

1-1-1986

An analysis of attitudes of public school principals toward the use of computers in their workspace : a case study of an urban school system.

John J. Kelley

University of Massachusetts Amherst

Follow this and additional works at: https://scholarworks.umass.edu/dissertations_1

Recommended Citation

Kelley, John J., "An analysis of attitudes of public school principals toward the use of computers in their workspace : a case study of an urban school system." (1986). *Doctoral Dissertations 1896 - February 2014*. 4102.
https://scholarworks.umass.edu/dissertations_1/4102

This Open Access Dissertation is brought to you for free and open access by ScholarWorks@UMass Amherst. It has been accepted for inclusion in Doctoral Dissertations 1896 - February 2014 by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.



312066007118497

AN ANALYSIS OF ATTITUDES OF PUBLIC
SCHOOL PRINCIPALS TOWARD THE USE OF
COMPUTERS IN THEIR WORKSPACE:

A Case Study of an Urban School System

A Dissertation Presented

By

John Joseph Kelley

Submitted to the Graduate School of
the University of Massachusetts
in partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

May, 1986

Education

© Copyright by John Joseph Kelley, 1986

All Rights Reserved

AN ANALYSIS OF ATTITUDES OF PUBLIC
SCHOOL PRINCIPALS TOWARD THE USE OF
COMPUTERS IN THEIR WORKSPACE:

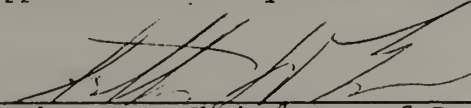
A Case Study of an Urban School System

A Dissertation Presented

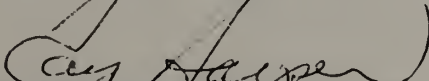
by

John Joseph Kelley


Approved as to style and content by:




Arthur Eye, Chairperson of Committee



Ray Harper, Member



Frank Rife, Member



Mario Fantini, Dean
School of Education

To my mother and father, Josephine and Colman Kelley,
my wife Maureen, and four children, Patrick, Ryan, Sarah
and Maura, with love. Thank you for your encouragement,
patience and understanding.

ACKNOWLEDGEMENT

Professor Arthur Eve, my chief advisor, Professor Ray Harper and and Professor Frank Rife, members of my committee, guided me through difficult periods of my study and gave me the encouragement and counseling necessary for me to complete the research. They were always a phone call away and were willing to answer all my questions and offer suggestions on how I might solve a given problem. I consider myself most fortunate to have met them early in my degree program and will always value their professional judgement and friendship.

Stephen Desroches, Eileen Herbert and Susan Dukess, who gave many hours of their time, proved to be trusted colleagues and friends. They listened with patience, encouraged me when I needed it and made valuable suggestions concerning my study. They were a great support group and were always there when I needed them.

I want to thank Manthala George, Jr., Superintendent of the Brockton Public Schools, for allowing me to carry out this study in Brockton and Robert C. Jones, Administrative Assistant, for encouraging me in this endeavor.

I am especially grateful to the principals of the Brockton Public Schools who contributed to the study. Without their contribution and time the study would not have been possible.

And finally, to my friend, confidant and typist Norma McWilliams,

who gave up numerous weekends to make my dream come true. My most sincere gratitude. Norma, thank you.

ABSTRACT

AN ANALYSIS OF ATTITUDES OF PUBLIC
SCHOOL PRINCIPALS TOWARD THE USE OF
COMPUTERS IN THEIR WORKSPACE:
A Case Study of an Urban School System

May, 1986

John Joseph Kelley, B.A., Southeastern Massachusetts University
M.Ed., Bridgewater State College, Ed.D., University of Massachusetts

Directed by: Professor Arthur Eve

Abstract

This study evolved from a need for an understanding of the utilization of computers in public school offices. The purposes of the study were to: (1) obtain perceptions from school principals regarding problems they may be encountering in the utilization of computers in general, and more specifically, microcomputers for managerial purposes; (2) to identify and examine the reasons principals do and do not utilize microcomputers for managerial purposes; (3) to identify problems in methods of dissemination of information and what information may or may not be amenable to computerization in their school and school district; and (4) to obtain perceptions from school principals regarding the competencies and training

needed by them in a technological age.

Qualitative research methods including in-depth semi-structured interviews using an interview guide and standardized open-ended approach (adapted by the researcher from a guide developed by the Institute of Governmental Services from the University of Massachusetts), field observation, document analysis, and an open-ended questionnaire were used to collect data. All data from the interviews were categorized and organized into category systems such as those advocated by Guba. The questionnaire developed by the researcher and administered to all 23 principals was used to cross-check data obtained from the above mentioned research techniques.

The researcher concluded that public school principals in the system under study personally were not utilizing microcomputers for managerial purposes. Most principals in the study have positive attitudes regarding the future use of computers and are willing to pursue their use as an office tool. However, the principals lack the training necessary to implement an office automation program.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	v
ABSTRACT	vii
Chapter	
I. INTRODUCTION	1
The Problem and Some Related Issues	1
Significance of the Problem	5
Purpose and Scope	8
Design and Research Methodology	11
II. REVIEW OF RESEARCH AND RELATED LITERATURE	13
Introduction	13
Defining Administrative Uses of Microcomputers	18
Advantages and Disadvantages of Using Microcomputers	27
Business Use of Computers in an Automated Office	38
III. RESEARCH DESIGN AND ANALYTICAL TECHNIQUES.	59
IV. PRESENTATION OF DATA AND ANALYSIS	68
Introduction	68
The Opinions of Users and Nonusers	71
Who Is Responsible for Computerization and Training Programs?	76
What Information Lends Itself to Computerization and What Hardware Would Best Meet the Admini- strators' Needs?	79
What Competencies are Required?	87
What Areas In the Public Schools Can be Serviced?	90
The Opinions of Users and Nonusers - Cross-Check of Data	92
Who Is Responsible for Computerization and Training Programs? - Cross-Check of Data	96
What Information Lends Itself to Computerization and What Hardware Would Best Meet the Admini- strators' Needs? - Cross-Check of Data	99
What Competencies are Required? - Cross-Check of Data	107
What Areas In the Public Schools Can be Serviced? - Cross-Check of Data	113
V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	115
Summary	115
Conclusion	117
Recommendations From the Study	124

NOTES	129
APPENDIX	138
A School List	139
B Letter to Interviewees	140
C Interviewer Manual	141
D Letter to Questionnaire Participants	148
E Questionnaire	149
F Computer Systems Catalog	158
BIBLIOGRAPHY	163

C H A P T E R I

INTRODUCTION

The Problem and Some Related Issues

The advancement of computer technology during the past several years has presented a wide range of improvements as to the methods of managing information. Because the advancements have reduced the cost and increased the availability of computer technology, administrators in the public schools now have a valuable resource with which to improve the way they manage educational matters. A review of current literature on computer use shows that advancements range from simple data base information systems (e.g., reporting names, addresses and telephone numbers of students) to complex scheduling and diagnostic management programs (e.g., designing flexible course offerings and individualized programs). Other important advancements include spreadsheets and graphics for fiscal and budgetary forecasting, word processing programs, and telecommunication networks.

The growth in the use of computers in business is evident, but according to available literature there is very little activity centering around the school office. The classroom use of computers, especially microcomputers, is steadily climbing in instructional areas. Why is it then, that administrators who according to past studies have had a favorable attitude towards computers, have not brought them into their offices to

aid in managing their buildings and school districts? A review of the literature shows that the computer can cover just about any aspect of school administration and that new advances are made daily to improve hardware and software programs that support their use.

Many educators in the last two decades have stated that the school principal is the driving force behind the successful implementation of programs introduced into their schools.¹ More recently views have been expressed regarding the use of microcomputers:

....the most important individual influencing the rate of change and/or introduction of an innovation in school is the principal.²

....it is still the enthusiastic and creative nature of the individual administrator who develops the time-saving potential of the microcomputer.³

If, in fact, the school principal is responsible for the computerization of the school office what problems are preventing the use of the microcomputer to help in this task?

A further review of the literature shows that administrators have a favorable attitude toward what the computer can do for them.⁴ Since the 1960's computers have become a relatively common tool to aid in the administration of schools. However, there seems to be conflicting information concerning whether the administrator's attitude towards microcomputers is as

favorable as that towards computers in general. Without a positive attitude, the microcomputer's potential will not be explored.

A third factor that may influence administrators' attitudes toward computer use is the way school districts manage information. Richard Dennis' examination of information flow in schools offers two basic models.⁵ The first, called the "trickle-down" model allows information to be collected and processed near the top and the results sent down to the end users. The second, called "percolated-up" model allows information to be collected and processed at the source and distributed where needed. The use of these models may have a bearing on the utilization of microcomputers in public schools.

The fourth issue that emerges in the literature concerns the basic competencies a school administrator must acquire to function effectively in an age of technology. Because of rapid advances, it is essential that the practicing administrator stay attuned to the changing technology and be aware of the advantages and disadvantages of hardware and software programs. This necessitates either the district providing training programs or the self-reliant administrator becoming responsible for his or her own training. Mims and Poirot view the basic competencies for school administrators as the ability to:

1. Justify the cost of educational computing;
2. Discuss values and benefits of computerization in education and society;
3. Identify possible funding sources for instructional and administrative computing;
4. Identify training needs of teachers using the computer as an object of instruction, as an instructional medium, and as a problem-solving tool;
5. Demonstrate an awareness of future trends in computing as they relate to educational computing;
6. Describe the computer training needs of students who will be entering the job market in the future;
7. Identify training needs of teachers and administrators related to the administrative uses of computers in education;
8. Identify various alternatives for using computers in instruction.

Do practicing administrators themselves now consider these competencies necessary?

In the final analysis, a review of the literature shows that the microcomputer can accomplish just about any aspect of school administration. However, the literature also reveals some unanswered questions about actual use of the computers:

- Is the school principal responsible for the computerization of the school office? And if so, what resources must be made available?
- Is the use of centralized computers by a district preventing the use of smaller computers by school building administrators in managing daily office work?
- Does the method of disseminating information in a school system affect the use of microcomputers?
- What computer competencies are needed by practicing school administrators to computerize their offices?

Significance of the Problem

There are several reasons for undertaking a study of the attitudes of public school principals towards the computerization of their offices. The first is an attempt to address problems and issues identified in the aforementioned literature.

The second is to provide information on the efficiency of school offices and address what areas can be improved by computerization. Public school principals are not only educational leaders but also educational managers. As managers, they must become involved with a large volume of information in a variety of formats: school attendance records, grade reports, inventory lists, schedules, student records, budget projections, student activity accounts, handbooks, mailing lists and emergency telephone numbers. The time-saving potential of the microcomputer would allow a principal more time to devote to the students and the educational issues in his or her school.

A third reason for conducting a detailed investigation deals with economic considerations. Public schools are always under close scrutiny as to how they spend money allotted to them by federal, state, and local revenue sources. In the age of tax caps and Proposition 2 1/2, any expenditure of money has to be carefully explained, planned and accounted for. The principal who wishes to undertake the costly computerization of an

office has to be an advocate so that he or she can answer concerns presented by parents and school board members. This study will provide research data that would be useful in supporting a principal's position.

The fourth reason concerns the impact of training on the successful implementation of any computerization program. The competencies, objectives, and skills needed to successfully computerize an office have to be clarified before training takes place and a study such as this one will provide information that will contribute to this clarification.

The fifth reason for the investigation will help to clarify the question of information flow from one area to another. The efficiency with which a school and a school district operate will produce a definite improvement in its overall effectiveness. Any further insight on improving information flow will aid the administrator in managerial tasks and strengthen the efficiency and effectiveness of the total school system. This study will attempt to examine different models of information flow in the school system under study and make recommendations regarding compatibility with office computerization.

In summary, this study will attempt to contribute to the relatively new area of office automation in public schools by addressing the issues and answering the questions posed above.

It will:

- add insight as to what extent principals do make use of microcomputers and to find out the reasons they do not;
- analyze where the responsibilities lie for one to computerize an office, from the central office or from within the school building itself;
- examine the relationship in the use of centralized computers as compared to microcomputers by school building administrators in managing daily office work.
- analyze what information would be more efficient and effectively used if computerization was involved.
- analyze the computer competencies needed by practicing administrators.

Purpose and Scope

This study gathered and analyzed qualitative data regarding the perceptions of public school administrators, namely principals and housemasters, towards the utilization and impact of microcomputers on administrative tasks in their offices. The job responsibilities of the housemaster are identical to those of the principal. Therefore "Principal" will be used in this study to refer to both principal and housemaster. The study focused on gaining insight into the relatively new field of microcomputers and their use in administrative functions in public schools. These insights were formulated from the perceptions of those individuals who are the closest to the process - the building principals. It is the goal of this research effort to understand the circumstances and tools which will best improve managerial tasks in the school office and address four objectives:

1. To obtain perceptions from school principals regarding problems they may be encountering in the utilization of computers in general, and more specifically, microcomputers for managerial purposes.
2. To identify and examine the reasons principals do and do not utilize microcomputers for managerial purposes.
3. To identify problems in methods of dissemination of information and what information may or may not be amenable to computerization in their school and school district.

4. To obtain perceptions from school principals regarding the competencies and training needed by them in a technological age.

The investigation centered around the Brockton School System, the fourth largest urban school system in Massachusetts, located approximately twenty-five miles south of Boston. The system is comprised of:

- Two K-6 Elementary Schools
- Twelve 1-6 Elementary Schools
- Four Junior High Schools (Gr. 7-8)
- One Senior High School (Gr. 9-12) made up of four different "houses".

The rationale for selecting the Brockton Public School system as the focus of this research was based on several factors.

First, Brockton, as a large urban school system has a diverse student population, as well as a mixture of large and small schools, some neighborhood schools and some where bus transportation is essential. The managerial problems which confront Brockton's principals are representative of those that confront principals in other communities.

Second, Brockton is ready now to plan for the administrative use of the microcomputer in the near future. The school system began to utilize the microcomputer in 1982 for instructional purposes in grades K-12. A minimum of three and a maximum of 15 microcomputers are being utilized in each building's microcomputer laboratory in the K-8 schools throughout the

city. Each of four laboratories at the high school utilize between 20 and 30 microcomputers. With Proposition 2 1/2 affecting curriculum areas for the last three years, the instructional program has not been expanded. A \$400,000 comprehensive curriculum plan involving hardware and software acquisition, curriculum development and training was approved for the 1985-86 school year. Phase Two of the proposed program will address the computerization of school offices for the 1986-87 school year. Information is needed so decisions can be made by an administrative team concerned with the use of microcomputers and their impact on the school office setting.

A third reason for choosing Brockton as the focus of this case study is that the researcher has been involved in micro-computer related activities for several years in this community and has been affiliated with the Brockton Public School system as a teacher and administrator for over sixteen years. As a result, the researcher has been able to gather a wealth of information about the school system and has direct access to data needed to complete the desired research.

