computer expertise of the subjects in this study.
In general, more than one half of the principals in this study consider themselves nonusers to beginning users of computers and approximately 40 percent consider themselves intermediate and very experienced users.
In general, more than three-fourths of the computer laboratory teachers considered themselves intermediate and very experienced users of computers while one further considered themselves beginners.

Role Group Self Perception of Level of Computer Experience
Classroom Teachers (n=90)

In general, classroom teachers viewed their computer experience similarly as principal. More than one half considered themselves nonusers and beginning users of computers.
In summary, more than one half of the principals and classroom teachers in this study considered themselves nonusers to beginning users of computers and more than three-fourths of the computer laboratory teachers considered themselves intermediate level or better users of computers.

Formal Training Experience

Figures 16 through 19 present data reflecting formal training in the use of computers in the instructional program of the subjects in this study.
In general, less than one half of the principals received formal training in using computers in the instructional program.
In general, less than one half of the computer laboratory teachers received training in using computers in the instructional program.

Formal Training in Instructional Computing
Classroom Teachers (n=90)

In general, fewer than one-fourth of the classroom teachers received training in using computers in the instructional program.
In summary, half or more of each role group did not have any formal training experience in using computers in instruction. It can be concluded that more than half of all study subjects are self-taught in using computers in the instructional program with students.

Summary

The principals and classroom teachers in this study are, on the average, a mature and experienced group in their traditional roles with zero to little experience with computers while the computer laboratory teachers are more experienced in a non-traditional role of using technology in instruction and consider themselves fairly skilled in using computers. The computer laboratory teachers, generally are the more technology oriented persons of the subjects in this
this study in the elementary school buildings.

Leadership Data and Analysis

Leadership Practices

Research Question 1. What pattern of leadership practices will teachers and principals express about the leadership of the principals engaged in the integration of computers in the instructional program?

The group mean score and standard deviation for each practice of leadership measured by the Leadership Practices Inventory are presented in Table 2.

Table 2

Mean Score and Standard Deviation by Group (P+LT+CT) on the Leadership Practices Inventory (LPI) (n=133)

<table>
<thead>
<tr>
<th>Leadership Practice</th>
<th>Mean</th>
<th>S.D.</th>
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<tbody>
<tr>
<td>Challenging the Process</td>
<td>3.81</td>
<td>.94</td>
</tr>
<tr>
<td>Inspiring a Shared Vision</td>
<td>3.91</td>
<td>.99</td>
</tr>
<tr>
<td>Enabling Others to Act</td>
<td>4.09</td>
<td>.89</td>
</tr>
<tr>
<td>Modeling the Way</td>
<td>3.88</td>
<td>.89</td>
</tr>
<tr>
<td>Encouraging the Heart</td>
<td>3.94</td>
<td>1.03</td>
</tr>
<tr>
<td>All Practices</td>
<td>3.94</td>
<td>.89</td>
</tr>
</tbody>
</table>

The group mean scores of the respondents on the Leadership Practices Inventory ranged from 3.81 for Challenging the Process to 4.09 for Enabling Others to Act. Practices of Modeling the Way, Inspiring a Shared Vision, and Encouraging the Heart fell between this range of mean scores with very small variances between them. Enabling
Others to Act had the highest mean score. This was followed by Encouraging the Heart and Inspiring a Shared Vision. Challenging the Process was scored the lowest.

Table 3 presents the mean and standard deviation for each of the five leadership practices by role group of principal, computer laboratory teacher, and classroom teacher on the LPI-Self and LPI-Other respectively.

Table 3
Mean and Standard Deviation on the LPI by Role Group: (P, LT, CT)

<table>
<thead>
<tr>
<th>Practice</th>
<th>Mean P (n=22)</th>
<th>SD</th>
<th>Mean LT (n=22)</th>
<th>SD</th>
<th>Mean CT (n=89)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenging</td>
<td>3.84 .70</td>
<td></td>
<td>4.14 .96</td>
<td></td>
<td>3.72 1.00</td>
<td></td>
</tr>
<tr>
<td>Inspiring</td>
<td>3.98 .70</td>
<td></td>
<td>4.14 1.06</td>
<td></td>
<td>3.84 1.03</td>
<td></td>
</tr>
<tr>
<td>Enabling</td>
<td>4.33 .42</td>
<td></td>
<td>4.23 .97</td>
<td></td>
<td>3.99 .94</td>
<td></td>
</tr>
<tr>
<td>Modeling</td>
<td>3.94 .58</td>
<td></td>
<td>4.01 1.00</td>
<td></td>
<td>3.81 .93</td>
<td></td>
</tr>
<tr>
<td>Encouraging</td>
<td>3.93 .76</td>
<td></td>
<td>4.22 1.23</td>
<td></td>
<td>3.88 1.04</td>
<td></td>
</tr>
</tbody>
</table>

Overall, the mean score for each leadership practice for computer laboratory teachers was somewhat higher than classroom teacher and principal self scores. Classroom teacher mean score for each of the leadership practices was lower than principal mean self scores and computer laboratory teacher mean scores. The variances among mean scores for each of the leadership practices were low to modest.
Profiles of the Leadership Practices

In order to further explore the leadership variable, the mean of the sum scores (see Table 4) for the total group and for each role group were mapped on a standardized percentile graph presented by Kouzes and Posner (1988).

Table 4
Mean of the Sum Score by Leadership Practice and Role Group

<table>
<thead>
<tr>
<th>Practice</th>
<th>P (n=22)</th>
<th>LT (n=22)</th>
<th>CT (n=89)</th>
<th>All (n=133)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenging</td>
<td>23</td>
<td>25</td>
<td>22</td>
<td>23</td>
</tr>
<tr>
<td>Inspiring</td>
<td>24</td>
<td>25</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>Enabling</td>
<td>26</td>
<td>25</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>Modeling</td>
<td>24</td>
<td>25</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>Encouraging</td>
<td>24</td>
<td>25</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>All Practices</td>
<td>24</td>
<td>25</td>
<td>23</td>
<td>24</td>
</tr>
</tbody>
</table>

The profiles of the three role groups are shown in Figures 20 and 21 respectively.

The profile graph in Figures 20 and 21 represent the percentile rankings determined by studies of Kouzes and Posner (1988). A "high" score is one that is at the 70th percentile or above. A "low" score is one at the 30th percentile or below. A score that falls between the 30th and 70th percentile is considered a moderate score. Using the percentile criteria with a ranking of "high, moderate, and low", the group as a whole fell into the high category (above the 70th percentile) of Inspiring a Shared Vision with the remaining four practices falling into a moderate
Figure 20 Profile of Group Perceptions of Leadership Practices. Percentile Mean Sum Scores as Measured on the LPI (n=133)

<table>
<thead>
<tr>
<th>PERCENTILE</th>
<th>CHALLENGING</th>
<th>INSPIRING</th>
<th>ENABLING</th>
<th>MODELING</th>
<th>ENCOURAGING</th>
</tr>
</thead>
<tbody>
<tr>
<td>99%</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>90%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>80%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>70%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>60%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>40%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>30%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

Note. Chart for graphing scores is from the Leadership Practices Inventory (LPI) (Figure 1, p. 15), by J.M. Kouzes and B.Z. Posner, 1988, San Diego, CA, Copyright 1990, 1995, Kouzes Posner International, Inc. Reprinted with permission.
Figure 21 Profile of Sub-Group Perceptions of Leadership Practices. Percentile Mean Sum Scores by Role: Principals (n=22), Computer Lab Teachers (n=22), and Classroom Teachers (n=89) on Leadership Practices as Measured on the LPI.

Note. Chart for graphing scores is from the Leadership Practices Inventory (LPI) (Figure 1, p. 15), by J.M. Kouzes and B.Z. Posner, 1988, San Diego, CA, Copyright 1990, 1995, Kouzes Posner International, Inc. Reprinted with permission.
category (between the 50th and 70th percentile).

The pattern of graphed scores show an upward slope for inspiring and modeling behaviors and a downward slope for challenging, enabling, and encouraging practices.

A close analysis of the profiles of each role group revealed some differences in perception by each role group (see Figure 21).

Principal scores fell into a moderate category of practice for behaviors of challenging, enabling, modeling, and encouraging. On the measure of inspiring behaviors, the scores fell into a high category of practice.

Classroom teacher scores fell into a moderate category of practice on all behaviors.

Computer laboratory teacher scores fell into a high category for challenging, inspiring, modeling, and encouraging behaviors. On the measure of enabling behaviors, computer laboratory teacher scores fell into the moderate category.

The patterns of the graphed scores reveal a common high upward slope for inspiring behaviors for each subgroup. Classroom teachers and laboratory teachers have a definitive downward slope for enabling behaviors compared with principals and a much lower slope for modeling behaviors than both laboratory teachers and principals.

Leadership Perceptions

Research Question 2. Are the perceptions of leadership
practices significantly different among the three role groups?

The Analysis of Variance procedure was used to determine the main effect of role group on the LPI scores. Tables 5 to 9 present the one-way ANOVA of the main effects of role group for each dimension of the leadership variable. The ANOVA results indicate there was no significant difference in scores between role groups on the LPI for each practice of leadership.

Table 5
ANOVA of Leadership Scores - Challenging The Process Practices (LPI) by Group

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>3.120</td>
<td>1.560</td>
<td>.17</td>
<td>NS</td>
</tr>
<tr>
<td>Within Groups</td>
<td>130</td>
<td>112.993</td>
<td>.869</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>116.113</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N     Mean    SD
Principals 22 3.84  .699
Laboratory Teachers 22 4.14  .860
Classroom Teachers 89 3.72  .996
Total      133 3.81  .938

NS: p > 0.05
Table 6

**ANOVA of Leadership Scores - Inspiring a Shared Vision Practices (LPI) by Group**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>Prob</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>1.700</td>
<td>.850</td>
<td>.421</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>130</td>
<td>126.939</td>
<td>.977</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>128.640</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principals</td>
<td>22</td>
<td>3.98</td>
<td>.708</td>
</tr>
<tr>
<td>Laboratory Teachers</td>
<td>22</td>
<td>4.14</td>
<td>1.065</td>
</tr>
<tr>
<td>Classroom Teachers</td>
<td>89</td>
<td>3.84</td>
<td>1.026</td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>3.91</td>
<td>.987</td>
</tr>
</tbody>
</table>

NS: p > 0.05
Table 7
ANOVA of Leadership Scores - Enabling Others Practices (LPI) by Group

Dependent Variable: Enabling Practices

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>Prob</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>2.531</td>
<td>1.265</td>
<td>.20</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>130</td>
<td>101.278</td>
<td>.779</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>103.808</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N  Mean  SD

Principals  22  4.33  .421
Laboratory Teachers  22  4.23  .966
Classroom Teachers  89  3.99  .941
Total  133  4.09  .887

NS: p > 0.05
Table 8

ANOVA of Leadership Scores - Modeling The Way Practices (LPI) by Group

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>1.623</td>
<td>.812</td>
<td>.36</td>
<td>NS</td>
</tr>
<tr>
<td>Within Groups</td>
<td>130</td>
<td>103.469</td>
<td>.796</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>105.0919</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N Mean SD

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Principals</td>
<td>22</td>
<td>3.94</td>
<td>.576</td>
</tr>
<tr>
<td>Laboratory Teachers</td>
<td>22</td>
<td>4.10</td>
<td>1.000</td>
</tr>
<tr>
<td>Classroom Teachers</td>
<td>89</td>
<td>3.81</td>
<td>.927</td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>3.88</td>
<td>.892</td>
</tr>
</tbody>
</table>

NS: p > 0.05
Table 9

ANOVA of Leadership Scores - Encouraging the Heart Practices (LPI) by Group

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
<th>Prob</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>2.060</td>
<td>1.03</td>
<td>.38</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>130</td>
<td>138.378</td>
<td>1.06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>140.438</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N Mean SD

Principals 22 3.93 .760
Laboratory Teachers 22 4.22 1.230
Classroom Teachers 89 3.88 1.037
Total 133 3.94 1.032

NS: p > 0.05

Tukey's post hoc pairwise mean comparisons was used to further explore the possibility of significance of variance between role groups. Statistical inferences were made at the .05 level of significance. No two groups were significantly different.

Summary of Leadership Data Analysis

The scores on the Leadership Practices Inventory of principals, computer laboratory teachers and classroom teachers were relatively similar, with no statistical
differences found on any of the five leadership practices. An overall grand mean score of 4.00 and grand mean sum score for the group indicates the principals in this study were perceived as fairly often engaging in actions and behaviors identified with leadership practices. Using standardized sum scores and percentiles for graphing the scores, laboratory teacher perceptions were shown to be higher than classroom teachers except on the practice of enabling behaviors which was the only behavior falling into a moderate category for computer laboratory teachers. Classroom teacher perceptions were the lowest of the three groups.

The overall leadership pattern for the principals in this study as perceived by self and both groups of teachers fell into the moderate category of leadership with the exception of one high category practice, Inspiring a Shared Vision.

**Concerns Data and Analysis**

**Pattern of Concerns Data**

*Research Questions 3 and 4.* What pattern of specific concerns will principals express about the role of change facilitator and what pattern of specific concerns will computer laboratory teachers and classroom teachers express about using computers in the instructional program?

The mean scores and standard deviations for the principal group response by concerns stage are presented in
Table 10.

Table 10

Mean Stage Score and Standard Deviation for Principal Subgroup on CFSoC (n=22)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness (0)</td>
<td>3.01</td>
<td>1.51</td>
</tr>
<tr>
<td>Informational (1)</td>
<td>3.60</td>
<td>2.24</td>
</tr>
<tr>
<td>Personal (2)</td>
<td>1.45</td>
<td>1.03</td>
</tr>
<tr>
<td>Management (3)</td>
<td>3.10</td>
<td>1.19</td>
</tr>
<tr>
<td>Consequence (4)</td>
<td>4.46</td>
<td>1.44</td>
</tr>
<tr>
<td>Collaboration (5)</td>
<td>3.96</td>
<td>1.77</td>
</tr>
<tr>
<td>Refocusing (6)</td>
<td>2.29</td>
<td>1.21</td>
</tr>
<tr>
<td>All</td>
<td>3.13</td>
<td>1.05</td>
</tr>
</tbody>
</table>

Stage 4, concern for increasing the effectiveness of technology for both teachers and students reflect the highest mean score of 4.46. Stage 5, concern for collaboration with others about computers in instruction with a mean score of 3.96 was the second highest concern and Stage 1, concern for more information was the third highest mean score respectively.

Table 11 presents the mean stage scores and standard deviations for computer laboratory teachers and classroom teachers on the Stages of Concerns questionnaire. The mean stage scores for computer laboratory teachers and classroom teachers range from 1.35 to 5.74. Concerns of consequence (stage 4), collaboration (stage 5), and personal (stage 2) concerns were the highest mean score stages for computer lab
Table 11
Mean Scale Score and Standard Deviation for Each Role Group on the Concerns Questionnaires (n=133)

<table>
<thead>
<tr>
<th>Concern Stage</th>
<th>LT (n=22)</th>
<th>CT (n=89)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>0) Awareness</td>
<td>1.35</td>
<td>1.19</td>
</tr>
<tr>
<td>1) Informational</td>
<td>3.30</td>
<td>1.48</td>
</tr>
<tr>
<td>2) Personal</td>
<td>3.89</td>
<td>1.77</td>
</tr>
<tr>
<td>3) Management</td>
<td>2.31</td>
<td>1.16</td>
</tr>
<tr>
<td>4) Consequence</td>
<td>5.74</td>
<td>.97</td>
</tr>
<tr>
<td>5) Collaboration</td>
<td>4.95</td>
<td>1.45</td>
</tr>
<tr>
<td>6) Refocusing</td>
<td>3.43</td>
<td>1.40</td>
</tr>
<tr>
<td>All</td>
<td>3.59</td>
<td>1.00</td>
</tr>
</tbody>
</table>

teachers. Consequence concerns (stage 4), personal concerns (stage 2), and informational concerns (stage 1) were the highest scored stages for classroom teachers.

Concerns Profile

In order to further explore the concerns variable, the sum score mean for each stage of concern for each subgroup was converted to corresponding percentile values for interpretation by peak score concerns based on studies presented by Hall, et al. (1979, 1991). Examining the high stage score (peak stage score interpretation) is the simplest form of interpretation. Differences of ten (10) or more percentile points is a suggested ground rule for interpreting difference according to Hall et al. (1991).

Results for the subgroup percentiles in this study are
presented in graphic profiles in Figures 22 through 24 to easily discern peak stages of concern.

In general, the total group profiles correspond with the typical "non-user" profile found in the work of Hall, et al. (1979, 1991). The non-user profile indicates the concerns with Awareness (Stage 0), Informational (Stage 1) and Personal (Stage 2) are the highest stages of concern in intensity (see Figure 22). These stages reflect self concerns in relationship to using computers in the instructional program which developmentally reflect the lowest or beginning level of using an innovation.

Developmentally, task and impact concerns develop as self concerns are attended to and resolved.

Principal Profile

Figure 22 presents the concerns profile of the principal as a change facilitator for computers in instruction. The principal profile reflect peak intense concerns at Stage (0) Awareness and Stage (1) Informational. A second peak concern is at Stage (3) Management, and Stage (6) Refocusing.

Using Hall's definitions (1991, pp. 34-42), the high Stage 0 - 87th percentile - for change facilitators is an indicator that the principals, as a group, had a lot of other things on their minds besides the instructional use of computers and little thought or concern was focused on the technology or facilitating its use at the time of the
Figure 22  Profile of Peak Change Facilitator Concerns by Stage Percentiles (Principal n=22)

Figure 23  Profile of Peak Concerns of Computer Laboratory Teachers by Stage Percentile (n=22)

Stage Mean Sum Score
7  17  20  12  29  25  17

Percentile Score
66  63  72  43  71  68  52

Percentile Total = 71%

Figure 24  Profile of Peak Concerns of Classroom Teachers by Stage Percentile (n=89)

survey. The second peak concern at Stage (1) and Stage (6) reflect concern with a need and desire to know more about the instructional use of computers, its characteristics, and its effects. The tailing up at Stage six reflect principal concern about the effectiveness of the technology thrust, but not necessarily focused on facilitating that thrust. Management (Stage 3) concerns are also a peak concern, but moderate in intensity, with low intensity Stage 2, 4, and 5, all reflecting little attention to the change facilitation role for technology.

**Computer Laboratory Teacher Profile**

Figure 23 presents the profile for the Computer Laboratory Teachers. The profile of computer laboratory teachers reflect peak concerns at Stage 4, 2 and 5 (Consequence, Personal and Collaboration concerns). The dip at Stage 3 reflect little concern about logistics, time, and management. Stage 4 and 5 developmentally are at the highest lest and reflect impact concerns, concerns about the consequences of use for students and a desire to work with other teachers to maximize the effectiveness of computers in instruction.

**Profile of Classroom Teachers**

Figure 24 presents the profile data for the classroom teachers, those who send students to the computer lab for instruction. The profile of classroom teachers corresponds with the typical "non-user" profile. Stage 0, Awareness;
Stage 1, Informational; and Stage 2, Personal are the peak stages of concern in intensity, reflecting teachers interested in learning more from a positive proactive perspective, but reflect concerns at the developmentally beginning level of interest in an innovation.

Summary Analysis of Concerns Patterns

The overall mean score analysis indicate stage 4, consequences of the impact of an innovation for clients, teachers and students respectively, followed by collaboration (stage 5), concern for coordinating with others and stage 2, informational concerns, an interest in learning more about computer use in the instructional program had the highest mean score of the stages.

Principal highest mean scores reflect a rank order of consequence (stage 4), collaboration (stage 5) and informational (stage 1). Computer laboratory teachers and classroom teacher reflect an order of consequence, collaboration and personal stages.