Design and Research Methodology

The research project began with a comprehensive review of the literature. Three main topics were addressed: identification of possible administrative uses of microcomputers in schools; an analysis of how the growth of micro-electronics technology since 1975 has affected the administrator's workspace in public schools; and the development of the automated business office using microcomputers.

The second phase of the project involved a case study investigation into the targeted school system. Widely accepted qualitative research methods for collecting and analyzing data were used, including:

in-depth semi-structured interviews using an interview guide approach and a standardized open-ended approach, conducted with building principals who were directly involved with the problems and concerns of computerization of school offices;

field observations of actual offices and their environments;

document analysis of the school district's computerized management programs currently utilized by building principals;

an open-ended survey questionnaire administered to the total population under study.

Qualitative rather than quantitative approaches and analysis techniques were employed because the researcher chose to look at the detailed descriptions of situations and people, and was also concerned with the attitudes, beliefs and thoughts about

experiences in the field. In so doing, no pre-existing expectations on the research setting or hypothesis were stated nor was the setting manipulated in any way.

A holistic, inductive and naturalistic inquiry approach lends itself to this research problem because its goal was to arrive at an understanding of a situation as experienced and perceived by people in the field. The researcher used qualitative methods to provide "a framework for and guidance in making practical, tactical decisions about the evaluation."⁷ Because of the nature of qualitative research, the researcher began with "the understandings of frequently minute episodes or interactions that are examined for broader patterns and processes."⁸ Hypotheses, theorems and models with quantitative designs did not lend themselves to the design in question. A detailed description of the qualitative methodology employed will be offered in the Research Design and Analytical Techniques section of this study.

C H A P T E R I I

REVIEW OF RESEARCH AND RELATED LITERATURE

Introduction

The purpose of this section is to review the literature on the administrative uses of the microcomputer and how the growth of micro-electronics technology since 1975 has affected the administrator's workspace in the public schools. In addition to these two areas, the business use of the microcomputer and the development of the automated business office will be reviewed.

Since the 1960's computers have become a relatively common phenomenon in schools.⁹ However, the use of microcomputers in the field of education has been a recent development. In 1977 just over 50% of secondary schools used computers for administrative tasks.¹⁰ Only since 1979 have microcomputers been extensively marketed to the education as well as business communities.¹¹ Many writers have referred to the new technology as a micro-revolution and compare its impacts to that of the Industrial Revolution. Indeed, the computer is the single most identifiable reason for America's transformation from an industrial society to an information society.¹² A Market Data Retrieval research study presented in American School and University in August of 1985 stated that "the number of microcomputers installed for instructional purposes in the nation's public

schools increased by 75% from fall '83 to fall '84 ... in raw numbers, from 325,000 to 750,000".

Unless otherwise stated, this review will be limited to literature which deals exclusively with the microcomputer. In some instances, for background information, it was necessary to review literature concerning the general use of all types of computers. A definition and brief history of the development of the microcomputer will allow the reader an opportunity to clarify any confusion caused by different terminology presented in the literature.

Many authors define the term "computer" with terms as electronic device, calculator, micro, microprocessor, in hopes of setting parameters for a definition. Coburn, et al., defines a computer as an electronic device that manipulates symbolic information according to a list of precise (and limited) instructions (a program) in order to perform a few very simple operations. He defines a microcomputer as a computer whose central processing unit is a microprocessor.¹³ Presley defines a computer as a machine that accepts information, processes it according to specific instructions and provides the results as new information. He differentiates it from a calculator in that it can store and move large quantities of data at a very high speed, can make simple decisions and comparisons, and can perform many varied tasks by changing its

instructions.¹⁴ Eve and Braverman make a further distinction in their definition. They differentiate the microcomputer from other computers by the fact:

that its major electronic device is located on one chip rather than on several chips. A chip is a collection of miniature electronic switches located on a wafer the size of a thumbnail. Neither the size, price, nor capabilities are such that these items will, in every case, differentiate the microcomputer or even the mainframe computer. Mini computers and mainframe computers will usually allow a large number of people to store information and to use the computer at the same time. Most microcomputers are used by only one person at a time, but there are microcomputers which handle large amounts of information and are used simultaneously by many people. With increasing miniaturization, the minimal distinction which now exists¹⁵ between microcomputers and computers will diminish.

Davis describes a microcomputer as a computer with at least one microprocessor, plus supporting devices. He defines a microprocessor as the central logical unit for data manipulation.¹⁶

In addition to the clarification of what a microcomputer is, there are many technical terms which the administrator must be aware of in order to understand the use and operation of microcomputers. Several authors (e.g., Coburn, Eve, Braverman, and Doerr) include definitions to help the novice.

Most writers trace the development of the modern computer from simple calculating machines (e.g., the abacus) to the first modern computer. Included are machines such as Blaise Pascal's adding machine, the Pascaline, Hollerith's data tabulator, Felt's macaroni box, the Comptometer, and pre-computer data

processing equipment. Most believe that the first working computer was the IBM Mark I computer, developed in the late 1930's by Dr. Howard Aiken. Many changes have taken place since then. ENIAC, developed soon after the Mark I, used vacuum tubes instead of relay switches. These computers, known as first generation computers, occupied several rooms with elaborate wiring and rigid environmental control. The next major accomplishment was made by Dr. John Von Neumann who proposed the idea of storing a program in a computer's memory. He and others designed EDSAC (Electronic Delay-Storage Automatic Computer) in 1949 at Cambridge University in England. By 1950 there were only twelve computers in the United States.¹⁷ It was then that EDVAC, the first electronic computer to use binary arithmetic for machine language, was built.

In the late 1950's transistors replaced vacuum tubes in computers and allowed them to become smaller, more reliable and much less expensive. The transistor computers became known as the second generation computers. Introduction of the integrated circuit in the mid 1960's made possible still smaller, more reliable, and less expensive computers. The integrated circuit combined many electronic parts (transistors, capacitors, and resistors) into a single chip. These computers are known as third generation computers.

In the last ten years many advances have taken place so that the computer has decreased both in size and price to the

point where it is now available to almost anyone desiring one.¹⁸ The development of the computer is from a machine that took several seconds to solve a single addition problem to a machine that can do close to a billion arithmetic calculations per second. In fact, computer technology changes so quickly, writers no longer think of each improvement as causing a new generation of computers.¹⁹

The availability and use of a variety of microcomputers in school districts has led to an increased awareness among many administrators of the processing capabilities of the microcomputer, according to Dr. John Haugo, President of Edu-Systems, Inc. He believes most educators who have an awareness of the microcomputer see potential for its use as a management tool and are asking for more information about applications that may be feasible.²⁰

The technological developments within the last ten years have resulted in increasing memory capacity and decreasing cost of microprocessor chips. Because of these advancements, education has entered a new technological era. It is the purpose of the next sections to review literature on the administrative and business uses that this technology can and will bring to public school administrators.

Defining Administrative Uses of Microcomputers

Because of the relative newness of the topic, most of the information about the administrative and business uses of microcomputers has been found in journals, educational and business magazines, dissertations and position papers offered at various conferences in the United States. Two ERIC (Educational Research Information Center) searches were utilized. The first used the following descriptors with the term Microcomputers: administrators, coordinators, principals, assistant principals, department heads, superintendents, supervisors, faculty, middle management and directors. The second used the descriptors of office and office automation. In addition to the ERIC searches, traditional research practices were used.

This literature review has been divided into three sections. The first pertains to literature reviewing the variety of administrative uses of microcomputers; the second pertains to the advantages and disadvantages of their uses; and the third pertains to the business use of microcomputers. Each of the first two sections are further divided into two. One subsection contains those articles written prior to the development of the microprocessor (1975) and thus concerns applications and administrative uses for larger computers. The second subsection of each is strictly devoted to the applications of microcomputers.

The third and final section, literature reviewing the management and business use of the microcomputer in the automated business office

addresses literature from 1983 to present. By examining the uses of computers before the development of the microcomputer the reader will have a clearer understanding of the advantages and disadvantages of using microcomputers in administration. Also, by examining literature addressing the business use of computers, the reader has an opportunity to transfer those experiences to the school office.

The following authors classified the use of computers into different categories prior to the development of the microcomputer.

Hickey and Newton in 1967 used the term "computer-assisted education" as a general heading for the totality of functions performed by computers in education. These uses included payroll, recordkeeping, scheduling and library information retrieval systems.²¹ Silberman considered the computer applications in education as: a subject of instruction, a tool of instruction, a research and development tool or a management tool.²² In 1969, Glauberman reduced this list to "administrative functions", "instructional functions" and "educational functions" including curriculum evaluation, problem solving, vocational guidance, student counseling and library services.²³ In 1966 the Congress of the United States recognized three areas: first, computerized instruction; second, the use of computers for student testing, guidance and evaluation and the storage, retrieval and distribution of information; and third,

the use of computers for programmed courses of instruction, such as teaching machines, particularly the "talking typewriter".²⁴

The U.S. Office of Education in 1969 categorized its support of computer activities under six headings:

1. Computer-Assisted Instruction and Computer-Managed Instruction (CAI and CMI);
2. Programming for Specialized Data Development and Analysis;
3. Computer Models and Simulation;
4. Data Banks and Information Retrieval Systems;
5. Computer in Administration and Organization;
6. Curriculum and Training for Computer Applications.²⁵

Karl Zinn, in 1969, described an instructional system for computers as composed of all elements including the learner, materials, monitor, author-teacher and administrator.²⁶ Alan Salisbury, after reviewing the above authors, defined administrative functions as those performed in direct support of the "administrator" element. The criterion used by Salisbury was whether or not the primary purpose of the system is to serve the administrator. He concluded that the following elements would directly support the administrator: payroll, record-keeping, scheduling, counseling, curriculum evaluation, vocational guidance, grading systems and some databanks and information retrieval systems²⁷.

After the development of the microcomputers, authors continued to classify the uses of computers paying special attention to microcomputer applications. Baun and Dennis, in 1979, divided the administrative application of computers into

three basic types or areas: financial accounting, student information, and personnel information.²⁸ These authors added a fourth category called "miscellaneous" for all other management activities. In this area they included class scheduling, bus route planning, library catalogue keeping and many others. They concluded that just about any aspect of a school's administrative functions can be assigned to a computer, but they cautioned that the important questions to be answered was whether or not they should be, and if so, how the computerizing should be organized and designed.

In 1979 a report on the administrative uses of microcomputers was published by the Minnesota Educational Computing Consortium (MECC) entitled A Feasibility Study of Administrative Uses of Microcomputers. The report identified the following administrative uses of a microcomputer:

Potential Microcomputer Non-Instructional Applications

Student

1. Student Records (grades, locker numbers, courses, etc.)
2. Census (family)
3. Enrollment Projection
4. Attendance (daily - building)
5. Attendance (annual)
6. Athletic Eligibility List
7. Health Records
8. Mark Reporting
9. Student Scheduling Assistance (not computer scheduling)
10. Transportation (bus route development assistance information from census file)
11. Instructional Management (building level)
 - a. CAM - type
 - b. Student Achievement

12. School Calendar (schedule of work days, holidays, teacher days, etc.)
13. Graduate Follow-up
14. Guidance Records
15. Test Scoring and Analysis

Personnel

1. Personnel Record (certification, seniority, etc.)
2. Salary Simulation
3. Paycheck Calculation
4. Assignment "System" (teaching assignments)
5. Payroll Related Reports (PERA, labor, sick leave, etc.)

Facilities

1. Facilities/Equipment Inventory
2. Energy Management (energy use accounting)
3. Facilities Utilization (percent of building utilization)
4. Maintenance (schedule of records)

Finance

1. General Accounting (budget, receipts, expenditures)
2. Accounts Receivable/Payable
3. Financial Forecasting
4. Lunch Program (lunch counts, inventory and reports)
5. Petty Cash Accounting
6. Vendor Reports and Purchase Orders
7. Certificates of Deposit and Investments (interest rate value at maturity)
8. General Ledger

General

1. Statistical Analysis (research activities)
2. Library Circulation
3. Media Reservations (equipment, scheduling, inventory)
4. Snow Removal Schedule
5. Project Planning and Budgeting
6. Activity Scheduling (extra curricular)
7. Word Processing (newsletters, etc.)
8. Mailing Lists/Labels (students, parents, staff, etc.)
9. Information Storage and Retrieval
10. Ad Hoc Reporting from Large Data Files²⁹

In a survey report conducted by Education Turnkey Systems, Inc. of Washington, D.C. in conjunction with its Microcomputer

Education Application Network (MEAN) the preliminary findings showed significant interest in the following administrative functions using the microcomputer:

- Monitoring of Individualized Special Education Programs
- Test Scoring and Analysis Programs
- Title I Report Generator
- Computerized Curriculum Guides
- Student Scheduling
- Attendance
- Equipment/Materials Inventories
- Grade Reporting³⁰

The surveyed group were school administrators who attended several national conventions.

Coombs, et al., suggested the following needs for storing and processing data using a microcomputer: accounting, alphabetizing, attendance accounting, monitoring and reporting, budget modeling and projection, bus routing, communications, address list, mailing labels, form letter files, data base manipulation, food service reports, forecasting, form files, inventory control and ordering, maintenance schedules, payroll, personnel files and reports, pupil files and reports, pupil scheduling and class lists, and student activity records.³¹

Roeck's study in 1981, based on Norman Watts categories of computer use, classified computer applications in thirteen separate categories, one more than originally declared by Watts.

These included:

1. Administrative
 - Accounting, payroll, and employee records
 - Attendance, grades, and student records
 - Timetabling, planning systems
2. Curricular Planning
 - Resource information file
 - Production of instructional materials
3. Professional Development
4. Library
5. Research
6. Guidance and Special Services
 - Vocational counseling
 - Diagnosis and remediation
7. Testing
 - Test construction
 - Test scoring
 - Test evaluation and analysis
8. Instructional Aid
9. Instructional Management
10. Computer-Assisted Learning
11. Computer Awareness and Literacy
12. Computer Science
13. Institutional Coordination
 - Information sharing
 - Coordination of existing computer services³²

A 1981 extensive telephone survey of secondary school principals conducted by the Center for Educational Management, San Diego State University found the following administrative uses of the microcomputer in California:

1. Attendance accounting
2. Registration and scheduling
3. Testing, grading, reporting
4. Time Management
5. School-based needs assessment studies
6. Inventory control
7. Cafeteria accounting
8. Discipline problem accounting
9. Newsletters
10. Word processing³³

Brown divides administrative tasks into four function areas: decision support, communication, personnel assistance, and task management.³⁴

The National Association of Secondary School Principals in its newsletter, The Practitioner, devoted its October 1983 issue to Managing Computers: What a Principal Needs to Consider. Listed were the following administrative uses of microcomputers:

1. Information management (data base management) comprises such tasks as keeping school attendance records, generating grade reports, making inventory lists, scheduling the school, and maintaining permanent student records.
2. Financial management (spread sheet applications) includes budget projections, student activity accounting, and school accounting.
3. Word processing is used for such things as developing manuals and handbooks, maintaining mailing lists, and producing form letters.
4. Telecommunications involves connections with remote computers via telephone (modem).
5. Graphics capabilities are not highly developed for school administrative use at this time, but can be very useful for displaying data and running simulations to support decision making.³⁵

It can be concluded from the review of this section of literature, that the administrative use of microcomputers can cover just about any aspect of school administration. The 1979 MECC feasibility study appears to be the most extensive and comprehensive listing of uses of microcomputers for school

administration. However, it must be noted, that as new advances are made in software programs and technology, such as those suggested by the NASSP newsletter concerning telecommunications and graphics, other administrative areas will lend themselves to the use of microcomputer technology. Ongoing review of the literature is necessary for the practicing administrator to stay attuned to advances in the possible uses of microcomputers in the school office setting.

Advantages and Disadvantages of Using Microcomputers

Since the 1960's the use of computers in schools, especially larger school districts, has become common. This section of the literature review will examine the advantages and disadvantages of computer use in the administration of schools.

In a paper sponsored by the Exxon Education Foundation in 1979, Richard Dennis examines two basic models of information flow in schools:

1. The "trickle-down" model - Information is collected and processed near the top of the administrative structure and the results flow down to various end users.
2. The "percolate-up" model - Information is collected and processed at the source, processed for the needs at that point, then passed to other administrative levels for appropriate processing at each level.³⁷

Dennis concludes that what is missing in effective computerization is not the technical knowledge one has about computers, but that "the important missing link usually is a very conscious and precise definition of the task of the school persons themselves".³⁸ Because of the rapid expansion and emergence of micro-electronics Dennis also believes that a vast amount of computing power is available to even the smallest school and for a fraction of former costs. He offers his two models to assist school personnel in getting the maximum benefit from their investments in computing and to caution users that careful

attention must be paid to the detailing of information sources and uses. Had school districts done so, the history of school administrative computing would have been much smoother for most participants.

In an attempt to document school administrators' attitudes towards advantages and disadvantages of computers, David Ahl's "Survey of Public Attitudes Toward Computers in Society" (1975) was compared to that of educator's attitudes by David Lichtman in 1976. Lichtman found that administrators were generally far more positive in their attitudes towards computers than were other educators,³⁹ specifically that:

1. Teachers viewed computers in a much more dehumanizing and isolating manner than administrators;
2. Administrators are more confident in their relationship to computers particularly in relationship to privacy of data and mistakes;
3. Both teachers and administrators are more wary of computers in relation to jobs and skills than other people;
4. Administrators overwhelmingly see improvement in the quality of life through the use of computers.⁴⁰

LaChance and Stokka reported the results of a study entitled, Telecommunications and Microcomputers: A Study of the MECC Elementary and Secondary School Educational Computer Delivery System in 1979 to clarify the problem of changing from a large, central computer to a microcomputer.

Their study indicated that there is an advantage to change. The conclusions drawn from the pilot program were that "the distribution of work from the large/central processor to intelligent remote devices is an excellent option....it appears distribution of work from the Computer Center will happen."⁴¹

A similar study on computer use by Roeck, in 1981, introduced the advantage of using a combination of both a microcomputer and a large central computer. Roeck's conclusion was that "...better student records would result if student accounting systems kept on microcomputers for each campus were merged with the schoolwide testing system maintained on a larger computer."⁴²

Haugo offered the following pros and cons of using microcomputers in his paper "Management Applications of the Microcomputer's Promises and Pitfalls". He lists the advantages of microcomputer-based management applications as:

Equipment Cost - A microcomputer with 48K, dual disk drive, card reader, and a printer can be purchased for less than \$3,000. (Today this price is under \$1,000.)

Ease of Implementation - A school district can get started with a microcomputer with very little investment of time, effort, or money.

Ease of Operation - Microcomputers are relatively easy to operate; as such, highly trained technicians are not required.

Flexibility - The school user can achieve the capability of downloading or extracting portions of a district's data base from a large computer to a microcomputer.

Multi-purpose use - The same microcomputer can be used for administrative and instructional applications. By having multiple units within a district, there would be backup in the event of equipment problems.

Operational responsibility - District staff are responsible for hardware operation and maintenance; for securing or supplying hardware; and software selection and maintenance.

Software cost - The cost of purchasing commercially developed programs for microcomputers is much less than programs for larger computers. Programs for microcomputers can be sold in much larger volume than can programs for larger computers, and they are typically less complex.

User Control - The local school district can own the equipment, use it exclusively for their use, and completely control its use and operation.

The disadvantages of using the microcomputer for school management applications are:

Available software - Most current administrative programs have been developed for large computers. There are very few administrative programs with documentation currently available for microcomputers.

Difficulty of application development - It is relatively easy to develop fairly simple programs for microcomputers; however, more complex programs, in particular those that make extensive use of files and require extensive data manipulation and updating, are difficult to develop on a microcomputer.

External reporting - As compared to larger computers, external reporting and integration are more difficult with stand alone microcomputers.

Integrated applications - Due to the limited size of core and mass storage, it is not feasible to develop integrated data base systems by using microcomputers.

Limited usability - Some management applications require large machines to run (computer scheduling of students, large sorts, large volumes of data storage) and are not amendable to small computers.

Reliability - There are some problems with reliability of data storage on diskettes commonly used with microcomputers.⁴³

Haugo concludes by stating that the users of microcomputer-based management applications can receive support services in the form of training, trouble shooting, and other user services from software vendors, publishers, local district services staff, and in some instances through the use of user manuals. He cautioned that the users will have to be more self-reliant. However, "the advantages and the economies of use will see widespread use of microcomputer-based applications for school management purposes in the not too distant future".⁴⁴

Many authors cited the building administrators' interest, knowledge and enthusiasm as important contributors as to the way computers are viewed in district schools. Kehrer and Schepis reported that their work with the Broward County Florida schools proved that the microcomputer is a viable and reliable administrative tool. Their findings are

summarized below:

Software packages exist for all facets of administrative tasks. The following list summarizes those tasks as implemented in Broward County:

Data-base packages are used for:

1. Activity calendars
2. Athletic schedules
3. Athletic statistics
4. Attendance lists
5. Course offerings
6. Equipment inventory
7. Master schedules
8. Media center statistics
9. Referral statistics
10. Requisition information
11. School calendar
12. School facilities
13. School keys
14. School parking
15. Teacher schedules
16. Textbook inventory

VisiCalc is used for:

1. Enrollment projections
2. F.T.E. preparation
3. Salary schedule simulations
4. School budget

Word processing is used for:

1. Daily bulletins
2. Faculty correspondence
3. Newsletters
4. Handbooks and manuals
5. School reports
6. School calendars
7. School surveys

This list is by no means complete since specific applications are only limited by need and creativity of the administrator. This process gives new meaning to the concept of "Computer Literacy".⁴⁵

They conclude that "it is still the enthusiastic and creative nature of the individual administrator who develop the time-saving potential of the microcomputer".⁴⁶

Bowers, in a position paper delivered at the 1982 Association of Educational Data Systems Conference in Washington, D.C., concluded his remarks with the following statement:

The microcomputer's potential as an administrative tool is tremendous...Administrative applications with the microcomputer open up a new management alternative to school administrators who previously were unable to make effective management decisions because of the lack of information organized in the appropriate manner.⁴⁷

In contrast to Kehrer, Schepis and Bowers, a 1981 study by the Center for Educational Management: Research and Training within the greater San Diego County area found:

Of approximately 580 microcomputers in use in schools within the county, only four school principals, (one elementary principal, one secondary principal, and two vice principals) had microcomputers in their offices and were making administrative use of them.⁴⁸

Corbett (and others) concluded their study stating that "the most important individual influencing the rate of change and/or introduction of an innovation in a school is the principal". The study showed that school principals are not interested in microcomputers for administrative use in the San Diego County area.⁴⁹

Cutts, Mathews, Winkle and Nichols in a 1982 NASSP Bulletin concurred with Corbett, as did Cromer, Thompson, Hoover, and Gould; the key to microcomputer use in schools lies with the educational administrators.⁵⁰ Unlike schools, business

offices have already been transformed into electronic offices. The benefits of using microcomputers, according to these authors, are that the same effectiveness and efficiency that has been brought into business offices could be brought into schools. Other authors specified systems and software programs for microcomputers that have proven to be more advantageous than centralized computer terminals. These studies have shown that the microcomputer can perform necessary functions in the areas of student scheduling, recordkeeping, report cards and attendance.⁵¹

George Uhlig, offers an important view concerning why many administrators are not using microcomputers. He believes that many administrators are more familiar with larger systems because they have large amounts of resources devoted to the system and its operators. These administrators have an automatic resistance to change. He states that this resistance against microcomputers is not restricted to public school administrators, but is found at nearly every installation where a mainframe computer has been in place for several or more years.⁵²

Brown's 1983 report entitled "The Administrator's Use of Microcomputer Systems" concluded that most of the evidence regarding increases in manager's productivity is anecdotal and that no quantitative data to support such claims are offered. However, he claims, the belief that microcomputers

can increase managers' productivity seems to be widely held. Brown cites such authors as Hackathora and Keen (1981), Stein (1982), and Ridge (1980) as examples. In a very well documented article, Brown made the following statement:

"Microcomputers can be a valuable tool to help administrators solve a variety of problems."⁵³

He believes the microcomputer can aid the administrator in the use of electronic worksheets, graph and chart formulating aids, data base management systems, computer-based message systems, electronic mail, word processing systems, and a variety of programs to assist in office tasks.⁵⁴ On the question of reliability, Brown cited a MECC study which found that "microcomputers had not been around long enough to adequately assess reliability."⁵⁵

Croner, reporting on the conclusions of a 1983 EPCOT Symposium on Education and the Information Age, stated that school administrators in an Information Society will have more of a variety of information at the building level concerning school based management programs that will allow them to make decisions that would otherwise be made at a district level. The shift in the Information Age will be towards decentralization. The principal's role will be as the educational leader, staff developer and neighborhood liaison, as well as manager and program entrepreneur.⁵⁶

The Mims and Poirot study identified, validated and ranked a set of computing competencies required of school administrators to stress the importance of school building administrators' key role in persuading the advantages a micro-computer can bring to their office. They believe the following eight competencies are necessary for administrators to meet responsibilities in administrative and educational computing:

1. Be able to justify the cost of educational computing;
2. Be able to discuss values and benefits of computerization in education and society;
3. Be able to identify possible funding sources for instructional and administrative computing;
4. Be able to identify training needs of teachers using the computer as an object of instruction, as an instructional medium, and as a problem-solving tool;
5. Be able to demonstrate an awareness of future trends in computing as they relate to educational computing;
6. Be able to describe the computer training needs of students who will be entering the job market in the near future;
7. Be able to identify training needs of teachers and administrators related to the administrative uses of computers in education;
8. Be able to identify various alternatives for using computers in instruction.⁵⁷

Donald R. Johnson views concurred with many other authors such as, Cutts, Mathews, Winkle, Nichols, Cromer, Thompson and Mims and Poirot that school managers can make the difference in a successfully automated school office. He believes that before any equipment is considered for purchase, administrators need to identify problems, set goals, and select the best alternatives.⁵⁸

It can be concluded from this section of the literature review that many authors believe that the school principal is the driving force behind the implementation of microcomputers into their workspace. Many authors believe that the administrators' attitudes concerning what a large computer can do for them is extremely positive. However, there seems to be conflicting opinions about information as to whether the administrators' attitude towards microcomputers is as favorable as that attitude towards computers in general. As we move into the Information Age many schools and school districts will have to reassess the way they process the information which allows them to operate their schools. Planning, goal setting, and the identification of problems are essential elements to success. Whether administrators choose to focus on a centralized or decentralized system of operation, the use of computers will play an important role in decision making.

Business Use of Computers In An Automated Office

Jay R. Galbraith and Robert K. Kazanjian reported in 1983 that in the mid 1970's there appeared to be a strategic redirection and expansion in the office products industry. The shift from stand alone products (e.g., typewriters, copiers and dictating machines) towards an industry built around developing microprocessors, computers, and telecommunication technologies began to emerge. The researcher discovered it wasn't until 1983 that significant literature was available discussing the uses and problems that these new technologies brought to office automation. This section of the review of literature will address the uses and problems of the new technologies in business from 1983 to the present. The researcher concluded that because of the rapid changes in the technologies and the emergence of new technologies, the problems encountered by businesses are ongoing. They concern such questions as: (1) what should be automated?; (2) who should be trained?; (3) what hardware and software can be utilized for the end result desired?; and (4) when should the office be automated? These concerns will be addressed in the context of what year the article or study was completed to give the reader an understanding of the development of the automated business office.

Willoughby Ann Walshe declared 1983 as the "Year of the Executive Computer". She stated: "...Due to this sudden interest in computing power by people in the upper echelons of the office, it is possible there will be more new users of computers in the

12 months of 1983 than in the entire 25 year history of these commercial machines."⁶⁰ Willoughby believes that the personal computer offers a wide variety of software application packages including spreadsheet analysis, management reports, graphic representations of information, electronic mail capabilities and access to large computer databases. She also believes it is imperative for business people to gain experience with personal computers and to "...put the new tools to use in board rooms and meetings to generate reports and slides, communicate messages to remote sites, access information in large computer databases, and handle teleconferences among company executives."⁶¹

A 1983 Diebold Group Study on Stages of Growth in Office Automation reported that major corporations experience near complete penetration in word processing and have named electronic mail as an office automation function which most big companies use and accept. The study also stated that decision support systems, the use of graphics and personal computing were moving somewhat slower. The study cited the most significant inhibitors as machine-to-machine communications in a multivendor environment.⁶² Brenda Pena, manager of network development at Equitable Life Assurance Society, concurred with this portion of the study and described the communications problem as an "industry in turmoil, segmented, competitive, non-cooperative." She forecasts years of continuous, unpredictable changes concerning machine-to-machine communications.⁶³

In contrast to these views another 1983 study by Honeywell, Inc., entitled Office Automation and the Workplace, found office automation "not yet widespread". The study involved 1,262 secretaries, 937 managers in 433 establishments of over 100 employees. The survey disclosed that half of all offices did not have word processing and that Southern firms were least likely of all to have office automation equipment.⁶⁴

A paper delivered by Chemical Bank Vice President John Binkowski at Info '83 in New York concurred with the Honeywell study. Binkowski chided business for lacking the ability to absorb the benefits of office automation already available. He believed that blame should be placed on the senior executives who "are unable to articulate what impact information technology is, or should be, having on their businesses."⁶⁵

Recommendations to automate an office or business were cited in Walter A. Kleinschrod article, "Why Automate? No One Knows Better Than You". Kleinschrod advice to executives was to start small, with a pilot study, but include basic planning and "strategize...try to see your entire organization as it moves and confronts others and tries to succeed in the total world around it."⁶⁶

Eugene Raudsepp examined another way of developing effective in-house office automation committees in his article "Building Team Spirit". The premise for the article was based on two assumptions. The first, that because complex technology and events greatly affect business today success demands organizational teamwork. The second

that the whole group and its goals should take precedence over any member.⁶⁷

Both of the above authors cited basic planning and teamwork for the success to office automation. Patrick Flanagan, in his article "Fitting PC's Into Your OA Plan - How the Personal Computer Shifts Office Strategies" stressed the importance of the manager, who must be interested and knowledgeable in PC's.⁶⁸ Henry Lee, President of Lee Pharmaceuticals in South El Monte, California, also agreed, as was cited in Flanagan's article. Flanagan concurred with Raudesepp and Kleinschrod stating that clear goals must be established. He recommended focusing on the following areas:

- End-user needs and applications in terms of total office automation systems.
- Defining the corporate attitude toward automation on a broad scale, as well as for PC's.
- Evaluating PC's as effective tools for users.
- Establishing policies for the implementation and administration of PC purchases or leases.
- Setting priorities for executing suggestions to top management.⁶⁹

Flanagan also recommended that a PC must be able to interact with office automated systems on four different levels:

1. Central data processing unit. PC's become part of the network, therefore, they must either be capable of becoming compatible with the mainframe or be loners by intent.
2. Data Input. PC's act as intelligent terminals and as keyboarding units for word processing and other forms of data entry. Networks are also required to transmit data as near or as far as is required.
3. Data retrieval. Hooked to the PC's must be a graphics terminal, draft and letter-quality printers, an intelligent copier, and facsimile units.