Converting scores to percentiles to reflect peak score concerns developmentally, the group as a whole fell into the self or beginning stages of using an innovation. The peak concerns of principals as change facilitators were at the awareness, informational and management level of concerns. Classroom teacher peak concerns were at the awareness, informational and personal stages while the computer laboratory teacher peak concerns were at the
consequence, collaboration, and personal stages of concern. Developmentally, classroom teachers and principals were at the self stage and computer laboratory teachers were at the impact stage.

Concern Differences

Research Question 5. Are there significant differences in Stages of Concern among the three role groups?

The Analysis of Variance procedure was used to determine role group differences on the concerns questionnaires. Results are presented in Tables 12 to 18.

The F values associated with group differences on each stage of concern show that significant differences were found between the groups on six of seven stages (Stage 0, 1, 2, 3, 4, and 6 at the .05 level of significance).
Table 12

ANOVA for Stage of Awareness Concerns by Group

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>Prob</th>
<th>F Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>32.336</td>
<td>16.168</td>
<td>.0001</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>130</td>
<td>213.093</td>
<td>1.639</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>245.429</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N | Mean | SD
---|------|------
Principals | 22 | 3.00 | 1.51
Laboratory Teachers | 22 | 1.35 | 1.20
Classroom Teachers | 89 | 2.43 | 1.24
Total | 133 | 2.35 | 1.36

*p < .05
Table 13

ANOVA for Stage of Information Concerns by Group

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F Prob</th>
<th>F Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>21.871</td>
<td>10.936</td>
<td>.0150</td>
<td>*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>130</td>
<td>327.505</td>
<td>2.519</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>349.376</td>
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<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principals</td>
<td>22</td>
<td>3.60</td>
<td>2.24</td>
</tr>
<tr>
<td>Laboratory Teachers</td>
<td>22</td>
<td>3.30</td>
<td>1.48</td>
</tr>
<tr>
<td>Classroom Teachers</td>
<td>89</td>
<td>4.29</td>
<td>1.45</td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>4.01</td>
<td>1.63</td>
</tr>
</tbody>
</table>

*p < .05
Table 14

ANOVA for Stage of Personal Concerns by Group

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Squares</th>
<th>F Prob</th>
<th>F Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>176.946</td>
<td>88.473</td>
<td>.0000</td>
<td>*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>130</td>
<td>341.122</td>
<td>2.624</td>
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<tr>
<td>Total</td>
<td>132</td>
<td>518.067</td>
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<table>
<thead>
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<th></th>
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<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principals</td>
<td>22</td>
<td>1.45</td>
<td>1.03</td>
</tr>
<tr>
<td>Laboratory Teachers</td>
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<td>3.89</td>
<td>1.77</td>
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<tr>
<td>Classroom Teachers</td>
<td>89</td>
<td>4.61</td>
<td>1.70</td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>3.97</td>
<td>1.98</td>
</tr>
</tbody>
</table>

*p < .05
## Table 15

ANOVA on Stage of Management Concern by Group

### Dependent Variable: Stage 3 - Management

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>Prob</th>
<th>F Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>12.361</td>
<td>6.18</td>
<td>.0303</td>
<td></td>
<td>*</td>
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<tr>
<td>Within Groups</td>
<td>130</td>
<td>223.603</td>
<td>1.72</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>235.964</td>
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<table>
<thead>
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<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principals</td>
<td>22</td>
<td>3.10</td>
<td>1.20</td>
</tr>
<tr>
<td>Laboratory Teachers</td>
<td>22</td>
<td>2.31</td>
<td>1.16</td>
</tr>
<tr>
<td>Classroom Teachers</td>
<td>89</td>
<td>3.14</td>
<td>1.37</td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>2.99</td>
<td>1.34</td>
</tr>
</tbody>
</table>

*p < .05
Table 16
ANOVA on Stage of Consequences Concerns by Group

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>Prob</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>17.887</td>
<td>8.943</td>
<td>0.051*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>130</td>
<td>211.304</td>
<td>1.63</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>229.191</td>
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<table>
<thead>
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<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principals</td>
<td>22</td>
<td>4.46</td>
<td>1.44</td>
</tr>
<tr>
<td>Laboratory Teachers</td>
<td>22</td>
<td>5.74</td>
<td>.97</td>
</tr>
<tr>
<td>Classroom Teachers</td>
<td>89</td>
<td>5.14</td>
<td>1.30</td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>5.13</td>
<td>1.32</td>
</tr>
</tbody>
</table>

*p < .05
Table 17

ANOVA on Stage of Collaboration Concerns by Group

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>Prob</th>
<th>F Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>12.710</td>
<td>6.36</td>
<td>.0701</td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td>Within Groups</td>
<td>130</td>
<td>304.444</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Total</td>
<td>132</td>
<td>317.153</td>
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<table>
<thead>
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<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principals</td>
<td>22</td>
<td>3.96</td>
<td>1.77</td>
</tr>
<tr>
<td>Laboratory Teachers</td>
<td>22</td>
<td>4.95</td>
<td>1.45</td>
</tr>
<tr>
<td>Classroom Teachers</td>
<td>89</td>
<td>4.20</td>
<td>1.49</td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>4.28</td>
<td>1.55</td>
</tr>
</tbody>
</table>

NS p > .05
Table 18

ANOVA on Stage of Refocusing Concerns by Group

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>Prob</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>20.870</td>
<td>10.434</td>
<td>0.024</td>
<td></td>
<td>*</td>
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<td>Within Groups</td>
<td>130</td>
<td>214.224</td>
<td>1.65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>235.092</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principals 22</td>
<td>2.29</td>
<td>1.21</td>
</tr>
<tr>
<td>Laboratory Teachers 22</td>
<td>3.43</td>
<td>1.40</td>
</tr>
<tr>
<td>Classroom Teachers 89</td>
<td>3.33</td>
<td>1.27</td>
</tr>
<tr>
<td>Total 133</td>
<td>3.18</td>
<td>1.33</td>
</tr>
</tbody>
</table>

*p < .05

Tukey's post hoc pairwise mean comparisons was used to further explore the variance between the mean score differences at each Stage of Concern. Statistical inferences were made at the .05 level of significance. Results are shown in Table 19.
Table 19
Tukey’s Post Hoc Pairwise Comparison of the Mean of Each Role Group on Stages of Concern (n=133)

<table>
<thead>
<tr>
<th>Variable Stage</th>
<th>Principal (n=22) Mean</th>
<th>Lab T. (n=22) Mean</th>
<th>Classroom T. (n=89) Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0) Awareness</td>
<td>3.00*LT</td>
<td>1.35</td>
<td>2.43*LT</td>
</tr>
<tr>
<td>(1) Informational</td>
<td>3.60</td>
<td>3.30</td>
<td>4.29*LT</td>
</tr>
<tr>
<td>(2) Personal</td>
<td>1.45</td>
<td>3.89*P</td>
<td>4.61*P</td>
</tr>
<tr>
<td>(3) Management</td>
<td>3.10</td>
<td>2.31</td>
<td>3.14*LT</td>
</tr>
<tr>
<td>(4) Consequence</td>
<td>4.46</td>
<td>5.74*P</td>
<td>5.15</td>
</tr>
<tr>
<td>(5) Collaboration</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>(6) Refocusing</td>
<td>2.29</td>
<td>3.43*P</td>
<td>3.33*P</td>
</tr>
</tbody>
</table>

* Denotes pairs of groups significantly different at the 0.05 level.

Results of Tukey’s pairwise comparison of mean scores by role group and concerns stage indicate that principal and classroom teacher scores differences from lab teachers were contributing to the significant F value for the Awareness Stage (0); classroom teacher score differences from principal and lab teachers were contributing to the
significant F value for the informational Stage (1); classroom teacher and lab teacher score differences from principal scores were contributing to the significant F value at the Personal Stage (2); lab teacher score differences from classroom teachers and principals were contributing to the significant F value at the management stage; significantly different from lab teacher scores at the Management Stage (3); lab teacher score difference from principals and classroom teachers were contributing to the significant F value at the Consequence Stage (4); and lab teacher and classroom teacher score differences from principals were contributing to a significant F value on at the Refocusing Stage (6).

Correlations

Using the scores of each practice of leadership and each Stage of Concern, a simple correlation coefficient was computed. A significant correlation, though negligible, was found between the leadership practice of Inspiring a Shared Vision, the principal’s skill and behavior directed towards a positive, hopeful future and practice of enlisting the support of others to a common purpose was significantly correlated to the Impact Stages of Concern (stages 4, 5, 6) at .19, .18 and .26 respectively for the combined group and .25, .22, and .33 for classroom teachers, Tables 20 and 21.
Table 20

**Pearson’s Significant Correlation Matrix for Leadership and Stages of Concern for Combined Role Group (n=133)**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Inspire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness (0)</td>
<td></td>
</tr>
<tr>
<td>Informational (1)</td>
<td></td>
</tr>
<tr>
<td>Personal (2)</td>
<td></td>
</tr>
<tr>
<td>Management (3)</td>
<td></td>
</tr>
<tr>
<td>Consequence (4)</td>
<td>.19*</td>
</tr>
<tr>
<td>Collaboration (5)</td>
<td>.18*</td>
</tr>
<tr>
<td>Refocusing (6)</td>
<td>.26**</td>
</tr>
</tbody>
</table>

*p < .05
**p < .01

Table 21

**Pearson’s Correlation Matrix for Leadership and Stage Concerns for Classroom Teachers (n=89)**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Inspire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness (0)</td>
<td></td>
</tr>
<tr>
<td>Informational (1)</td>
<td></td>
</tr>
<tr>
<td>Personal (2)</td>
<td></td>
</tr>
<tr>
<td>Management (3)</td>
<td></td>
</tr>
<tr>
<td>Consequence (4)</td>
<td>.25*</td>
</tr>
<tr>
<td>Collaboration (5)</td>
<td>.22*</td>
</tr>
<tr>
<td>Refocusing (6)</td>
<td>.33**</td>
</tr>
</tbody>
</table>

*p < .05
**p < .01
Although negligible, more negative correlations between leadership practices and concerns were associated with self (stages 0, 1, 2) and task (stage 3) and more positive correlations were associated with impact concerns (stages 4, 5, 6).