4. Records Management. Compatibility with information storage devices - ranging from microfilm to automated document storage and retrieval systems that store micrographic images.⁷⁰

Flanagan offered a plan for immediate realities, citing that affordable technologies in all of the areas above would not be a reality until 1990. The steps in the plan include the identification of what PC's can do for an organization, a study of how information flows within an organization and the anticipation of future needs of the organization.⁷¹

James M. West, a manager for the Xerox Corporation, recounted his first year experiences using an executive workstation in an article entitled "Living the Automated Office". West identified with the necessary steps Flanagan believed to be important. He stated:

In the past year, I have been able to identify 33 typical tasks, under six general categories, where automation can be applied. The more structured and repetitive, the more dramatic the payoff...On the value-added side, the automated office represents new alternatives for professionals in terms of greater activity, diversity, and productivity. Combine these elements with better turnaround and organization, plus savings in labor, supplies, printing, graphic arts, communications (postage), and file space.⁷²

West used his workstation for graphic transfers, overhead transparencies, record files, follow-ups, buck slips, electronic message scratch pads, and electronic versions of official company stationary. In addition to these tasks, mail processing, date stamping, calendars, travel itineraries, document filing, to-do lists and telephone messages were included.⁷³

The researcher concurred with Kleinschrod that in 1983 confusion centered around office automation.

With the personal computer, however, with thousands of application packages to choose from, the management not always in control of who is choosing what, some PC's are being used by executives for financial analyses, some are being used to access databases, some are interchanging electronic mail, and some are still in the hands of secretaries for basic word processing work. These are stand-alone PC's incompatible PC's and PC's tied to impressive office automation networks. "The Way" is a seeming jumble.⁷⁴

Kleinschrod believed that the PC's have paved the way. He compared the use of PC's to that of word processing. He stated that word processing got office executives to appreciate the power of electronics in handling business information. That word processing "lit a theoretical pathway to larger-scale office automation." He concludes that executives now tinker with spreadsheets, leave and receive electronic messages and think about a PC link-up between office and home. Kleinschrod states that this can only lead to clearer goals for the automated office.⁷⁵

When examining literature and studies from 1984, the researcher discovered that many articles focused on the benefits and uses of office automation. The reoccurring theme of basic planning and teamwork was offered by Lawrence W. Lynett's article "Introduction of New Office Automation Technology Cries Out for a Team of Managers, Users, and DP Staff". Lynett stated that the "...introduction of new office automation technology cries out for a 'team' of managers, users and data processing staff."⁷⁶ He believed that middle

managers, professionals, and administration all agree that the implementation of office technology is a mandate. When dealing with office automation, Lynett states that a consortium of management and data processing professionals, administrators, and users must form an office systems planning team. The basic questions which must be asked are: Who is doing what, for whom, with what, how and why. In summary Lynett believes that "...the current scenario of successfully integrating office technology is very similar among the companies involved - don't attempt to automate everything; study, plan, review, test incremental pilots, train, build, add, integrate and support."⁷⁷

Patrick Flanagan's article "What I Use My PC For" examined the experiences of managers using P.C.'s. He believed that "many are reaping the benefits of this increasingly important tool, but a successful 'union' is more than just a matter of luck."⁷⁸ He attributed specific factors for the smooth transitions among management users. The factors include: acquiring some computer literacy during the assessment and justification stages; being receptive to using new technology, including prior experience with small computers; increasing degrees of user friendliness and vendor support and locating administrators who fast become and qualify as "old pros". These managers, according to Flanagan's study, use microcomputers for:

- Spreadsheets for planning, budgeting, number crunching, and other administrative functions previously done with a pencil and electronic calculator.

- Word processing, most often for integrating limited text into financial reports, rather than personally keyboarding correspondence and lengthy documents on a regular basis.
- Communications with other PC users at the same and other company locations, between suppliers and clients and for electronic mail - although the latter use is resisted because the telephone is preferred.
- Data transmissions and exchanges, both to the in-house mainframes and with outside services.
- Graphics for internal budget presentations, report simplifications, and "what if" calculation summaries.⁷⁹

A study by David Steinbrecher agreed with Flanagan's findings. Steinbrecher stated electronic mail, spreadsheets, project management, word processing, presentation graphics, and database management as the variety of application uses for computers.⁸⁰

Based on the experience of managers, Flanagan's study offered the following as important considerations in becoming an effective PC user:

- Explore the hardware and software fully before making a decision.
- Learn one step at a time; avoid setting unrealistic deadlines. Expect to put in some hours after five P.M.
- Ask colleagues for help. Those who now use PC's will ease the process and help translate the manuals.
- Be prepared to share. Teaching your secretary to use the PC makes for greater managerial efficiency, and colleagues will also want keyboard time.
- Frequently back up as you work. At first you can make mistakes that could wipe out hours of work, and later you can lose valuable resources.
- Use what you learn to become a home computer owner. Having a compatible PC in the den is one way of reducing the time you spend in the office after hours.

Like Lynett and Flanagan, Garret VanSeters, believes that the extent to which a computer is used depends largely on the selection

of the system, the amount of training acquired by the manager and the manager's willingness to use the system. He believes that "...most general business functions, such as accounting, order entry, inventory management, word processing, invoicing, and client management, can be handled successfully by a good computer system."⁸²

Van Seters, like many of the other authors, believes a formal set of objectives of computerization are necessary for effective planning. General objectives might include:

- to increase productivity;
- to reduce the cost of processing any item;
- to cut down on errors by eliminating or reducing the number of times a single task is processed;
- to increase the value and timelines of information;
- to provide needed information that previously was not available;
- to make more effective use of human resources by replacing detailed⁸³ tasks with creative and management functions.

Van Seter concluded his article by stating

...Computerization is an ongoing process; it doesn't stop. You shouldn't wait until you have thought of all the possibilities for using the computer before buying one. Don't necessarily wait to buy because⁸⁴ you assume tomorrow there might be a better one.

Van Seter's views on automation was supported by the New York based Omni Group Study "The Office Automation Challenge: American Business Responds". According to this survey conducted in 1984 more than half of the nation's largest corporations already have strategic plans to automate their offices. All but fifteen percent of the Fortune 500 Industrial and Service Companies surveyed

estimated that by 1985 they will have plans in place that govern the way in which electronic mail systems, word processors, personal computers and other office automation tools will be evaluated, purchased and installed. Medium-sized and small companies (those with fewer than 100 employees) have fewer formalized plans. However, approximately 50 percent have plans for developing strategies within the next two years. The study also found that roughly two-fifths of the Fortune 500 Industrial and Service Companies use some form of local-area networks which allow different electronic office tools to communicate with each other. By 1985 nearly three quarters expect to use local-area networks along with 35 percent of medium-sized companies and one quarter of small companies.⁸⁵

In line with this study and the projected trends for office automation use, Kathleen Foley Curley believes that there are variables which affect success when installing office automation technology. She concurs with Klimschrod, Raudsepp, Flanagan, Lynett and VanSeter and concludes that "...the variables affecting success include using the equipment for specific beneficial goals, experimenting to see what results are achievable and providing good support systems."⁸⁶

Larry L. Hamilton offers additional guidelines for managers who wish to automate their office. The first guideline, similar to what other authors have stated, is for managers to learn how computer-based technology may be used in the business. Managers

must ask the question - What functions can computer-based technology perform? He states the most helpful source of information is people who use computers in similar businesses. He warns managers not to be sold on the very first system. Hamilton recommended that managers become involved in computer clubs, courses, and seminars to learn basics about what makes one kind of computer and set of software more suitable than another. The second guideline was to hire a consultant to assist in a technology needs assessment based on a business plan. The plan should address the following: applications to be performed, hardware and software needs, training needs, growth impacts, and cost estimates, "It also should designate who has the responsibility for planning and managing the technology, the data, and its use."⁸⁷

Betty Jo Licata offers further guidelines. She believes the success of management information systems, teleconferencing, message systems and robotics depends on how effectively they are introduced into the office. Licata states that solicitation of employee input is needed to overcome resistance to change and encourage acceptance of the new technology. The potential impact of office automation must be studied at the individual employee level as well as on the total organization. The results can be positive and negative. Positive impacts include improved intellectual performance, increased work discipline, reduction in wasted time, increased efficiency, increased timing and control, increased visibility, increased quantity and quality of work,

increased flexibility of time and location of work, and improved quality of work life. Negative impact include boredom, feelings of isolation, problems of dependency and stress, decrease in organizational loyalty, decrease in quantity and quality of social interactions and decrease in the quality of work life.⁸⁸

Dr. Edward J. Lias concurred with the above mentioned authors and stressed the importance for a company to invest in a master plan. He offered the following objectives as reasons when a master plan is a necessity:

- To bring order to a complex or dynamic activity.
- To enable a company to budget for a predictable, scheduled expenditure.
- To eliminate surprise requests for funds trickling to management repeatedly.
- To give credibility to a costly venture.
- To focus the attention of many people on a worthy activity.
- To pace and schedule the rate of change or rate of growth, thus governing the expenditure.
- To promote change to prompt action such as the upgrading of skills or the adoption of new procedures.
- To involve many people at many levels during times of rapid change.
- To stimulate innovative ideas and alternative options.
- To air frustrations, shortcomings, and misgivings.
- To establish or reestablish management by objective.
- To assist the distribution and implementation of new ideas or procedures.
- To provide a management tool for measuring outcomes, scheduling events, and planning for profit.⁸⁹

Belden Menkus, editor of Data Processing Auditing Report and Journal of Systems Management sited a September 1984 study of 701 corporate managers and professions at major U.S. firms to substantiate his beliefs. He stated that office automation will continue to refashion the working environment for executives as new software

and personal computer products give greater control over tasks and enable business managers and executives to accomplish more. The study cited by Menkus concluded that: 75% of those surveyed had access to some form of word processing; more than half were using some type of personal computer; 40% had begun to use such specialized office automation tools as electronic mail; and 80% felt that access to office automation tools let them do more work of higher quality in less time.⁹⁰

In summary, the researcher concluded that office automation made more inroads in 1984. Planning was the essential element for success as stated by many authors. Team work was important in the process as well as the manager's role. The manager appeared to be the critical key in the success of computer utilization in business. Word processing, spreadsheets, graphics and database management were used extensively in business in 1984.

The year 1985 brought additional information and research to the office automation scene. The authors and studies continued to address the uses of computers, the role of the managers, and the effect that the new technologies will have on the business community.

John J. Connell, executive director of the Office Technology Research Group believed that managers may be retarding progress towards more flexible, functional office systems. Connell offers two theories. The first holds "...that office automation is word processing - a task performed by the clerical staff and therefore

low among corporate priorities."⁹¹ The second theory is the belief that telecommunications, data processing and central services have converged. The result being a "...jumble...rooted in different disciplines...a situation that prompts infighting."⁹² Connell believes that office automation is less about machinery than about a new way of thinking about the way work is done. He believes the tools of automation should aid the manager to communicate faster and more efficiently. However, he believes many powerful executives adhere to antiquated approaches and cannot see the sense of alternative strategies. Thus, they adhere to one of the two above theories presented.

A study by the Omni Group in New York City concurred with Connell's claim that managers are retarding progress towards office automation. The study found that more than one-third of managers and executives surveyed cited boredom as a critical problem associated with computer use; that 49 percent of executives and managers who do not use computers doubt whether they would affect their own productivity; that 36 percent questioned whether computers would help them; that 19 percent believed computers are not appropriate for their jobs; and that in more than 60 percent of the Fortune 1000 companies surveyed, managers have started to delegate computer-oriented tasks to support staff.⁹³

Mark Krupka, director of marketing at Digital Learning Systems, also agrees that executive "computerphobia" is blocking the full acceptance of office automation. However, he offers a different

theory for the reason. Krupka believes that software developers have focused their efforts on business productivity programs that meet the needs of support personnel. These include word processing, accounting, and spreadsheet analysis. "In effect, the industry has concentrated on entering the office through the back door. We need more conceptual programs that the business executive can relate to"⁹⁴ stated Krupka.