Leadership and Concerns Data and Analysis

Multivariate analysis of variance was used to analyze the leadership and concerns variables simultaneously, taking into account the differences on all variables jointly and the correlations among the variables. Mean sum scores and grand mean scores were used in the analysis. The results are shown in Table 22.

Table 22

MANOVA Test of Significance for Leadership and Concerns

<table>
<thead>
<tr>
<th></th>
<th>LP</th>
<th>Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DF = 130</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LP</td>
<td>3972.867</td>
<td>204.399</td>
</tr>
<tr>
<td>204.452</td>
<td>5996.691</td>
<td></td>
</tr>
<tr>
<td>Between</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DF = 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LP</td>
<td>84.509</td>
<td>-146.399</td>
</tr>
<tr>
<td>Stage</td>
<td>-146.399</td>
<td>509.349</td>
</tr>
</tbody>
</table>

Wilks' Criterion Test

<table>
<thead>
<tr>
<th>Effect</th>
<th>Variable</th>
<th>F</th>
<th>DF</th>
<th>Prob Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>LP/Concerns</td>
<td>3.45</td>
<td>4,258</td>
<td>.009*</td>
</tr>
<tr>
<td>ANOVA</td>
<td>LP</td>
<td>1.38</td>
<td>2,130</td>
<td>.255</td>
</tr>
<tr>
<td></td>
<td>Stage</td>
<td>5.52</td>
<td>2,130</td>
<td>.005*</td>
</tr>
</tbody>
</table>

*p < 0.05
The results show that the variables of leadership and concerns interact significantly for the subjects in this study \( F(4,258) = 3.45, p < .05 \). Analyzed separately, the F value for leadership was not significant for the subjects in the study while the F value for concerns was significant.

The multivariate correlation partial \( r \) analysis was used to estimate the relationship of leadership and concerns variables with the effects of role group statistically removed. The results are shown in Table 23.

**Table 23**

<table>
<thead>
<tr>
<th></th>
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<th>Stages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership Practices</td>
<td>1.00</td>
<td>0.041</td>
</tr>
<tr>
<td></td>
<td>0.00</td>
<td>0.634</td>
</tr>
<tr>
<td>Stages of Concern</td>
<td>0.041</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>0.634</td>
<td>0.00</td>
</tr>
</tbody>
</table>

The partial correlation coefficient between the leadership and concerns variables, controlling for the effects of role group was \( r = .63 \), significant at the 0.05 level. The relationship between leadership practices and stages of concern for the participants in this study indicate the presence of a statistically significant, positive strong correlation between the scores on leadership practices and the scores on the stages of concern.
CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter presents a summary of the relationship of the leadership role of the principal and the personal dimensions of change for administrators and teachers in the implementation of computers in the instructional program in the elementary school. The most important findings will be summarized, followed with conclusions, implications drawn from this study, and recommendations for action and further study.

Summary

This study examined two constructs in the implementation of technology in the elementary school: the leadership practices and concerns of principals and teachers as a measure of effective implementation. The study was designed to explore the relationship between the leadership practices of principals and the technology implementation process. Five dimensions of leadership practices and seven stages of concern were measured with two survey instruments administered to principals, computer laboratory teachers, and classroom teachers in selected schools engaged in using computers in the instructional program to improve student

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academic achievement. An analysis of the survey was used to determine (1) the pattern of principal use of selected leadership practices, (2) the extent of differences in perceptions of the leadership practices by role group, (3) the developmental stage of principal change facilitator concerns and teacher concerns at the time of the study, (4) the extent of differences in each stage of concern by role group, and (5) the relationship between leadership and stages of concerns.

Most Important Findings from this Study

The following statements are presented as the most important findings discovered in this study:

Leadership

1. The overall pattern of principal leadership behavior was at a "moderate or managing" level of practice. Principals were generally perceived to engage in four of the leadership practices fairly often. The principals engaged in an relatively "high" or facilitating level of action and behaviors associated with one leadership dimension: Inspiring a Shared Vision.

2. No significant differences in scores were found between the role group (principals, computer laboratory teachers, and classroom teachers) perceptions of leadership. These findings support the pattern of leadership practices in statements one above.

3. The percentile leadership profiles of the three
role groups were quite different, although the difference was not at a significant level. The percentile scores on leadership perceptions of the computer laboratory teachers were the highest of the three groups. Classroom teacher percentile scores were the lowest.

Concerns

4. Significant differences in scores were found on six of the seven stages of concern for the role groups.

5. Classroom teachers and principals were significantly different from computer lab teachers on the awareness stage. Classroom teachers were significantly different from principals and lab teachers on the informational stage. Principals were significantly different from lab teachers and classroom teachers on the personal stage. Classroom teachers were significantly different from lab teachers on management concerns. Lab teachers were significantly different from principals on consequence concerns and lab teachers and classroom teachers were significantly different than principals on refocusing concerns.

6. The percentile concerns profiles were significantly different for each role group. Principals' most intense concerns were at Stage 0, 1, 3 and 6 (self and task). Computer laboratory teachers' most intense concerns were at Stage 2, 4 and 5 (self and consequence). Classroom teachers' most intense concerns were at Stage 0, 1, and 2 (self).
Leadership and Concerns Interaction

7. Leadership and Stage of Concerns significantly interact for the three role groups (.009).

8. Leadership and Concerns strongly correlate (.63) when role group is controlled.

9. Significant positive correlations were found between the high, facilitating use of Inspiring a shared vision and Impact Stages of Concern (Consequence, Stage 4; Collaboration, Stage 5; and Refocusing, Stage 6).

Conclusions

The above findings reveal that a strong relationship exists between leadership practices and stages of concern. Assessment of both leadership variables and concerns variables can be an invaluable indicator of the progress of the implementation process in schools. The concerns data for the principals in this study support the conclusion that they were positively disposed to using computers in the instructional program, but minimally focused on computer use or facilitating and guiding the staff to collaborate and collectively use computers in the instructional program. Their responses indicate that they had a lot of other things on their minds besides the innovation.

The concerns data for the classroom teachers support the conclusion that the classroom teachers were positively disposed to using computers in the instructional program and were at the self developmental stage of concerns. They were
intensely in need of acquiring more knowledge, personal assurance of adequacy, encouragement, and the setting of reasonable and easy-to-meet expectations. In contrast, the concerns data for the computer laboratory teachers support the conclusion that their concerns were developmentally more advanced with peak concerns targeted toward students impact, but were in need of encouragement, recognition, support, reinforcement and assistance from the principal. Concerns of teachers indicated a need for differentiated attention to resolve group concerns.

The leadership exerted by the principals towards instructional use of computers was basically at a moderate or managerial level. The principal self and others perception of leadership practices data help to clarify some of the distinctions and behaviors that help facilitate innovation implementation and school improvement.

Principals typically wear three hats: leader, manager, and politician. In the leadership role, particularly in the era of school reform for school improvement and site based management, the job of a principal has taken a new role. As a manager, the principal must ensure that the organization runs smoothly and efficiently. Being a politician, the principal must achieve a balance between the interest of everyone involved in the school system and the community. However, as a leader for using the resources of technology, the principal must help the school community focus on
decisions that impact children and effectively facilitate and guide the school community in the direction of the larger vision during the improvement process.

In the context of leadership in general, today the world is changing in the way our institutions function, requiring those in leadership positions to not only lead, but to assess their leadership strengths and understand what qualities they need to guide their institutions effectively while leading. Historically, leaders were controllers who managed staff who followed rules without questioning. Today, leaders are expected to facilitate group decisions and oversee the "big picture". In the context of the instructional use of computers, educators could be in the best positions to lead on leadership.

Implications

The results of this study have implications not only for the principals in this study, but also for principals in the field who find themselves faced with a challenge such as implementing an innovative new product, a new process, a reorganization--a change from the status quo. The finding that there is a strong and complex relationship between the way a leader leads and the focus of concerns of the staff directs attention to a need for continuing professional development for both principals and teachers.

Training or staff development for principals and/or teachers often focuses on consequences or impact for
students. For example, the schools in this study were acquiring computers to improve instructional effectiveness for low achieving students in the basic skills of reading and mathematics. Most often, technology is acquired due to discussion of how effectively technology has been used elsewhere or principals are told what wonderful things they can expect from their teachers and, in turn, for their students, if they just add computers in their instructional program. Simply acquiring the machines and regarding technology as a powerful independent force for organizational improvement is not likely to lead to successful implementation. Rather than viewing technology as the driving agent of change, a view of technology as an enabler and opportunity for change is a more plausible and inclusive viewpoint. To reach such a view, principals require some form of training focused specifically on new skills and a changed role for integrating technology in the curriculum.

A Model for Leadership Development for Integrating Technology

From the findings and conclusions presented in this study, one can sense that the principal's role is crucial to successful implementation of technology and their is a need for professional growth if technology is going to be effectively used in the school environment.

The Concerns-Based Adoption Model (CBAM) offers one
approach towards the implementation process. Two of the CBAM tools used in this research—the principal’s concerns about the role of change facilitator (CfSoC) and the stages of concern about an innovation (SoC) with Kouzes’ Leadership Practices Inventory (LPI) would be useful for a principal leadership development program. Using the instruments in the beginning of training would raise the awareness of diversity in concerns and leadership practices among principal colleagues. At a personal level principals would gain an understanding of self while engaged in the school improvement/implementation process. Training sessions need to recognize, attend to and resolve principal concerns. Principals can be trained to use the instruments as diagnostic tools for making relevant decisions about what actions should be taken to support teachers in their buildings and help them decide what actions are needed for self development and staff support and guidance. A taxonomy of intervention practices can be developed during the program to understand a variety of facilitating and time appropriate actions resulting in more proactive leadership. Below are some suggestions of how-to-issues for training sessions:

1. Administer, score, interpret and use assessment data for effective facilitation of the implementation process.

2. Identify and rank problems and concerns that
incorporating a computer into the curriculum may present. Rather than try to solve all problems and concerns associated with implementation, select one or two of the implementation variables to stress.

3. Make decisions which enable one to solve the selected problems and concerns. Develop interventions for each stage of concern.

4. Recognize and attend to managerial tasks such as scheduling, specific computer training, obtaining helpful resources such as quality software, specific lesson plan samples, expert consultant services, staff to help supervise student use of computers.

5. Create a favorable climate, compatible settings and quiet workplaces with comfortable furniture and an accessible library of technology materials such as professional magazines, books, training videos, training software and enough electrical outlets.

6. Improve the student:computer ratio through grant writing, PTA sponsorship, and state and federal money.

7. Acquire adequate software (helping teachers to decide, asking peers about what works, attending software demonstration workshops, asking students, establishing student preview groups). Look for software that can be used by individuals, small groups, or whole classes at a time. Look for a variety of applications, drill and practice for reinforcing learned skills, tutorials, simulations, word
processing.

8. Develop a positive attitude among staff members through demonstrations that using computers in education is good for students; demonstrate that students appreciate the teachers' efforts in using the resources of technology; create non-fail conditions; give teachers time to learn; provide perks--recognize and reward teachers for implementation efforts.

9. Promote computer implementation efforts by sending written notes, making suggestions, conducting miniworkshops, information conversations, assisting directly in the classroom.

10. Establish clear goals for the staff in simple and understandable language such as all students can use a word processor or graphing tool for survey results, etc.

11. Provide attention and encouragement by providing frequent opportunities to discuss professional matters in the company of administrators, outside experts, and other teachers. Use passing remarks to recognize effort or use sincere inquiry about how efforts are progressing.

12. Learn to become a competent computer user educator and administrator.

Recommendations for Further Study

As a result of the findings and conclusions of this study, the following recommendations are suggested for further research.
Combine a quantitative survey with a qualitative case study using a longitudinal collection of data during a two to three year innovation implementation schedule. Include measures of student outcomes, leadership variables, teacher concerns and leadership training. Such a study would lend strong support to the relationship of leadership training, teacher processing, student outcomes as it relates to effective integration of technology in the school environment.
APPENDIX A

SURVEY INSTRUMENTS
LEADERSHIP AND COMPUTERS INVENTORY

CONCERNS AND PRACTICES

ANN GANIER JACKSON
LEADERSHIP AND COMPUTERS INVENTORY

PART I

LEADERSHIP PRACTICES

The purpose of Part I of this inventory is to identify the extent to which you as a principal engage in certain leadership practices during the process of adopting computer technology to enhance the instructional program in your school. There are no right or wrong answers since adoption of an innovation is influenced by many different variables. There is no one definition of this innovation and leadership practice so please think in terms of your own perception of what it involves. The name Leadership and Computers never appears. However, words such as projects, work, and job, all refer to School Leadership and Computer Technology in the instructional program.

On the next two pages are thirty descriptive statements about various leadership behaviors and activities. Please read each statement carefully, then rate yourself in terms of how frequently you engage in the practice described. Record your responses by drawing a circle around the number that corresponds to the frequency you have selected. You are given five choices:

1. If you RARELY or NEVER do what is described in the statement, circle the number 1.
2. If you do what is described ONCE IN A WHILE, circle the number 2.
3. If you SOMETIMES do what is described, circle the number 3.
4. If you do what is described FAIRLY OFTEN, circle the number 4.
5. If you do what is described VERY FREQUENTLY or ALWAYS, circle the number 5.

In selecting the answer, be realistic about the extent to which you actually engage in each behavior. Do not answer in terms of how you like to see yourself or in terms of what you should be doing. Answer in terms of how you typically behave. For example, the first statement is "I seek out challenging opportunities that test my skills and abilities." If you believe you do this "once in a while," circle the number two. If you believe you seek out challenging opportunities "fairly often," circle the number four.

Reference:
## PART I  Leadership Practices

To what extent do you engage in the following actions and behaviors? Circle the number that applies to each statement.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Rarely</td>
<td>Once in a While</td>
<td>Sometimes</td>
<td>Fairly Often</td>
<td>Very Frequently</td>
<td></td>
</tr>
</tbody>
</table>

1. I seek out challenging opportunities that test my skills and abilities ....... 1 2 3 4 5
2. I describe to others the kind of future I would like for us to create together ............ 1 2 3 4 5
3. I involve others in planning the actions that we will take .................. 1 2 3 4 5
4. I am clear about my own philosophy of leadership 1 2 3 4 5
5. I take the time to celebrate accomplishments when project milestones are reached. ........ 1 2 3 4 5
6. I stay up-to-date on the most recent developments affecting our organization ........ 1 2 3 4 5
7. I appeal to others to share my dream of the future as their own. ................. 1 2 3 4 5
8. I treat others with dignity and respect. ....... 1 2 3 4 5
9. I make certain that innovative projects I manage are broken down into manageable chunks. .. 1 2 3 4 5
10. I make sure that people are recognized for their contributions to the success of our projects ............. 1 2 3 4 5
11. I challenge the way we do things at work ......... 1 2 3 4 5
12. I clearly communicate a positive and hopeful outlook for the future of our organization ... 1 2 3 4 5
13. I give people a lot of discretion to make their own decisions. ............... 1 2 3 4 5
14. I spend time and energy on making certain that people adhere to the values that have been agreed on. .............. 1 2 3 4 5

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15. I praise people for a job well done. ......... 1 2 3 4 5
16. I look for innovative ways we can improve what we do in this organization. ................. 1 2 3 4 5
17. I show others how their long-term future interests can be realized by enlisting in a common vision. ................. 1 2 3 4 5
18. I develop cooperative relationships with the people I work with. .......................... 1 2 3 4 5
19. I let others know my beliefs on how to best run the organization I lead. .................... 1 2 3 4 5
20. I give the members of the team lots of appreciation and support for their contributions 1 2 3 4 5
21. I ask "what can we learn?" when things do not go as expected ................. 1 2 3 4 5
22. I look ahead and forecast what I expect the future to be like. .......................... 1 2 3 4 5
23. I create an atmosphere of mutual trust in the projects I lead. .................... 1 2 3 4 5
24. I am consistent in practicing the values I espouse. .......................... 1 2 3 4 5
25. I find ways to celebrate accomplishments ................. 1 2 3 4 5
26. I experiment and take risks with new approaches to my work even when there is a chance I might fail ................. 1 2 3 4 5
27. I am contagiously excited and enthusiastic about future possibilities ................. 1 2 3 4 5
28. I get others to feel a sense of ownership for the projects they work on. .................... 1 2 3 4 5
29. I make sure we set clear goals, make plans and establish milestones for the projects I lead. .... 1 2 3 4 5
30. I make it a point to tell the rest of the organization about the good work done by my staff 1 2 3 4 5
LEADERSHIP AND COMPUTERS INVENTORY

PART II

LEADERSHIP CONCERNS

The purpose of this questionnaire is to determine what you are thinking about regarding your responsibilities as a leader and manager of change for an innovation. It is not necessarily assumed that you have change facilitator responsibilities. This questionnaire is designed for person who do not serve as change facilitators as well as for those who have major responsibility for facilitating change. The questionnaire attempts to include statements that are appropriate for widely diverse roles. Therefore, there will be items that appear to be of little relevance or irrelevant to you at this time. For the complete irrelevant items, please circle "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale.

For Example:

This statement is very true of me at this time. 0 1 2 3 4 5 6 7
This statement is somewhat true of me now. 0 1 2 3 4 5 6 7
This statement is not at all true of me at this time. 0 1 2 3 4 5 6 7
This statement seems irrelevant to me. 0 1 2 3 4 5 6 7

Please respond to the items in terms of your present concerns, or how you feel about your involvement or potential involvement with Leadership and Computer Technology in the instructional program in your school. We do not hold to any one definition of this innovation, so please think of it in terms of your own perceptions of what it involves. The name Leadership and Computer Technology never appears. However, phrases such as "THIS INNOVATION," "THIS APPROACH," and "THE NEW SYSTEM" all refer to Leadership and Computer Technology. Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with Leadership and Computer Technology in the instructional program of your school.
<table>
<thead>
<tr>
<th></th>
<th>Irrelevant</th>
<th>Not true of me now</th>
<th>Somewhat true of me now</th>
<th>Very true of me now</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I would like more information about the purpose of this innovation.</td>
<td>0 1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>I am more concerned about facilitating use of another innovation.</td>
<td>0 1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>I would like to develop working relationships with other administrators to facilitate the use of this innovation.</td>
<td>0 1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>I am concerned because responding to the demands of staff relative to this innovation takes so much time.</td>
<td>0 1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>I am not concerned about this innovation at this time.</td>
<td>0 1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>I am concerned about how my facilitation affects the attitude of those directly involved in the use of this innovation.</td>
<td>0 1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>I would like to know more about this innovation at this time.</td>
<td>0 1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>I am concerned about criticism of my work with this innovation.</td>
<td>0 1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Working with administrators and other change facilitators in facilitating use of this innovation is important to me.</td>
<td>0 1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>I am preoccupied with things other than this innovation.</td>
<td>0 1 2 3 4 5 6 7</td>
<td></td>
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<tr>
<td>11.</td>
<td>I wonder whether use of this innovation will help or hurt my relations with my colleagues.</td>
<td>0 1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>I need more information about and understanding of this innovation.</td>
<td>0 1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
13. I am thinking that this innovation could be modified or replaced with a more effective program. 0 1 2 3 4 5 6 7

14. I am concerned about facilitating use of this innovation in view of limited resources. 0 1 2 3 4 5 6 7

15. I would like to coordinate my efforts with other change facilitators. 0 1 2 3 4 5 6 7

16. I would like to know what resources are necessary to adopt this innovation. 0 1 2 3 4 5 6 7

17. I want to know what priority my superiors want me to give this innovation. 0 1 2 3 4 5 6 7

18. I would like to excite those directly involved in the use of this innovation about their part in it. 0 1 2 3 4 5 6 7

19. I am considering use of another innovation that would be better than the one that is currently being used. 0 1 2 3 4 5 6 7