A study from the Newton-Evans Research Company entitled "Micro-computer Usage Trends in Key Industries" presents another similar view. This study reported findings by categorizing different industry groups with their needs and uses of micros. The study reported: that in the manufacturers group about 37 percent of all micro users were white-collar workers; that most of the 360 manufacturing respondents believe the accounting department has the most need for personal computers; that in the banking group category 44 percent of the users were managers and executives; that the accounting department leads the way in "need for" micros; that in the retailers and wholesale trade business group managers and executives compose 44 percent of the users; and that spreadsheet analysis is the most widely used application, followed by word processing, accounting and sales analysis.⁹⁵

In contrast to these reports which tend to demphasize the growth of computers and the managers' interest in their use, other authors continue to build on the advances made with the new technologies. Darold R. Klauk presents possible reasons for the

differences. According to Klauk many organizations are taking full advantage of the benefits of Office Automation technologies and at the same time are setting strategies to accommodate tomorrow's technologies. In contrast, other organizations are just beginning to realize the importance of office automation and its impact on the whole organization. The gradual acceptance of office automation and the theory that improved office productivity can be achieved has produced a set of issues new to these organizations. Klauk states, "Decision makers, financial managers, and potential end users are having to come to grips with such issues as what is the best technology, who should receive the technology, what are the goals and objectives for use and management of this technology, and who in the organization has the most to gain or lose from this technology."⁹⁶

Klauk believes a plan is essential and is the key to understanding the issues and answers. He states that the most critical component of the plan is that of maintaining continuity from one technological phase to the next. The plan must address "automated facilities such as electronic mail, automated calendaring and scheduling, electronic spreadsheets and image and records processing."⁹⁷ It must also address new technologies such as "...voice annotated documents, telephone integrated into workstations, voice activated workstations, natural language user interfaces, artificial intelligence (computers that learn), full-motion video conferencing and erasable optical disks."⁹⁸ The end result of a good office automation system has the potential to; "(1) help management make better and faster decisions, (2) reduce personnel costs,

(3) reduce floor space and storage requirements, (4) improve document processing time, (5) increase the level of interoffice communications, (6) enhance the quality of work products, and (7) improve the quality of work life."⁹⁹

James Carlisle, president of the Office of the Future, Inc., agrees with Klauk. He believes that "office automation is an evolving process. The implementation never ends."¹⁰⁰

Lamont Wood concurs with both Klauk and Carlisle, that planning is essential and on going. He believes that the needs, demands, and quirks of the users require close attention and cited many instances where the users help develop office automation plans.¹⁰¹ Wood states that "experience with initial office automation plans has compelled managers to question the true utility of some technologies and views others with a new light."¹⁰² He quotes several manager's views concerning their involvement with office automation and the positive results that they have experienced because of careful utilization of the technologies.

Thomas L. McDole agrees with the above mentioned authors that with careful planning most problems can be overcome. He believes office managers must consider more than the obvious question of which system to purchase. According to McDole the following questions must be answered:

- Will automation yield benefits of a significant magnitude to warrant its expense?
- What effects will the changing over to a new system have on employees?

- Will automation necessitate other changes in the physical office environment?
- Will automating one department have a ripple effect on the entire organization?
- Will the transition to automate result in a temporary decrease in productivity and work stoppages effect the organization during that time?¹⁰³

Information technology has not only changed the managers' role but also the office structure. It has also influenced business strategies. These changes have led to the development of a number of new trends in the business community, as reported by the following executives.

According to James A. Henderson a number of private and public organizations have established internal Information Resource Management (IRM) units to bring focus and order to the issues and problems produced by the information/information technology explosion. Henderson states that the IRM units handle "functions such as: computing services, word processing, telecommunications, office automation, paper work management, media services, printing, micrographics, libraries, mail services and management analysis services."¹⁰⁴

William R. King, Professor of Business Administration at the Graduate School of Business at the University of Pittsburgh believes "that recent advances in computer technology and developments in the business environment mean that many firms can gain an information-based comparative advantage. By ensuring that its information technology supports its business strategy, a firm can

effectively focus its information resources."¹⁰⁵

W. Douglas King, Executive Vice-President of South Carolina National Bank, believes the future is bright for electronic banking.¹⁰⁶

Ronald L. Aldrich Jr., Vice-President of Information Services for Policy Management Systems Corporation states that "through the use of the Information Bank, agents, companies, and third-party vendors of insurance data are better able to manage the increasing amounts of insurance-related information. Costs associated with the management of that information are reduced, the flow of information is streamlined, and the information is timely and accurate."¹⁰⁷

Thomas G. Faulds, Executive Vice-President of Blue Cross and Blue Shield of South Carolina agrees with the other executives concerning the benefits of technology in their fields. He states that "information transactions have changed the nature of the financial services industry. The technology has given participating companies a competitive advantage as they extend their business into new employee benefits services."¹⁰⁸

Frederic G. Withington, Vice-President of the Arthur D. Little, Inc., Cambridge, Massachusetts believes "by the year 2050, it is safe to say that anyone on earth willing to carry a tiny device can be in video communication with any other person or with any information source, wherever they may go."¹⁰⁹

The researcher concluded that the successful use of new technologies depends on the manager's role, the organizational plan, and the user's commitment. Most aspects of business can utilize the new technologies if a plan is in place and the user can adapt and control the end result. Dr. Ralph T. Hocking of the University of Pennsylvania stated:

The increased rate of change in computing technology, however means increased investment of time. Initially, we must learn to operate a given computing system; thereafter, additional investments in learning will be needed as technology changes.¹¹⁰

New technologies which managers, executives, and administrators must become familiar with include such items as CD-ROMS (compact disk read-only memories)¹¹¹, LAN (Local Area Network)¹¹², super-minicomputer¹¹³, laser optical disks¹¹⁴, propriety chip technology¹¹⁵, and RUA (Report-utility analysis)¹¹⁶.

In summary, the following conclusions can be drawn from the three sections of research and literature review:

- The administrative use of computers in the school office as well as those uses in the business office appear to be unending. In most cases there are programs available to meet the needs of both types of offices. Technology advances so fast that both the administrator and business manager must continually update their knowledge on hardware and software advancements.
- The attitudes of both school administrators and business managers play a major role in the utilization of the new

technologies. Their role as a decision maker, makes the difference if advancements in the use of computer technology occur in their office or business.

- The school administrators attitude towards what a larger computer (mainframe) can do for them is extremely positive. There are conflicting opinions about information as to whether the administrators' attitudes towards microcomputers is as favorable. Also, there are conflicting opinions concerning the business manager's attitude towards his use of microcomputers in the automated business office. Many rely on the services of the data processing center.
- Planning, goal setting and the identification of problems are key ingredients for the successful use of computers in the office setting. Questions, such as: What should be automated?; Who should be trained?; What hardware and software can be utilized for the end result desired?; and When should the office be automated?, are common questions that must be answered. Each advancement in the technology has to be carefully analyzed to see if it can be successfully utilized in either office setting.
- The effect of the new technology will change the role of the business manager and will influence business strategies.
- The use of computer technology will play an important role in both the school and business communities. Schools and school districts, as well as businesses, will have to reassess the way they process information as new developments are made.

C H A P T E R I I I

RESEARCH DESIGN AND ANALYTICAL TECHNIQUES

This section describes in detail the design of the study and documents the techniques used. The purpose and objectives of the study called for a research design which allowed for the collection and discovery of perceptions from individuals, the defining of characteristics of a social phenomenon, as well as the understanding of the forms and variations of those forms it assumed. Many researchers support the idea that the researcher must choose a method which is appropriate to the intent and circumstances of the study as well as the subject.¹¹⁷ Patton concurs when he states: "The paradigm of choices recognizes that different methods are appropriate for different situations."¹¹⁸

In great detail Patton, Lofland and Filstead define qualitative methodology with research strategies that include: detailed descriptions of situations, events and people; direct quotations from people about their experiences, attitudes, beliefs and thoughts; participant observation; in-depth interviewing; and case documentation. It is the intent of this researcher to use these research strategies and be committed to a design that is "relevant, rigorous, understandable, and able to produce useful results that are valid, reliable and believable."¹¹⁹

Researchers, such as Patton, Wolf and Tymitz House, Menzel, Sechrest, Barker, Cutmann and others offer definitions on process evaluation which strongly support naturalistic inquiry techniques for evaluation models.¹²⁰ Because process evaluations seek to understand the perceptions of those closest to the problem, this researcher used process evaluation methodology using the case study approach. Documentation of individual client outcomes plus a great deal of description of the program and the experiences of those in the program allowed the researcher to gather systematic, comprehensive, and in-depth information about each case of interest.

The preparation of the case study followed two logical paths: the selection of the participants and the development of an instrument, a combination of an interview guide and standard open-ended interview guide.

The unit of analysis of the study was one school system. The findings of this research effort will aid this system in making critical decisions concerning the four objectives under study. The participants were selected randomly from the unit under analysis using a combination of stratified sampling techniques advocated by Gay¹²¹ and purposeful sampling techniques as explained by Lundbert¹²², Patton¹²³, Schatzman and Strauss¹²⁴. In this way a random sample of the unit of analysis was interviewed using a combination of an interview guide and a standard

open-ended interview guide.

The 23 principals in the unit of analysis were divided into four groups. The grouping of the principals was based on school size, population, and grade level. The first and second group included those principals of the K-6 grade level buildings. The first group included those buildings with a population below 600 students, and the second group comprised those buildings with a population above 600 students. The third division included the four junior high schools, which are unique because students remain there only two years as compared to several years in the other divisions. The fourth group was based on the one building housing grades 9-12 students under the house plan organization. (see Appendix A).

Each of the 23 principals were assigned a number which was placed in a container. Numbers were drawn from the container from each of the four divisions. This method of sampling was advocated by Gay for use when involved with a small population.

...One way to do this is to write each individual's name on a separate piece of paper, place all the slips in a hat or other container, shake the container, and select slips from the container until the desired number of individuals is selected.¹²⁵

From each strata a proportional number of principals were selected. Group 1, population below 600 contained three principals; Group 2, population above 600, contained four principals; Group 3, junior high schools contained two principals; and Group 4, high school

contained two principals.

Once the participants were selected interviews were arranged. (See Appendix B). The purpose of the interviews was to understand how the participants viewed the use of microcomputers, to learn their judgements and to understand the complexities of their individual experiences and perceptions. A combination of an interview guide approach with a standardized open-ended approach was used. According to Patton it is:

...possible to combine an interview guide approach with a standardized open-ended approach. Thus, a number of basic questions may be worded precisely in a predetermined fashion, while permitting the interviewer more flexibility in probing and more decision-making flexibility in determining when it is appropriate to explore certain subjects in greater depth, or even to undertake whole new areas of inquiry that were not originally included in the interview instrument.¹²⁶

The interviewer manual utilized was an adaptation of one developed by the Institute of Governmental Services from the University of Massachusetts, Amherst by Frank Rife, et. al., titled, Evaluation of Automation on State Agencies, Type II Agency. Using this manual as a guide the researcher added additional concerns and listed those concerns of others who have a close connection to the research and the objectives which it wished to meet. This procedure was described by Lofland in his work Social Settings.¹²⁷ The resulting interview manual (see Appendix C) focused on the following categories:

- Individual experiences and perceptions concerning microcomputers
- Individual concerns about their introduction to micro-computers and use of training programs
- Individual concerns about the flow of information in schools
- Individual perceptions of skills needed by administrators in a technological age
- Individual perceptions concerning the future use of computers in the school setting.

It should be noted that the purpose of the interviewer manual was "to make sure that basically the same information was obtained from a number of people covering the same material".¹²⁸ All interviews took place at the convenience of the interviewee at a location and time of his or her choosing. The interviewee was told that the interview would be taped in order to increase the accuracy of data collection advocated by Lofland and Patton.¹²⁹ Immediately after each interview, a one-hour period was allotted to review the tape, take additional notes, and make observations concerning the interview itself and begin the task of categorizing the data.

All data from the interviews were analyzed and organized into category systems such as those advocated by Guba.

Focusing problems have been defined as emerging from the analysis, categorization, and interpretation. Two sub-categories of problems were identified: problems of convergence, involving the development of categories within which data may be assimilated, and problems of divergence,

involving the "fleshing out" of categories with whatever additional information is required for completeness and thoroughness.

...The task of converting field notes and observations about issues and concerns into systematic categories is a difficult one. No infallible procedure exists for performing it.¹³⁰

The researcher collected data and sorted the information from the interviews into categories based on Guba's criteria of internal homogeneity and external heterogeneity. This system allowed the researcher to place the data into categories and check the accuracy and meaningfulness of the categories.

In addition to interviews, field observations of actual offices were recorded. Bogdan and Taylor state the importance of using observational data which describes the setting that was observed, the activities that took place, and the people who took part as "essential to a holistic perspective".¹³¹ By examining the physical environment the researcher gained important insight into the intensity and type of activities under study, as well as the individual participant's perspectives.

The third type of research strategy which was utilized was document analysis. In this study, a search was conducted of any written documentation which may help in understanding the objectives under study. Klaus Krippendorff defines content analysis as "a research technique for making replicable and valid inferences from data to their context."¹³² According to Krippendorff the need exists to: summarize the data; establish

and discover patterns and relationships with the data; and relate the data obtained from content analysis to data obtained from other methods "so as to either validate the methods involved or to provide missing information."¹³³ Patton views this type of data as a rich source of information. He contends that they serve a dual purpose:

... (1) they are a basic source of information about program activities and processes, and (2) they can give the evaluator ideas about important questions to pursue through more direct observations and interviewing.¹³⁴

The final strategy for data collecting was the utilization of an open-ended questionnaire developed after the interviews, observations and available written material was accomplished (see Appendix E). The researcher developed the open-ended questionnaire, keeping in mind the limitations discussed by Patton:

...open-ended responses on questionnaires represent the most elementary form of qualitative data. There are several limitations to open-ended data collected in writing on questionnaires; limitations to the writing skills of respondents, the impossibility of probing or extending responses, and the effort required of the person completing the questionnaire.

...What people say is a major source of qualitative data, whether what they say is obtained verbally through an interview or in written form, through document analysis or survey responses.¹³⁵

The open-ended questionnaire was administered to all 23 principals in the city. The data were compared and cross-checked with the other data collected to formulate the

conclusions concerning the four objectives. The data were also used to list new areas of concerns from the research. Patton explained that triangulating data sources

...means comparing and cross-checking consistency of information derived at different times and by different means within qualitative methods. It means (1) comparing observational data with interview data; (2) comparing what people say in private; (3) checking for the consistency of what people in a situation say about this situation over time; and (4) comparing the perspectives of people from different points of view - staff views, client views, funder views, and views expressed by people outside the program, where those are available to the evaluator.

...consistency in overall patterns of data from different sources and reasonable explanations for differences in data from different sources contributes significantly to the overall credibility of the findings presented in the evaluation report. ¹³⁶

Each of the 23 principals was requested to complete the questionnaire through a letter (see Appendix D) discussing its contents. The researcher also telephoned each participant to minimize any fear or difficulties the questionnaire might have presented.

Conclusion

In this section the researcher has described the design of the study consisting of a case study, field observation, documentation, and the administration and development of an open-ended questionnaire.

A review of the literature on qualitative methodology and analysis techniques to be used in the research effort was also reviewed.

The study involved qualitative research techniques which provided the researcher with information on the perceptions of public school principals on the utilization and the impact of microcomputers on their workspace. The information collected by the case study and the open-ended questionnaire is presented in Chapter IV.

C H A P T E R I V
PRESENTATION OF DATA AND ANALYSIS

Introduction

In the first section of this chapter, the data collected from the eleven interviews will be presented and analyzed. As stated in the design section the data were analyzed and organized into a category system as advocated by Guba. This methodology allowed the researcher to classify information from the interviews into significant areas according to the various purposes of the study. The second section of the chapter will compare and cross-check this data with the data obtained from the open-ended questionnaire.

The categories represent perceptions, thoughts and opinions that the administrators have toward the utilization of computers and microcomputers in their offices. They include:

The administrators' experience and perceptions concerning computers and microcomputers -- what are the opinions of users and nonusers?

The administrators' thoughts on the computerization of their office and use of training programs -- who is responsible?

The administrators' concerns and perceptions of the method of acquiring and disseminating information -- what information lends itself to computerization and what hardware would best meet the administrators' needs?

The administrators' perception of skills needed by them in a technological age -- what competencies are required? The administrators' perceptions concerning the future use of computers -- what areas in the public schools can be serviced?

The categories were developed after careful analysis of the respondents views and the general focus of the interview manual and questionnaire. By examining these categories, the researcher could best achieve the four objectives of the study:

1. To obtain perceptions from school principals regarding problems they may be encountering in the utilization of computers in general, and more specifically, microcomputers for managerial purposes.
2. To identify and examine the reasons principals do and do not utilize microcomputers for managerial purposes.
3. To identify problems in methods of dissemination of information and what information may or may not be amenable to computerization in their school and school district.
4. To obtain perceptions from school principals regarding the competencies and training needed by them in a technological age.

After the participants were randomly selected for the interviews, letters were sent asking each if he or she would be willing to participate in the study. All accepted and agreed to the time, place and date that the interview would take place. Four participants accepted with some reservation because of what they believed to be their lack of knowledge on the subject.

After assuring these participants that their views were important to the study, no hesitation existed. Each interviewee was encouraged to be honest, straightforward and specific about his/her thoughts. Each interviewee appeared relaxed and unthreatened and responded in a thoughtful, straightforward manner to the questions asked. Other spontaneous issues were discussed as they presented themselves.

Ten of the eleven interviewees were males. Nine have acquired master's degrees plus additional graduate credits, one has acquired a C.A.G.S. and one a doctorate. All interviewees were between the ages of forty-five and fifty-five years of age. Together they represent a total of one hundred eighty-one years of administrative experience as principals in public education with a range of as little as five years to a maximum of twenty-six years of experience.

All 23 participants in the study were requested to complete the questionnaire. A letter was sent to each, followed by a telephone call, which minimized any fear or difficulties the questionnaire might have presented. Although all agreed to complete the questionnaire, 22 of the 23 questionnaires were returned on the desired date. In contrast to the data obtained from the interviews, 20 questionnaires were completed by males and 2 by females. Seventeen principals have acquired master's degrees plus additional graduate credits, two have acquired a C.A.G.S., and three a doctorate. All participants were between the ages of 45 and 64 years of age. Together represent a total of 380 years of administrative experience as prin-

cipals in public education with a range of as little as 5 years to a maximum of 27 years of experience.

The Opinions of Users and Nonusers

Once the purpose, ethics and topic of the interview were read to the interviewee the researcher began the interview. It was important to the researcher to separate the interviewees attitude about computers and microcomputers, in general, and to understand their perceptions of how microcomputers may or may not impact on their office settings. This was important because each interviewee had prior experiences with microcomputers in instructional areas during the past four years. By asking questions which pertained to their major roles and responsibilities as principals and by having the principals recount their experiences using computers the researcher believed the interviewees would become comfortable in offering their thoughts freely. This proved to be the case. Each respondent detailed his or her job description using similar phrases as:

"...responsible for the total education process..."

"...director and supervisor of all that takes place..."

"...educational leader who provides leadership for the system design..."

"...chief administrator..."

"...all things to all men..."

The researcher concluded that each respondent believed that he or she was responsible for everything that took place in the building.

This included all managerial tasks, the supervision of all personnel assigned to the building, the supervision of students and the curriculum. They also indicated that due to the size and scope of the school system they were managers working within a framework created by procedures and guidelines established by a central office staff.

Various responses were received which answered the question about prior experiences with computers and microcomputers. All principals had been introduced to the microcomputer through a mandatory indoctrination in-service program, and they also had experience dealing with microcomputers for instructional purposes. Beyond that, depending on the administrators' own ambitions and interest, the extent of the experiences varied.

Seven of the eleven interviewees went beyond the mandatory indoctrination program and became involved in special programs and courses to extend their skills. Three had taken a programming course and two had used microcomputers with teachers and students to demonstrate their impact as instructional tools. Three are utilizing a word processing program with their secretaries. In addition, four of the seven are utilizing a microcomputer in various phases and programs for a data base information source.

When asked if the interviewee personally used a microcomputer in his/her work only two responded in the affirmative. Three interviewees responded with a yes with the qualification that their secretary was responsible for the operation of the programs. Six responded with a no.

Of the five administrators who responded with a yes, two used it for word processing through their secretaries. Three used it for data base information, one through his secretary, one through his assistant principal and one personally. This information was confirmed through observation when each office was visited. All offices resembled the typical school office setting with such equipment as a typewriter, files, copier, and intercom. Of the eleven offices visited only three had microcomputers visible at the time of the interview. Two units were being used for word processing and one for data base management. Upon further discussion during the interviews the researcher discovered that two administrators could only borrow a computer for office use when it was not being used for instructional purposes.

The researcher concluded that of the five administrators who were using microcomputers in their offices in some form all were interested and had positive feelings concerning their use in a school office. This conclusion was also substantiated when the principals responded to the question concerning whether or not they would like the opportunity to use microcomputers in their offices. It was discovered that only two of the three visible computers were assigned to an office by central administration. In the remaining three offices one microcomputer was acquired from an unknown source and two computers were borrowed from instructional areas. In the remaining six offices, four of the principals stated they would like the opportunity to use a microcomputer. Three of the four had taken the necessary preliminary steps to requisition

tion one for managerial tasks but were refused because of budgetary problems. The remaining two principals were open to the idea of using a computer in their offices if the computer would answer their need to better manage the information required by them:

"...I believe so, if it answers the needs that I have..."

"...I am not sure. I am not sure what it would do for me easily or more quickly that I could do now, and that's because I do not have an in-depth familiarity with them and I do not claim to..."

Upon further probing concerning the location and operational use of the computer, nine principals indicated that a computer would best be utilized by their secretaries. The majority of principals believed that they should know how to access information. Some believed that they lacked the ability to type and this would hamper using a computer by them personally:

"...I cause it to be used...I don't touch it...I don't type..."

"...I've never run a typewriter in my life...I know nothing about keyboarding..."

"...Typing is my biggest problem..."

"...Frankly...to do the mechanical stuff that the computer can provide for us I should not be wasting my time...I should know what is in there..."

One principal believed all assistant principals should be the chief operators of the computers in their offices:

"...If I had my way, I would never have an assistant principal who was not knowledgeable of computers....It is essential to the running of the building. He should be the primary office person...to supervise the office and school computer."

Only one principal believed that the computer would be personally

used by him. When asked the question - Do you think you have changed since the computers have been in your building for instructional or managerial purposes? the principals responded in a variety of ways.

Nonuser: "...I have been influenced...I have been altered or influenced by computers...I've done a lot of thinking about it...I've made observations of other places. I've been aware of some programs that I would like to have..."

User: "...I think the personnel in the building thought it was a fantastic toy when started. Then, all of a sudden they started realizing that lists were generated for them instead of by them. Now they find their job alot easier... It is no longer a toy for them but a source for them."

User: "...I divide my job into two areas...administrative and operational...I think I don't worry so much about the administrative any more because I can get at it."

Nonuser: "...The computer has had some impact on some people...all ends of the spectrum, from a great deal to not at all, some say...when they train me to use a computer I'll use them."

The researcher concluded that both users and nonusers had positive feelings about computers and microcomputers and the capabilities that they could bring to their offices. Two respondents had slight concerns basically because of lack of knowledge of what a computer can do for an office setting. The majority of the principals (nine of the eleven interviewed) would like a computer assigned to their offices. They see their secretaries as the chief operators.

Experience varied greatly among the eleven interviewees. The majority of the principals received training or information concerning computers through their position and mandatory training sessions offered by the school system. Only three of the eleven principals have had advanced training or courses which they sought out for themselves

because of their own ambition and interests.

Who Is Responsible for Computerization and Training Programs?

As noted in the previous section only some of the principals have taken an active role in acquiring skills necessary to operate a micro-computer. However, for the most part, they all show positive attitudes towards using computers for managerial tasks. Because only two offices had officially acquired microcomputers for managerial purposes, many respondents answered questions concerning training programs based on past experiences of using microcomputers in instructional settings. The researcher specifically asked questions addressing that introduction and where possible asked questions regarding possible training sessions for using computers in a managerial setting.

Nine of the interviewees indicated that no needs assessment was completed when the present microcomputers were introduced for instructional purposes four years ago. Two respondents were not sure if one was completed or not. The researcher also discovered that the computers sent to the school offices were distributed without any provision for training. However, secretaries on their own time, have trained themselves to use the computers for word processing.

After careful probing, the researcher received different responses when asked if people within the school were consulted about the decision

to introduce the microcomputers in instructional areas:

"...Basically we were told there would be computers in the schools...Central Administration made the decision..."

"...The computers arrived for strictly instructional purposes..."

"...It was a proposal put forth by a group of people..."

"...They just arrived...We were told a certain number of computers were being purchased for each school..."

"...Building administrators were given lessons and addressed by various computer companies who explained the use of the computers...."

"...We did not give input as to how many we would get because we were not in charge of the budget, but we were given the opportunity to know what it was all about..."

"...They just arrived...they sat there for four months in the office...we were asked off and on if we would like one ...not really knowing what they could do and then being somewhat disappointed because of the lack of the hookup to the mainframe computer and data base...there was a national boom on and the schools were lagging behind... so you tend to think, obviously, that these things could do something...but we are all old, in our forties, we did not know what they could do...so if someone said, 'Do you want a computer for your office?' you didn't dare to say no because you would be embarrassed even though you did not know what they could do. Then you think they can do magic and then you find out it takes more...we were consulted in advance of the arrival..."

All respondents agreed that there was some training accompanying the introduction of the computers. Some of the training was mandatory and some was voluntary with increment credit offered as incentives receiving training. Five of the eleven principals were somewhat satisfied with the training received:

"...I got out of it what I wanted..."

"...very appropriate..."

"...satisfied..."

"...OK..."

Six of the interviewees offered additional input:

"...Now I think we need to know more about what a computer can actually do...For office situations. What you can generate from it...and particularly, what the secretary can use it for."

"...Be given software or proper hardware if you took the course.. After school training not proper. Release time from duties, either a full day or a full week, for full involvement should be provided."

"...Two paths should be followed - an incentive path and a vigorous mandatory program...Attractive release time programs... all kinds of opportunities, not just once a year, constantly."

"...contractually given an option of five years to have acquired three credits in computer use."

"...Everything should be occurring simultaneously. A five year program not given to chance."

"...Should be after school workshops. Requirements to take course contractually."

"...I think...ideally training should be one to one...We are trying to overcome our own unconscious prejudices we have... Enthusiasm must be given to the individual...must be given individually...the initial one to one makes you feel more comfortable and you are more successful."

The researcher concluded that the majority of computers thus far purchased for the city arrived at the schools through the direction of the central office staff. No needs assessment was completed to the knowledge of the principals interviewed. The majority of the principals also agreed that training programs should be offered for the successful implementation of microcomputers in their office settings. The training and implementation of the computers in an office setting should not be left to chance. Directions should be established and guidelines should

be developed. All the principals interviewed believe that the computer can aid them in managerial tasks, but are looking towards the central office for guidelines and training programs.

What Information Lends Itself to Computerization and
What Hardware Would Best Meet the Administrators' Needs?

A plethora of information was obtained from the interviews concerning current services being received from the data processing center located at the high school, as well as what type of information may or may not be amenable to computerization in their school offices. Upon careful examination of existing documentation, the researcher confirmed that a wide range of computerized programs exist in the school district. The researcher also discovered that many of the programs were geared only to specific levels of the school district. The following listing of programs by district or by grade level, are available from the data processing center. The programs are listed by general program headings. Many other sub-heading programs are included under the general heading (see Appendix F).

Monthly/Daily Attendance	District
Bus Routing	District
Basic Skills	Gr. 3,5,9,H.S.
School Budget	District
Cafeteria Accounting	District
Enrollment	District

School Library	9-12
Marking	7-12
Payroll	District
Student Scheduling	7-12
Special Needs	District
Utility Programs such as:	Various Levels
Student Street Addresses	
Kindergarten Wrist Labels	
Mailing Labels	
Homeroom Listings	

After analyzing the responses to the question of what services the principals used from computers housed outside their buildings, three categories were established. The categories were based on the use of the data processing department where the mainframe computer is located. The categories followed building grade level responsibility.

The first category includes the seven principals with K-6 building level responsibility. All seven included the processing of attendance data as the number one service received from the mainframe. One of the principals who is responsible for one of the two kindergarten centers responded that in addition to attendance, kindergarten registration was an available use of the mainframe computer. In addition to these comments one principal listed the reporting of Basic Skills Improvement results as a use; one mentioned mailing labels; one principal stated, "I don't know if I use it or it uses me!"; two mentioned class lists; and one mentioned energy use and budget allocations. The researcher concluded that attendance was the area that all principals on the K-6 level believed to be the most important program and use for using the

mainframe computer.

When asked the question, "What type of information do you need from it?" a variety of responses ensued.

"...I have often looked to see what better usage I can get out of that but I cannot get other information other than the attendance exception report, which is excellent..."

"...It also was used in our redistricting but I found it to be superfluous as far as my building was concerned..."

"...my data is updated day by day and that is only updated monthly..."

"...I do not call upon it for listings...it is not worth the effort or time involved, especially now when I can generate my own in a matter of moments. I have more information than they have...."

"...I have made special request for labels for mailing... I have not had occasions to ask for anything else...there may be capabilities there that I am not aware of..."

"...I do understand that I can get such things as street listings and that type of information but it seems that it is always after the fact, that I already have my street listings, etc., so I never avail myself of the service...."

Upon further questioning, additional data were received. This data clarified what type of information the K-6 principals need from the mainframe computer as well as what type of information they felt should be generated by a computer in their offices. The researcher discovered one underlying theme in the responses: the principals would like information which they use daily on line and would also like to be able to update that information on a daily basis. The one area of discontent voiced by the principals was that information generated by the mainframe computer very often had to be updated by hand. The information they received from the mainframe was not totally accurate or

complete due to their inability to access and edit the information at the building level as the need arose. All K-6 principals believed that the current system is better than returning to what was done manually; however, they felt that computers in their offices would allow them to accurately maintain records that they use on a daily basis. In fact, six of the seven K-6 principals would prefer computers for their offices versus the mainframe. One of the six believed both were necessary; one believed an interface or modem between each would be ideal. Only one of the seven didn't believe a computer in his office would make a difference to him at this time.

Most of the K-6 principals believe that the following list represents the type of information they would like to computerize in their offices: Student profiles; total budget process; class lists; building lists; test scores; student transcripts; attendance; bus routes; street files; personal information; free and reduced lunch; emergency telephone numbers; medical and health records; report cards; curriculum management programs for instruction; inventories; and personnel records.