20. I would like to help others in facilitating the use of this innovation. 0 1 2 3 4 5 6 7

21. I would like to determine how to enhance my facilitation skills. 0 1 2 3 4 5 6 7

22. I spend little time thinking about this innovation. 0 1 2 3 4 5 6 7

23. I see a potential conflict between facilitating this innovation and overloading staff. 0 1 2 3 4 5 6 7

24. I am concerned about being held responsible for facilitating use of this innovation. 0 1 2 3 4 5 6 7

25. Currently, other priorities prevent me from focusing my attention on this innovation. 0 1 2 3 4 5 6 7

26. I know of another innovation that I would like to see used in place of this innovation. 0 1 2 3 4 5 6 7

27. I am concerned about how my facilitating the use of this innovation affects those directly involved in the use of it. 0 1 2 3 4 5 6 7

28. Communication and problem-solving relative to this innovation take too much time. 0 1 2 3 4 5 6 7

29. I wonder who will get the credit for implementing this innovation. 0 1 2 3 4 5 6 7
30. I would like to know where I can learn more about this innovation.
0 1 2 3 4 5 6 7

31. I would like to modify my mode of facilitating the use of this innovation based on the experiences of those directly involved in its use.
0 1 2 3 4 5 6 7

32. I have alternate innovations in mind that I think would better serve the needs of our situation.
0 1 2 3 4 5 6 7

33. I would like to familiarize other departments or persons with the progress and process of facilitating the use of this innovation.
0 1 2 3 4 5 6 7

34. I am concerned about finding and allocating time needed for this innovation.
0 1 2 3 4 5 6 7

35. I have information about another innovation that I think would produce better results than the one we are presently using.
0 1 2 3 4 5 6 7
Directions: Please check the following:

1. Years of experience as a principal:
   [ ] 1-2  [ ] 3-5  [ ] 6-10  [ ] 11-15  [ ] 15+

2. Years you have worked with this staff in implementing computers:
   [ ] 1-2  [ ] 3-5  [ ] 6-10  [ ] 11-15  [ ] 15+

3. Years at present school:
   [ ] 1-2  [ ] 3-5  [ ] 6-10  [ ] 11-15  [ ] 15+

4. In your experience of computer use do you consider yourself to be:
   (check one)
   [ ] nonuser  [ ] novice  [ ] intermediate  [ ] old hand

5. Have you received formal training in using computers in instruction?
   [ ] yes  [ ] no
TEACHING AND COMPUTERS INVENTORY

PART I

LEADERSHIP PRACTICES

The purpose of Part I of this inventory is to identify the extent of certain leadership practices principals engage in during the process of adopting computer technology to enhance the instructional program. There are no right or wrong answers since adoption of an innovation is influenced by many different variables. We do not hold to any one definition of this innovation and leadership practice so please think in terms of your own perception of what it involves.

On the next two pages are thirty descriptive statements about various leadership behaviors and activities. Please read each statement carefully, then indicate the degree of intensity to which your principal engages in the practice described. Record your responses by drawing a circle around the number that corresponds to the frequency you have selected. You are given five choices:

1. If the leader RARELY or NEVER does what is described in the statement, circle the number 1.
2. If the leader does what is described ONCE IN A WHILE, circle the number 2.
3. If he or she SOMETIMES does what is described, circle the number 3.
4. If he or she does what is described FAIRLY OFTEN, circle the number 4.
5. If the leader does what is described VERY FREQUENTLY or ALWAYS, circle the number 5.

In selecting the answer, be realistic; answer in terms of how the principal typically behaves. For example, the first statement is "He or she seeks out challenging opportunities that test his or her skills and abilities." If you believe he or she does this "once in a while," circle the number two. If you believe he or she seeks out challenging opportunities "fairly often," circle the number four.
**PART I Leadership Practices**

To what extent would you say the principal engages in the following actions and behaviors? Circle the number that applies to each statement.

<table>
<thead>
<tr>
<th></th>
<th>Rarely</th>
<th>Once in a While</th>
<th>Sometimes</th>
<th>Fairly Often</th>
<th>Very Frequently</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>4</td>
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</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

He or she:

1. seeks out challenging opportunities that test his or her skills and abilities. ........................................ 1 2 3 4 5

2. describes the kind of future he or she would like for us to create together ........................................ 1 2 3 4 5

3. involves others in planning the actions that will be taken. ......................................................... 1 2 3 4 5

4. is clear about his or her own philosophy of leadership ........................................................................ 1 2 3 4 5

5. takes the time to celebrate accomplishments when project milestones are reached. ........................... 1 2 3 4 5

6. stays up-to-date on the most recent developments affecting our organization .................................. 1 2 3 4 5

7. appeals to others to share his or her dream of the future as their own ............................................ 1 2 3 4 5

8. treats others with dignity and respect ................................................................................................. 1 2 3 4 5

9. makes certain that innovative projects he or she manages are broken down into manageable chunks .. 1 2 3 4 5

10. makes sure that people are recognized for their contributions to the success of our projects . .... 1 2 3 4 5

11. challenges the way we do things at work. ............... 1 2 3 4 5

12. clearly communicates a positive and hopeful outlook for the future of our organization ............ 1 2 3 4 5

13. gives people a lot of discretion to make their own decisions. ......................................................... 1 2 3 4 5

14. spends time and energy on making certain that people adhere to the values that have been agreed on... 1 2 3 4 5

15. praises people for a job well done . ..................... 1 2 3 4 5

16. looks for innovative ways we can improve what we do in this organization . .............................. 1 2 3 4 5

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He or she:
17. shows others how their long-term future interests can be realized by enlisting in a common vision.
18. develops cooperative relationships with the people he or she works with.
19. lets others know his or her beliefs on how to best run the organization he or she works with.
20. gives the members of the team lots of appreciation and support for their contributions.
21. asks "what can we learn?" when things do not go as expected.
22. looks ahead and forecasts what he or she expects the future to be like.
23. creates an atmosphere of mutual trust in the projects he or she leads.
24. is consistent in practicing the values he or she espouses.
25. finds ways to celebrate accomplishments.
26. experiments and takes risks with new approaches to his or her work even when there is a chance of failure.
27. is contagiously excited and enthusiastic about future possibilities.
28. gets others to feel a sense of ownership for the projects they work on.
29. makes sure the work group sets clear goals, makes plans and establishes milestones for the projects he or she leads.
30. makes it a point to tell the rest of the organization about the good work done by his or her group.
TEACHING AND COMPUTERS INVENTORY

PART II

TEACHER CONCERNS

The purpose of Part II of this inventory is to determine what people who are using or thinking about using various programs are concerned about at various times during the innovation adoption process. The items were developed from typical responses of school and college teachers who ranged from no knowledge at all about various programs to many years experience in using them. Therefore, a good part of the items on this part of the questionnaire may appear to be of little relevance or irrelevant to you at this time. For the complete irrelevant items, please circle "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale.

For Example:

This statement is very true of me at this time. 0 1 2 3 4 5 6 7
This statement is somewhat true of me now. 0 1 2 3 4 5 6 7
This statement is not at all true of me at this time. 0 1 2 3 4 5 6 7
This statement seems irrelevant to me. 0 1 2 3 4 5 6 7

Please respond to the items in terms of your present concerns, or how you feel about your involvement or potential involvement with Teaching and Computer Technology. We do not hold to any one definition of this innovation, so please think of it in terms of your own perceptions of what it involves. The name Teaching and Computer Technology never appears. However, phrases such as "THIS INNOVATION," "THIS APPROACH," and "THE NEW SYSTEM" all refer to Teaching and Computer Technology. Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with Teaching and Computers.
**PART II Teacher Concerns**

<table>
<thead>
<tr>
<th></th>
<th>Irrelevant</th>
<th>Not true of me now</th>
<th>Somewhat true of me now</th>
<th>Very true of me now</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I am concerned about students' attitudes toward this innovation.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2.</td>
<td>I now know of some other approaches that might work better.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>I don't even know what the innovation is.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4.</td>
<td>I am concerned about not having enough time to organize myself each day.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>I would like to help other faculty in their use of the innovation.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6.</td>
<td>I have a very limited knowledge about the innovation.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7.</td>
<td>I would like to know the effect of reorganization on my professional status.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>I am concerned about conflict between my interests and my responsibilities.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>9.</td>
<td>I am concerned about revising my use of the innovation.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>10.</td>
<td>I would like to develop working relationships with both our faculty and outside faculty using this innovation.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>11.</td>
<td>I am concerned about how the innovation affects students.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12.</td>
<td>I am not concerned about this innovation.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>13.</td>
<td>I would like to know who will make the decisions in the new system.</td>
<td>0</td>
<td>1</td>
<td>2</td>
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<tr>
<td>14.</td>
<td>I would like to discuss the possibility of using the innovation.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
15. I would like to know what resources are available if we decide to adopt this innovation.

16. I am concerned about my inability to manage all the innovation requirements.

17. I would like to know how my teaching or administration is supposed to change.

18. I would like to familiarize other departments or persons with the progress of this new approach.

19. I am concerned about evaluating my impact on students.

20. I would like to revise the innovation's instructional approach.

21. I am completely occupied with other things.

22. I would like to modify our use of the innovation based on the experiences of our students.

23. Although I don’t know about this innovation, I am concerned about things in the area.

24. I would like to excite my students about their part in this approach.

25. I am concerned about time spent working with nonacademic problems related to this innovation.

26. I would like to know what the use of the innovation will require in the immediate future.

27. I would like to coordinate my efforts with others to maximize the innovation's effects.

28. I would like to have more information on time and energy commitments required by this innovation.

29. I would like to know what other faculty are doing in this area.

30. At this time, I am not interested in learning about this innovation.

31. I would like to determine how to supplement, enhance, or replace the innovation.
32. I would like to use feedback from students to change the program.