The researcher concluded that the K-6 principals used the mainframe computer on a monthly basis for attendance purposes; on a yearly basis for Basic Skills Improvement; and occasionally for other programs. They also believed that microcomputers could best serve their immediate needs for updating and editing information in their offices. The activities and lists that a microcomputer could help manage include all general information lists, budget and inventory information, personnel

records including health and medical reports, and attendance including daily, monthly, and yearly reports.

The second category includes those principals whose responsibility focused on the 7-8 building level. These two individuals concurred that they used the mainframe computer for attendance but also for reporting student progress, for scheduling each student, for student information such as name, ID number, address, date of birth, telephone number and parents' name, budgetary information and labels for free and reduced lunch.

When asked what type of information they need from the mainframe as well as what type of information they felt should be generated by a computer in the school office, the researcher discovered that their needs were similar to those of the K-6 principals. Immediate access was important to them:

"...I would like it for more immediate output which would require an inhouse, I suppose, computer system. I would like it for daily attendance of students showing the total number of days absent and the number of consecutive days absent. I would like it to show me patterns of absence... I would like it to keep personnel attendance...I would like it to keep records of substitutes...days in my building and years in the system...I'd like it to give me an immediate output of students who are potential failures for the year or for that particular term...I'd like it to be able to give me the schedule of each child and teacher in the school for immediate location...I'd like it to help me schedule."

"...Everything that I have said already. I think I could speed it up by having immediate access to it, in addition to that, I feel and think the microcomputer will help me... I would like some programs to develop something with people who have more experience in it that I have, to be able to utilize it to better prepare my schedule, to refine it before I give it to data processing...I could refine my hand-built schedule better using a microcomputer."

Unlike their counterparts on the K-6 level the 7-8 building principals believed that the mainframe computer was necessary for the job they did. However, each principal would prefer to use both systems and would like the opportunity to have a microcomputer in his or her office.

"...We could have student schedules on computers so changes could be made easier...Student personal information cards could be on the inhouse computer...It would be a more efficient way to enter appropriate or needed information for new students moving in during the course of the year when cards are not done appropriately...It would facilitate locating students in the building more quickly...it would give an immediate report of dismissals, tardiness, detention... I wonder if it could be used for suspension letters?...and the number of suspensions per year?...We could reduce the paper copies we are outgrowing...It could be used for student records and transcripts..."

"...Scheduling could be refined and sent on to the mainframe.. the yearbook process could be computerized...internal inventory for my department heads and myself...budget information...by having it on computer it would be much faster to retrieve the information required...make for a more efficient filing system ...if it was in the computer it would be easier to have it, provide it for me without me having to remember where everything is and in the multitudes of filing places...special needs is another area...it is important to have that material readily available in ed plans."

The conclusion was drawn that the grades 7-8 building principals used the services of the mainframe computer on a greater basis than did their K-6 counterparts. The mainframe computer was used on a monthly basis for attendance, quarterly for report cards and yearly for scheduling and student listings. In addition, the mainframe was used to update student lists and for labels as needed. Because of the more varied use of the mainframe these principals would prefer to have the use of both the mainframe and microcomputers in their offices. Immediate access was important to them also. They concurred with their K-6 colleagues

that all general information lists, budget and inventory information, personal records including health and medical reports and attendance were activities they would like to see computerized. In addition all detention, suspension, Special Education plans and yearbook materials were included.

The third category includes those principals whose responsibilities centered around grade levels 9-12. They viewed the mainframe computer as their inhouse computer because it is located in their general building complex. In addition to the uses listed by their colleagues on the K-8 building levels, including attendance, scheduling, report cards, student personal data, other uses of the mainframe computer were explained:

"...Attendance lists, class lists, drop lists, program (schedules)...students by name, alphabetized, address, parents' name, etc....whatever I request I could get within an hour...the mainframe gives us everything we ask for...if we were tied in we would not have to ask for it...whenever needed I receive it..."

"...The mainframe gives us programming for kids... schedules, it gives us room utilization, it gives us study hall utilization...attendance,...report cards, ...exceptional absentee reports...grade distribution ...faculty members, both by department and alphabetized ...register...grade point average, both alphabetically and by class rank...it generates for us most everything we feel we need.

When asked what type of information they needed from the mainframe as well as what type of information they felt should be generated by an office computer the researcher found needs similar to those of principals on the K-8 levels. These needs, however, were not as pressing as they were for the other levels because of the access to the mainframe:

"...maybe permanent records should be on the computer..."

"...I would like a process where the kids' full programs can be put onto the equipment we have in the house office ...there are alot of possibilities that can be used... schedule, emergency numbers, etc. ...transcripts should be done...I think that would streamline the process in the guidance office."

The high school level principals were assigned microcomputers for their offices. They have the advantage of not only having microcomputers in their offices but the greater services of the mainframe. They concurred with their colleagues that immediate access to information is important:

"...I like what the mainframe is doing and I also like the services we are getting now from the microcomputer...if we ever tie into the mainframe maybe I could stop bothering data processing for my needs."

"...My secretary uses the microcomputer for word processing, letters of recommendation...suspension letters...need is there to keep track of suspensions etc..."

"...The mainframe is definitely necessary for the job I do... I could operate without the micro here but, I could operate better once it gets programmed and gets hooked up better - I prefer the mainframe, no question."

The researcher concluded that the 9-12 building principals utilized and relied on the services of a mainframe computer for much of their informational needs. Access is not as big a problem as it is on the other levels. These principals would like to expand the use of the microcomputer and interface with the mainframe. Many of the services requested by the K-8 principals are being received by those with 9-12 responsibility.

What Competencies are Required?

As reported earlier, only one of the eleven principals interviewed personally utilized a microcomputer. Three principals used a microcomputer through a secretary and one through an assistant principal. The perception of these principals concerning skills needed by them in a technological age are presented here in comparison to those who did not use a computer in their office. They will be referred to as users and nonusers. The researcher's intent is to determine if users and nonusers views differ on the skills that they believe administrators should have competencies in, as well as to determine what competencies are necessary.

Only one principal who utilized a computer in his office believed that the acquisition of computer skills by his staff has had any effect on personnel decisions he has made. This was in the area of new recruitment. All other principals stated that the acquisition of computer skills by themselves or by staff members have had no effect on personnel decisions they have made.

When asked if building principals should be able to justify the cost of educational computers, all but one of the principals agreed. The lone dissenter, a user, believed that responsibility was that of the central office staff.

All eleven principals believed they should be able to discuss values and benefits of computerization in education and society. Also,

unanimous agreement prevailed with the statement that administrators should be able to demonstrate an awareness of future trends in computing as they relate to educational computing.

Eleven principals believed that they should be able to identify the training needs of teachers using the computer as an object of instruction, as an instructional medium and as a problem solving tool.

Two principals, both users, qualified their answers:

"...Yes, to a degree, but...that usually gets mandated from central."

"...No, if we have a central administrative staff as we do, you go there, if not things are different."

Ten principals agreed that they should be able to identify training needs of teachers and administrators related to the administrative uses of computers in education. The lone dissenter again, a user, believed that to be the responsibility of central office. He believed they had the resources to accomplish the objective.

Nine principals agreed that they should be able to identify various alternatives for using computers in instruction. Two principals a user and nonuser, disagreed:

"...I know I can get my department head to justify that... I don't know if I should have to...my department head and central could."

"...I am not sure it is my task to identify the alternative uses...it is my function, that after the system has identified those sources, to take advantage of it."

Seven principals believed that they should be able to describe the computer training needs of students who will be entering the job market

in the future. Four, two users and two nonusers, did not feel that was their responsibility. They also were from the K-6 level of administration and stated that the technology is changing so fast that it was difficult to keep up with the skills. They believed that their students were too young and their curriculum was not as responsible as that in the secondary level for that objective.

Only five principals, one a user, concurred that they should be able to identify the possible funding sources for instructional and administrative computing. Three, two users, believed that they should be somewhat responsible and three, two users, believed that to be the responsibility of central office.

The researcher concluded that there was no apparent pattern of responses concerning computer competencies from users and nonusers. He discovered that, in the system under study, the principals evaluated competencies in the role they play in the system and delegated the responsibilities to various departments. That determined whether or not they believed it to be a competency needed by them.

The vast majority of principals believed that they should be competent in the following areas:

- be able to justify the cost of educational computing.
- be able to discuss values and benefits of computerization in education and society.
- be able to identify possible funding sources for instructional and administrative computing.

- be able to identify training needs of teachers using the computer as an object of instruction, as an instructional medium, and as a problem-solving tool.
- be able to demonstrate an awareness of future trends in computing as they relate to educational computing.
- be able to describe the computer training needs of students who will be entering the job market in the future.
- be able to identify training needs of teachers and administrators related to the administrative uses of computers in education.
- be able to identify various alternatives for using computers in instruction.

What Areas in the Public Schools Can Be Serviced?

All principals interviewed believed that the computer can improve the way the school services its students. Upon probing further the researcher discovered that all the principals believed that office management could be improved:

"...Yes,...as soon as we have one that's always available in the office and always have access to the mainframe then a lot of these things can take place...exactly how, I am really not sure, because we have to get into it."

"...I have often thought, for instance, not in terms of myself but in terms of my secretary, if there was an office computer here which was connected to the mainframe wouldn't it be lovely if she just punched in the daily attendance here and it was fed directly to the high school she would no longer have to do punched cards, a tremendous advantage for her in saving time...potential is there but I need a lot more information."

"...It has improved office management but not to the degree that it can."

"...I would like to have one...in addition to that, I would like to have immediate administrative access to the computer and a good security system."

"...Yes, the computer will help us prevent children from getting lost in the shuffle...it will get the secretary away from the typewriter...it will free up the principal to get into the classroom, free him from administration, it will make administrative bureaucracy more efficient in time."

In addition to office management nine principals agreed that curriculum management could be improved with the use of a computer and eight agreed that the computer could be an aid in learning styles. Those that did not agree wanted more exposure and research completed before they came to any conclusions:

"...I do not want another burden on the teacher...I would like to see it used more to get more administration away from the teacher."

The researcher concluded that every principal interviewed would like the opportunity to use a computer for managerial work in his/her office. The future use of the computer for managerial tasks in the system under study is bright. Administrators are willing to undertake the necessary steps to make it a reality.

The Opinions of Users and Nonusers -
Cross-Check of Data

The twenty-two principals concurred with the researcher's conclusions drawn from the eleven interviews that their role and major responsibilities include all managerial tasks, the supervision of all personnel assigned to their building, the supervision of students and the supervision of the total curriculum. Each questionnaire respondent detailed their job description using phrases similar to those used by the interviewees:

...I am responsible for the education, safety and well being of both pupils and staff in my building. Building organization, curriculum implementation, budget expenditures and maintenance supervision, as well as public relations constitute my work requirements.

...Chief Administrator of the School, responsible for all phases of the school program, its personnel and its management. Responsible for the administration, supervision, public relations, and other professional and non-instructional professional activities of the school. Responsible for the overall planning, organizing, directing, and coordinating of the educational program.

The questionnaire respondents, like those interviewed have various experiences using a computer. Fourteen feel they have "quite limited" minimum skills and do not feel proficient on a computer. Five respondents have taken an additional course or courses on the use of computers and four have either become involved in special programs or used them outside of education on a personal basis.

When questioned if the respondent personally used a microcomputer in his/her work, only three principals responded in the affirmative.

...Yes. An office tool to keep data on children and personnel. This contains the demographic data as well as educational services and levels.

...I record all school bank transactions on my office computer as well as preview different programs used at the school.

...Yes. The whole school student population is on the computer (815 students). It is used to generate class lists (reading and math), bus lists, emergency information, attendance list, street list, budget information, A.V. inventory, special needs and physically handicapped students.

Six respondents answered with a qualified yes, in that they either use a computer in a very limited way or that their secretary utilized a computer to complete assignments from them.

...At the moment, no. I have played around with word processing to make a few notices for my staff, but in the office I can never seem to find time to sit at the console without constant interruption. I guess "finding the time" is part of the problem.

...No, I do not but, my secretary is now making extensive use of one. As of now all information available for an office file card is stored on a micro along with additional information the office might need (bus number, lunch status, etc.). In addition she is presently placing A.V. equipment on inventory and staff info. A plan for placing all 766 info from start to the Educational Plan is being worked on. "Print Shop" for notices is being used.

...No, I've never learned to type and seem unable to acquire even a rudimentary skill in this area. Additionally, I am in a position to have others do what I need done.

...Limited in the amount of direct use that I make of it due to lack of time, etc. However it is used by my secretary to do numerous jobs including word processing, data bases, etc.

The remaining thirteen principals do not use a microcomputer in their work. The reoccurring reasons mentioned were: that none were available for office use; that many principals feel they lack the experience in its use; and that the time needed to implement a program does not appear to be available to them. The following are samples of responses stated by the principals.

...No, I do not use a microcomputer in my work. I do not do so because I have not wanted to take the time out of my busy schedule to implement that which would positively impact upon my busy schedule. And, to be honest, I really am not a "machine loving" kind of person.

...No, the computers at school are targeted for teachers and students. Little or no opportunity for office functions.

...No - do not have one!

...No. One is not available for office use. In the future one may be available. However information generated by computers is used by me.

...No! There is no microcomputer in the office nor do I presently feel qualified to use one in my work.

...No. One is not readily available for just office use itself.

...not enough hardware components available to encourage the change over to a primary administrative management tool.

...No. Don't have one and also not experienced in its use.

...No - no experience, not available.

Twenty-one of the twenty-two principals responded in a positive manner that they would like the opportunity to use a computer in their office. This result confirmed the conclusion drawn from the interviews

that the principals were interested and had positive feelings concerning computer use in their schools for managerial purposes. The lone dissenter stated:

...Not sure - I would really have to see what it could do better and/or faster for me.

Of the twenty-one principals who responded in a positive manner eleven believed that their secretary should be the chief operator; four believed that the responsibility should be shared between themselves and their secretary; three believed that their secretary (followed by their assistant principal and then themselves) should be the operators; one believed the assistant principal should be the operator (followed by the secretary, principal and reading specialist); one believed the assistant principal should be the operator (followed by the secretary); and one believed a microcomputer specialist should be the chief operator. The belief that the secretary should be the chief operator confirmed the results concluded from the interviews. Only eight of the twenty-two principals believed that they should have direct contact with the computer.

The researcher confirmed the conclusion drawn from the interviews that both users and nonusers had positive feelings about computers; that a majority (21 out of 22) would like a computer assigned to their office; and that their secretary would play an important role in the computerization of their office. The researcher also concluded that the thirteen principals who currently do not use a microcomputer in their office do so because of three reasons: there are no computers

available for office use; the principals lack the experience in using a computer; and time is needed for them to implement a program.

Who Is Responsible for Computerization and Training Programs? -
Cross-Check of Data

Like the interviewees, the respondents of the questionnaire agreed that training programs should be offered for the successful implementation of microcomputers in their office setting. The training and implementation of the computers in an office should not be left to chance. The respondents concurred with the interviewees that guidelines need to be established and training programs offered from Central Administration.