33. I would like to know how my role will change when I am using this innovation.

34. Coordination of tasks and people is taking too much of my time.

35. I would like to know how this innovation is better than what we have now.
TEACHING AND COMPUTERS INVENTORY

PART III

DEMOGRAPHIC INFORMATION

Directions: Please check the following:

1. Years of teaching experience:
   — 1-2  — 3-5  — 6-10  — 11-15  — 15+

2. Years you have worked with this principal:
   — 1-2  — 3-5  — 6-10  — 11-15  — 15+

3. Years at present school:
   — 1-2  — 3-5  — 6-10  — 11-15  — 15+

4. Number of years you have operated the computer laboratory:
   — 1-2  — 3-5  — 6-10  — 11-15  — 15+

5. In your experiences of computer use in instruction do you consider yourself to be a:
   (check one)
   — nonuser  — novice  — intermediate  — old hand

6. Have you received formal training in using computers in instruction?
   — yes  — no
TEACHING AND COMPUTERS INVENTORY

CONCERNS AND PRACTICES

ANN GANIER JACKSON
TEACHING AND COMPUTERS INVENTORY

PART I

LEADERSHIP PRACTICES

The purpose of Part I of this inventory is to identify the extent of certain leadership practices principals engage in during the process of adopting computer technology to enhance the instructional program. There are no right or wrong answers since adoption of an innovation is influenced by many different variables. We do not hold to any one definition of this innovation and leadership practice so please think in terms of your own perception of what it involves.

On the next two pages are thirty descriptive statements about various leadership behaviors and activities. Please read each statement carefully, then indicate the degree of intensity to which your principal engages in the practice described. Record your responses by drawing a circle around the number that corresponds to the frequency you have selected. You are given five choices:

1. If the leader RARELY or NEVER does what is described in the statement, circle the number 1.

2. If the leader does what is described ONCE IN A WHILE, circle the number 2.

3. If he or she SOMETIMES does what is described, circle the number 3.

4. If he or she does what is described FAIRLY OFTEN, circle the number 4.

5. If the leader does what is described VERY FREQUENTLY or ALWAYS, circle the number 5.

In selecting the answer, be realistic; answer in terms of how the principal typically behaves. For example, the first statement is "He or she seeks out challenging opportunities that test his or her skills and abilities." If you believe he or she does this "once in a while," circle the number two. If you believe he or she seeks out challenging opportunities "fairly often," circle the number four.
### Classroom Teacher

#### PART I Leadership Practices

To what extent would you say the principal engages in the following actions and behaviors? Circle the number that applies to each statement.

<table>
<thead>
<tr>
<th></th>
<th>Rarely</th>
<th>Once in a While</th>
<th>Sometimes</th>
<th>Fairly Often</th>
<th>Very Frequently</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td></td>
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<tr>
<td>3</td>
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<td></td>
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<td></td>
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<tr>
<td>4</td>
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<td></td>
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<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

He or she:

1. seeks out challenging opportunities that test his or her skills and abilities.
2. describes the kind of future he or she would like for us to create together.
3. involves others in planning the actions that will be taken.
4. is clear about his or her own philosophy of leadership.
5. takes the time to celebrate accomplishments when project milestones are reached.
6. stays up-to-date on the most recent developments affecting our organization.
7. appeals to others to share his or her dream of the future as their own.
8. treats others with dignity and respect.
9. makes certain that innovative projects he or she manages are broken down into manageable chunks.
10. makes sure that people are recognized for their contributions to the success of our projects.
11. challenges the way we do things at work.
12. clearly communicates a positive and hopeful outlook for the future of our organization.
13. gives people a lot of discretion to make their own decisions.
14. spends time and energy on making certain that people adhere to the values that have been agreed on.
15. praises people for a job well done.
16. looks for innovative ways we can improve what we do in this organization.
He or she:
17. shows others how their long-term future interests can be realized by enlisting in a common vision.
18. develops cooperative relationships with the people he or she works with.
19. lets others know his or her beliefs on how to best run the organization he or she works with.
20. gives the members of the team lots of appreciation and support for their contributions
21. asks "what can we learn?" when things do not go as expected.
22. looks ahead and forecasts what he or she expects the future to be like.
23. creates an atmosphere of mutual trust in the projects he or she leads.
24. is consistent in practicing the values he or she espouses.
25. finds ways to celebrate accomplishments.
26. experiments and takes risks with new approaches to his or her work even when there is a chance of failure.
27. is contagiously excited and enthusiastic about future possibilities.
28. gets others to feel a sense of ownership for the projects they work on.
29. makes sure the work group sets clear goals, make plans and establishes milestones for the projects he or she leads.
30. makes it a point to tell the rest of the organization about the good work done by his or her group.
TEACHING AND COMPUTERS INVENTORY

PART II

TEACHER CONCERNS

The purpose of Part II of this inventory is to determine what people who are using or thinking about using various programs are concerned about at various times during the innovation adoption process. The items were developed from typical responses of school and college teachers who ranged from no knowledge at all about various programs to many years experience in using them. Therefore, a good part of the items on this part of the questionnaire may appear to be of little relevance or irrelevant to you at this time. For the complete irrelevant items, please circle "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale.

For Example:

This statement is very true of me at this time. 0 1 2 3 4 5 6 7
This statement is somewhat true of me now. 0 1 2 3 4 5 6 7
This statement is not at all true of me at this time. 0 1 2 3 4 5 6 7
This statement seems irrelevant to me. 0 1 2 3 4 5 6 7

Please respond to the items in terms of your present concerns, or how you feel about your involvement or potential involvement with Teaching and Computer Technology. We do not hold to any one definition of this innovation, so please think of it in terms of your own perceptions of what it involves. The name Teaching and Computer Technology never appears. However, phrases such as "THIS INNOVATION," "THIS APPROACH," and "THE NEW SYSTEM" all refer to Teaching and Computer Technology. Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with Teaching and Computers.
PART I  Teacher Concerns

<table>
<thead>
<tr>
<th>Scale</th>
<th>Description</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrelevant</td>
<td>Not true of me now</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somewhat true of me now</td>
<td>Very true of me now</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

1. I am concerned about students' attitudes toward this innovation. 0 1 2 3 4 5 6 7
2. I now know of some other approaches that might work better. 0 1 2 3 4 5 6 7
3. I don't even know what the innovation is. 0 1 2 3 4 5 6 7
4. I am concerned about not having enough time to organize myself each day. 0 1 2 3 4 5 6 7
5. I would like to help other faculty in their use of the innovation. 0 1 2 3 4 5 6 7
6. I have a very limited knowledge about the innovation. 0 1 2 3 4 5 6 7
7. I would like to know the effect of reorganization on my professional status. 0 1 2 3 4 5 6 7
8. I am concerned about conflict between my interests and my responsibilities. 0 1 2 3 4 5 6 7
9. I am concerned about revising my use of the innovation. 0 1 2 3 4 5 6 7
10. I would like to develop working relationships with both our faculty and outside faculty using this innovation. 0 1 2 3 4 5 6 7
11. I am concerned about how the innovation affects students. 0 1 2 3 4 5 6 7
12. I am not concerned about this innovation. 0 1 2 3 4 5 6 7
13. I would like to know who will make the decisions in the new system. 0 1 2 3 4 5 6 7
14. I would like to discuss the possibility of using the innovation. 0 1 2 3 4 5 6 7

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*Procedures for Adopting Educational Innovations/CEAM Project
R & D Center for Teacher Education,
The University of Texas at Austin
15. I would like to know what resources are available if we decide to adopt this innovation. 0 1 2 3 4 5 6 7
16. I am concerned about my inability to manage all the innovation requirements. 0 1 2 3 4 5 6 7
17. I would like to know how my teaching or administration is supposed to change. 0 1 2 3 4 5 6 7
18. I would like to familiarize other departments or persons with the progress of this new approach. 0 1 2 3 4 5 6 7
19. I am concerned about evaluating my impact on students. 0 1 2 3 4 5 6 7
20. I would like to revise the innovation's instructional approach. 0 1 2 3 4 5 6 7
21. I am completely occupied with other things. 0 1 2 3 4 5 6 7
22. I would like to modify our use of the innovation based on the experiences of our students. 0 1 2 3 4 5 6 7
23. Although I don't know about this innovation, I am concerned about things in the area. 0 1 2 3 4 5 6 7
24. I would like to excite my students about their part in this approach. 0 1 2 3 4 5 6 7
25. I am concerned about time spent working with nonacademic problems related to this innovation. 0 1 2 3 4 5 6 7
26. I would like to know what the use of the innovation will require in the immediate future. 0 1 2 3 4 5 6 7
27. I would like to coordinate my efforts with others to maximize the innovation's effects. 0 1 2 3 4 5 6 7
28. I would like to have more information on time and energy commitments required by this innovation. 0 1 2 3 4 5 6 7
29. I would like to know what other faculty are doing in this area. 0 1 2 3 4 5 6 7
30. At this time, I am not interested in learning about this innovation. 0 1 2 3 4 5 6 7
31. I would like to determine how to supplement, enhance, or replace the innovation. 0 1 2 3 4 5 6 7
32. I would like to use feedback from students to change the program.

33. I would like to know how my role will change when I am using this innovation.

34. Coordination of tasks and people is taking too much of my time.

35. I would like to know how this innovation is better than what we have now.
Directions: Please check the following:

1. Years of teaching experience:
   ___1-2  ___3-5  ___6-10  ___11-15  ___15+

2. Years you have worked with this principal:
   ___1-2  ___3-5  ___6-10  ___11-15  ___15+

3. Years at present school:
   ___1-2  ___3-5  ___6-10  ___11-15  ___15+

4. Number of years you have been collaborating classroom activities with the computer laboratory applications:
   ___1-2  ___3-5  ___6-10  ___11-15  ___15+

5. In your experiences of computer use in instruction do you consider yourself to be a: (check one)
   ___nonuser  ___novice  ___intermediate  ___old hand

6. Have you received formal training in using computers in instruction?
   ___yes  ___no
APPENDIX B

CORRESPONDENCE
Dear District Superintendent:

In completion of the Ph.D. requirements at Loyola University of Chicago, I am writing a dissertation on the implementation of computer technology in the instructional environment of elementary schools. Schools that are currently using a computer laboratory model for instruction are important to research designed to develop guidelines for school improvement teams as they move toward computer-related learning environments in the future.

This letter is to request your cooperation in seeking the participation of the schools on the enclosed list for this study. Approval of this research project is on file with Research and Public Service in the Department of Research, Evaluation and Planning.

Each school will be randomly selected to respond to particular sections of a questionnaire on Leadership and Teacher Concerns, Practices, and Use of Computers, which field testing has shown to take approximately thirty minutes.

All schools and staff members are assured total anonymity. All results will be reported in the aggregate and no individual, school, or district will be identified.

Your cooperation with this study is sincerely appreciated. Upon its completion I will be pleased to see you a copy of the findings.

Sincerely,

Ann Ganier Jackson

Enclosures
Dear Principal:

In completion of the Ph.D. requirements at Loyola University of Chicago, I am writing a dissertation on the implementation of computer technology in the instructional environment of elementary schools. Your school is one of twenty-five (25) schools selected to participate in a study to identify the practices and concerns of principals and teachers as they implement computer technology in the school improvement program. Approval of this research project is on file with Research and Public Service in the Department of Research, Evaluation and Planning.

The study will provide an understanding of the significance of leadership for change in the use of microcomputer technology and the development of an implementation model to aid administrators and local school improvement teams faced with the challenge of implementing technology in the future.

I know you are extremely busy this time of year, but hope you can find about thirty minutes to participate in this study. Would you please take time to:

1. Complete the enclosed principal's questionnaire and place it in the attached envelope and seal.

2. Have your computer laboratory teacher and (5) classroom teachers (who send or take students to the lab) complete the appropriate questionnaire, place it in the attached envelope, seal and return it to the office.

3. Place all returned questionnaires in the large envelope. Arrangements will be made to collect it from your school by ________________________.

All schools and staff members are assured total anonymity. Results will be reported in the aggregate and no individual, school, or district will be identified.

I know that participation in this project makes some demands on you and your very busy staff and I greatly appreciate your cooperation. I hope that I can return the service to you in the future. Upon completion of the project, I shall be happy to share the results with you. Again, thank you for your time and effort.

Sincerely,

Ann Ganier Jackson
Dear Computer Laboratory Teacher:

Your school is one of twenty-five (25) schools selected to participate in a study to identify the practices and concerns of teachers and principals as they implement computer technology in the instructional program.

I know you are extremely busy this time of year, but hope you can find about thirty minutes to answer some questions about computer technology from the perspective of a computer laboratory teacher. Your response will become part of a project designed to develop concrete guidelines for school improvement teams as they move toward computer-related learning environments for the future.

Please take the time to complete the attached questionnaire. When you are finished, seal it in the attached envelope marked CONFIDENTIAL and return it to the school office by _________. I will make arrangements to pick it up from the office on _________.

All responses will be completely anonymous. All results will be reported in the aggregate and no particular teacher, principal, or school will be identified.

Your assistance in this project is essential to its success and is sincerely appreciated. Upon its completion, I will be pleased to send you a copy of the findings. Good luck with the continued success of your connection with computer technology in instruction.

Again, thank you for your time and effort.

Sincerely,

Ann Ganier Jackson
Dear Classroom Teacher:

Your school is one of twenty-five (25) schools selected to participate in a study to identify the practices and concerns of teachers and principals as they implement computer technology in the instructional program.

I know you are extremely busy this time of year, but hope you can find about thirty minutes to answer some questions about computer technology from the perspective of a classroom teacher of students who use computers in a laboratory setting. Your response will become part of a project designed to develop concrete guidelines for school improvement teams as they move toward computer-related learning environments for the future.

Please take the time to complete the attached questionnaire. When you are finished, seal it in the attached envelope marked CONFIDENTIAL and return it to the school office by _______. I will make arrangements to pick it up from the office on _______.

All responses will be completely anonymous. All results will be reported in the aggregate and no particular teacher, principal, or school will be identified.

Your assistance in this project is essential to its success and is sincerely appreciated. Upon its completion, I will be pleased to send you a copy of the findings. Good luck with the continued success of your connection with computer technology in instruction.

Again, thank you for your time and effort.

Sincerely,

Ann Ganier Jackson
March 20, 1990

Dear Ms. Jackson:

Your request to undertake a research project involving the Chicago Public Schools has been approved.

I wish you well with your study. I would appreciate receiving a copy of the final document.

Sincerely,

Bruce Marchiafava
Director
Research and Public Services

BTMijcm

Ms. Ann S. Ganier Jackson
35 N. Harbor Drive #1903
Chicago, Illinois 60601
January 16, 1990

Ann Jackson
155 N. Harbor Drive
Apt. 1903
Chicago, IL 60601

Dear Ms Jackson:

I am writing to grant you permission to use the Stages of Concern Questionnaire (SoC Q) and the Change Facilitator Stages of Concern Questionnaire (CFSoC Q) in your research. I would ask you to provide me with at least a summary of the findings from your research. In that way I can share your findings with others and we can have a chance to learn from what you are doing.

Enclosed is the information you requested about reliability and validity of the Change Facilitator Stages of Concern Questionnaire. I will see that you receive a copy of the manual as soon as it is available. Best of luck in completing your study.

Sincerely,

[Signature]

Gene E. Hall, Dean
College of Education

Enclosure
April 5, 1990

Ms. Ann S. Ganier Jackson
155 North Harbor Drive #1903
Chicago, Illinois 60601

Dear Ann:

Thank you for your correspondence of March 26 requesting permission to use the Leadership Practices Inventory (LPI) in your doctoral research. We are pleased to allow you to make copies of the LPI in your research studies to the extent outlined in your letter and according to the following three stipulations:

1. That the following copyright notice appear on all copies of the LPI-Self and LPI-Other: Copyright 1990 by Kouzes Posner International, Inc. Used with permission.

2. That we receive copies of all reports, papers, articles, including your dissertation itself, etc. which make use of the LPI data.

3. That the LPI may not be sold or used in workshop settings. In other words, that the LPI will be used by you solely as a research instrument.

If you agree to the terms outlined above, please sign one copy of this letter and return it in the enclosed envelope. Enclosed is a copy of an article providing more technical information about the instrument and its psychometric properties.

If we can be of any further assistance, please do not hesitate to let us know. Best wishes in your research efforts.

Cordially,

Barry Z. Posner, Ph.D.
Managing Director

I understand and agree to abide by these terms:

__________________________________________ Date: _____________
March 15, 1995

Ms. Ann S. Ganier Jackson
155 North Harbor Drive #1903
Chicago, Illinois 60601

Dear Ann:

Thank you for your facsimile (March 14) requesting permission to reprint the Leadership Practices Inventory (LPI) in your doctoral dissertation, along with Figure 1 from the Scoring Booklet. We are pleased to provide this permission, with the following understandings:

1. This permission is granted on a one-time basis, extending only to your dissertation and any copies of your dissertation which may be made in its entirety;

2. That the following copyright notification appear on each page of the LPI and on Figure 1: Copyright 1990, 1995 Kouzes Posner International, Inc. Reprinted with permission. All rights reserved.

3. That in granting this permission, it is specified that no extension of copyright is involved, either in publishing or distribution.

If you agree to the terms outlined above, please sign one copy of this letter and return it in the enclosed envelope. If we can be of any further assistance, please do not hesitate to let us know. Congratulations on being so close to completing your study. We look forward to receiving a copy and reading it ourselves.

Cordially,

Barry Z. Posner, Ph.D.
Managing Director

I understand and agree to abide by these terms:

________________________________________________________________________ Date: _____________
March 15, 1995

Ann Jackson
155 North Harbor Drive, Unit 1903
Chicago, IL 60601

Dear Ms. Jackson:

Congratulations on having completed your dissertation study. I am looking forward to learning about your findings.

You have my permission to include copies of the Stages of Concern Questionnaire and the Change Facilitator Stages of Concern Questionnaire in your dissertation report. Please include the appropriate citations for the technical manuals, and the Hall & Hord Change in School book.

I wish you continued success in your career.

Sincerely yours,

Gene E. Hall, Professor
REFERENCES


Technology in Public Schools. (1993-94). Quality Education Data, Inc.


VITA

The author, Ann S. Ganier Jackson, completed her elementary and secondary education in the Catholic and public schools of Chicago, Illinois. She received the degree of Bachelor of Education from Chicago Teachers College, the degree of Master of Education in School Administration and Supervision from DePaul University, and the Certificate of Advanced Study in Reading from The University of Chicago.

Her professional employment began with the Chicago Public School District with a teaching position at Aldridge Elementary School and Guggenheim Elementary School. Upon completion of six years of teaching she became a Master Teacher and Assistant Principal at the Guggenheim Elementary School and served as a Staff Assistant with the Department of Curriculum while on a special leave. She served as a District Instructional Coordinator in District Twenty followed by service as an Elementary School Principal at the Dunne Elementary School and Jahn Elementary School.

She has been working as a consultant and marketing representative for Wasatch Education Systems, a software development company while completing work on a degree of Doctor of Philosophy in Educational Leadership and Policy Studies.
APPROVAL SHEET

The dissertation submitted by Ann Smith Ganier Jackson has been read and approved by the following committee:

Dr. Max A. Bailey, Director
Associate Professor and Chairperson, Educational Leadership and Policy Studies, Loyola University of Chicago

Dr. Philip M. Carlin
Associate Professor, Educational Leadership and Policy Studies, Loyola University of Chicago

Dr. Todd J. Hoover
Associate Professor, Curriculum, Instruction, and Educational Psychology, Loyola University of Chicago

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 for the degree of Doctor of Philosophy.

May 30, 1995

Date

MaOBailey

Director's Signature