The principals are in total agreement that all office personnel should be included in the training. The majority believe the secretary, principal and assistant principal must receive training. In addition, some believed department heads, clerical aides, and other personnel who need the desired information must be included. The following are samples of responses.

...Anyone in the building office. Certainly the secretary first. Secondly a clerical aide as back up in the absence of the secretary. The principal and assistant principal. This training should include anyone and everyone who spends more than thirty minutes each day in the main office.

...Basically, the computer operator. The principal, during the initial implementation stages will consult as to the types of data desired along with program feasibility.

...Any staff member who may need access to the information - teachers, nurse, counselor, clerical staff.

...Secretary and principal intensively. Teachers and aides as to the power of the tool.

When asked what type of training the principals felt would be necessary, several similar responses were received. These included: training in word processing; data base management such as filing and reporting; training in the use of hardware and the printer; and training in specific software programs to be used. Word processing and data base management appeared in twenty-one of the twenty-two questionnaires. One principal believed that "salesmanship" would be more important than training in his office.

...Because my school's office is already very efficient, I feel that, prior to training, salesmanship would be much more an important factor than training. The office is an, "I'm from Missouri", type of place. Once shown, however, it's not the type of place to reject a good idea....Certainly in our school office anything sparking of "introduction" would seem to be appropriate.

Other respondents supporting training are as follows:

...data base management and word processing are critical and certainly any appropriate software programs to deal with day to day office management will save time and allow it to be re-directed toward communication and decision making.

...Actually very little. Time to do it must be considered. Once set up, it should go smoothly. Training in file and reporting and word processing should be required, including knowledge and operational use of a printer.

...Training should only be offered initially in those areas in which the data desired can be programmed and retrieved (data base management and word processing).

...Introduction to the software; and much practice with it and computer. Word processing and filing system.

...Principal and secretary must have workshops in the actual software. This should be done during regular work time. Also there should be training in the full use of a printer.

The respondents were split in their concern of when the training should be offered and if incentives should accompany the completion of the training. Four believed training should take place after work hours. One offered Saturdays as a good time. Six believed training should take place during the work day and five believed the best time is when school is not in session, either during vacations or the summer months. The remaining principals believed training must be coordinated when hardware is in place and decisions and a commitment have been made.

Eleven principals believe that incentives should not accompany the completion of training. Their responses reflect a commitment to the utilization of computers.

...I think not. The program should, after its completion, prove to be like virtue: its own reward.

...The reward is intrinsic, e.g., the retrieval of data in an orderly fashion cuts down on time and work.

...Not necessary. Professional improvement should suffice.

...Availability of microcomputers to put training into use.

...No, incentive would be that it would make individual's job easier.

...Personally, I would be satisfied in knowing the many advantages of the computer and being able to apply and make use of them.

...Managers should be expected to fulfill systems expectations in implementing changes that the entire system is moving toward by virtue of their job.

In contrast, eight principals believed some form of compensation or monetary incentive should be offered, especially if training is not included during the work day. Three had no opinion.

The researcher concluded that training must be provided by central office for the principals, secretaries, assistant principals and other members of the office team. The training should concentrate on hardware and software use, word processing, data base information and printer use. The time of training must be given careful attention. If training takes place during the work day, no added incentives are necessary.

What Information Lends Itself to Computerization and
What Hardware Would Best Meet the Administrators' Needs? -
Cross-Check of Data

As with the interviewees, a great deal of information was received through the questionnaire concerning current services being received from the data processing center located at the high school, as well as what type of information may or may not be amenable to computerization in the school office. The researcher found no additional existing documentation to analyze. Little documentation exists, other than the Computer Systems Catalog available from the

Data Processing Center and included in the first section of this chapter.

The analysis of the questions in the questionnaire concerning what services the principals used from computers housed outside their buildings follows the same guidelines as established when analyzing the interviewees' responses. The categories followed building grade level responsibility.

The first category includes the thirteen principals with K-6 building level responsibilities. The researcher's findings confirmed the results found in the interviews. All thirteen included the processing of attendance data as the number one service received from the mainframe. In addition to attendance five principals listed budget reporting, six listed street listings, four listed alphabetical class lists of pupils, one listed BSI and one listed kindergarten wrist labels.

The responses to the question, "What services would you like to receive from the data processing center or from a computer located in your office?" received a variety of responses. Many principals listed monthly attendance figures, as what they wish to continue to receive from the computer at the Data Processing Center. Again, like those interviewed, the respondents voiced one area of discontent when utilizing the services of the data processing center. The information generated from the mainframe very often had to be updated by hand. The information they received was not totally accurate or complete due to

their inability to access and edit the information at the building level.

...the data center provides little to me of any great input. The time lapse in processing makes it soon outdated.

...I can get more timely data from the PC since it is updated daily as compared to monthly updates at the Data Processing Center. I would like to be able to feed info into the center on a daily basis and then retrieve at will.

Three principals concurred with what was stated in some of the interviews. They responded that they have no idea what the Data Processing Center does provide.

...I have absolutely no idea what the D.P.C. capabilities are. I have never seen this center in operation or ever asked them for a menu; nor has the system ever arranged for a field trip to that place.

...I am not aware what is available.

...I'm not sure what they could make available to me.

Several principals believe the Data Processing Center should handle information which is standard for every school. Information needed for centralized decision making as well as of school concern. This was reflected in the comments below.

...Access to a central, primary source of all information that is standard to all schools such as B.S.I. results, system policies, Sped data, school supplies, vendor data, school budget data, etc.

...While not certain, I think the type of information generated at a local site would be much more related to specific data, e.g., which children are members of the school chorus, as opposed to what children belong in a school's district.

...The school computer should generate only items of local concern, items needed to service the operation of the school and personnel as opposed to city wide operations.

In contrast the principals offered a variety of uses for a computer located in their office. The questionnaire respondents agreed with the list compiled from the interview. The type of information they would like computerized from their office included: student profiles; total budget process; class lists; building lists; test scores; student transcripts; attendance; bus routes; street files; personal information; free and reduced lunch; emergency telephone numbers; medical and health records; report cards; curriculum management programs for instruction; inventories and personnel records. The respondents to the questionnaire also included: disciplinary log files; suspension lists; energy use; transfer slips; insurance lists; race and language data for students and families; enrollment projections; report cards and library use data.

To accomplish the tasks outlined above, the questionnaire respondents differed from the views presented by the interviewees. The interviewees favored a computer in their office versus the mainframe computer. Seven respondents to the questionnaire believed both the mainframe and office computer would be beneficial to help them function effectively and efficiently as a principal. Four believed a building computer would be more beneficial and one did not believe either of importance. The remaining principal had no comment.

The researcher concluded that the K-6 principals used the services of the mainframe computer for attendance. Other uses included budget reporting, street listings, class lists, BSI reporting results, and Kindergarten wrist labels. This confirmed the main uses of the mainframe as received by the interviewees. The respondents to the questionnaire also agreed with the interviewees that the information generated from the mainframe very often had to be updated by hand. The information received was not totally accurate or complete due to their inability to access and edit the information. A few principals, again like those interviewed, were not totally sure what services were available to them from the Data Processing Center.

Unlike the interviewees, the majority of the questionnaire respondents (7 out of 13) felt the services of both the Data Processing Center and a microcomputer located in their office would be beneficial to help them function effectively and efficiently as a principal. In contrast to the interviewees, four believed the services of a microcomputer would best serve their purposes. This data, therefore, changed the conclusion drawn from the interviewees where six of the seven principals preferred the use of a microcomputer over the mainframe. The principals in the questionnaire extended the uses of a microcomputer in their office by expanding on the office tasks they wished to have computerized. For the most part they believed that those functions which serve the total school population should have services from the Data Processing Center and those tasks which deal directly with a building should be handled by an office computer.

The second category includes those four principals whose responsibility focused in the 7-8 building level. There was complete agreement that the mainframe computer was utilized for attendance but also for reporting student progress, for scheduling each student, for student information, budgetary information and labels for free and reduced lunch.

The respondents were also in agreement with the interviewees as well as the K-6 principals when asked what type of information they need from the mainframe as well as what type of information they felt should be generated by a computer in their office. Immediate access was important to them:

...An ideal situation naturally would be to have an intelligent terminal at the school with direct access to the high school mainframe for quick retrieval of data.

...The mainframe computer is very helpful, however, the computer in the office with a modem to the mainframe will greatly increase our efficiency. The information both ways would be much faster. We would use the information in storage much more than is possible now if we had the above capacity.

The conclusions drawn from the interviewees were identical to those drawn from the questionnaire: the grades 7-8 building principals used the services of the mainframe on a greater basis than did their K-6 counterparts. The mainframe computer is mainly used for attendance, report cards, scheduling, student lists and student information. The principals would prefer to have the use of both the mainframe and microcomputers in their offices to make their operation more efficient. Immediate access was important to them. Other information they would

like to see computerized includes general information lists, budget and inventory information, personal records, attendance, detention, suspensions, Special Education plans and year book activities.

The third category includes those principals whose responsibility centered around grade levels 9-12. The five principals viewed the mainframe computer as important for the job they perform. Two believed that the mainframe is "fully equipped to do all they need at the high school". Like the interviewees, the questionnaire respondents viewed the mainframe computer as their in-house computer. They listed similar uses of the mainframe as their K-8 colleagues, including attendance, scheduling, report cards and student personal data. Also, the 9-12 respondents lists agreed with the interviewees on the other uses of the mainframe. These include: attendance lists, class lists, drop lists, program schedules, exceptional absentee reports, grade distributions, faculty member lists, grade point averages, class rank, study hall lists, room utilization, and election results.

When the respondents replied to the question on what type of information they felt should be generated by an office computer, the researcher found needs similar to those explained by principals on the K-8 level and also similar to those needs of the level 9-12 principals who were interviewed. The needs included such activities as: graduation lists, letters, suspension lists, repair reports, discipline lists, teacher and student schedules, teacher absences, school calendar. Like the K-8 respondents, material generated for their individual building took precedence.

Three of the high school principals believed that both the mainframe computer and a computer in their office would help them become more efficient and effective.

...Both. We should be moving to the 1990's... Should be tied into the same system and use it to its full capacity. Should also be a daily program for calling homes of absent students.

...I believe an office computer with access to the mainframe would help us become more efficient and effective.

Two believed that the current mainframe is all that is needed.

One principal compared the mainframe and microcomputer:

...The center at the high school has much more sophistication that it should give us all we need. The micro in the office is a toy by comparison.

The researcher came to the same conclusion as those expressed by the interviewees. The 9-12 building principals utilized and relied on the services of the mainframe computer for much of their informational needs. Access is not as big a problem as it is on the other levels. However, the majority of these principals would like to expand the use of their microcomputers which they have in their offices and interface with the mainframe. Many services requested by the K-8 principals are being received by those principals with 9-12 responsibilities. Three of the principals believed greater services could be accomplished if the database of the mainframe was a reality and if programs were developed or located to meet their needs.

What Competencies are Required? -
Cross-Check of Data

In contrast to those principals interviewed where only one of the eleven principals personally utilized a microcomputer, three of the questionnaire respondents personally used a microcomputer in their work. In comparison to the four principals interviewed who use a microcomputer through their secretary or assistant principal, six of the questionnaire respondents either use a computer in a very limited way of through their secretary. As with the interviewees, the perception of these principals concerning skills needed by them in a technological age are presented here in comparison to those who do not use a computer for managerial tasks in their office.

Additional data was gathered which was not included in the interviews, concerning the principals attitude whether or not principals should be able to read and write simple programs. Four respondents elected not to answer any questions concerning competencies required of principals. Two listed the following reasons:

...Since this principal is not computer literate, any of his answers to questions concerning competencies would be of little value to the research under consideration. But, I would state the principal does not need to have added to his duties the role of "Computer Department Head".

...My only interest at this time is to retrieve information.

Of the remaining eighteen principals, ten believe that reading and writing programs was not a competency needed by them. Four of the ten were users. Three principals, one user, believed reading programs

was important. The remaining four, all users, believed reading and writing programs were important competencies. The following comments reflect the three views stated above.

...Not necessary as long as we have amicable software programs.

...Being able to read and follow a program is necessary. I do not feel writing is necessary as I have not had need to write one.

...Although beneficial, I do not feel it is necessary for building principals to become programmers. Their basic function should be to determine the types of data required along with the ability to interpret the data in terms of making valid educational assessments.

...Not really necessary. There are too many good programs to necessitate the capability to read and write programs.

...This would be helpful but not a major priority. I believe simple programming might help in knowing the kind of info we may be able to obtain from computer use.

...Agreed! However, it is like most everything - unless you use it - you lose it.

Seventeen of the eighteen respondents believed that they should be able to access information from prepackaged software programs. The lone dissenter, a nonuser believed that "although beneficial to know, that is the function of the computer specialist".

Two users believed that they should not have to be able to justify the cost of educational computing. They stated:

...I don't see why this should be necessary. If so - justify to whom? Most parents will accept modern techniques and most school committee members should be aware of the versatility of computers.

...That is a problem for Central.

Of the remaining principals, fourteen believed this to be a competency that principals should be able to justify. Two principals, both nonusers, decided not to comment at all. The comments of the fourteen principals were in concert with those of the interviewees.

Sixteen of the questionnaire respondents also were in concert with the eleven interviewees in that they believed that they should be able to discuss values and benefits of computerization in education and society. The remaining two, a user and nonuser, did not feel this was necessary. They believed:

...With whom? Parents already know it. The public knows it.

...Should be obvious.

Fifteen questionnaire respondents elected to address the competency referring to the identification of funding sources for instructional and administrative computing. Ten principals, five users, believed this not to be a competency needed by administrators. Five principals, three users, believed it should be. The interviewees were also split in their decision, five for and six against. The reasons given by those not believing this is necessary are reflected in the comments below:

...To be basically knowledgeable but not to any great extent. Principals should not be the primary sources of knowledge relative to grants, special applications external to the regular source of the school budget.

...In a centralized setup such as ours this is not necessary.

...I do not feel, given the complexity of the present position, that principals should burden themselves with the problems of finding funding sources.

...No - function of Central Office.

Fourteen principals, seven users, out of the seventeen principals answering the question concerning the ability to identify training needs of teachers using the computer as an object of instruction, as an instructional medium and as a problem solving tool, felt this competency to be important. Two principals, nonusers, did not concur. One principal, a user, was uncertain that this be included as a competency necessary for building principals. The interviewees' opinions and attitude concurred with the majority view also.

Agreement between the two data sources also was evident regarding the competency that principals be able to demonstrate an awareness of future trends in computing as they relate to educational computing. Unanimous agreement prevailed from the interviewees compared to thirteen of the seventeen questionnaire respondents.

A disagreement between the two data sources appeared concerning the competency of describing computer training needs of students who will enter the job market in the future. Five principals, four users, believed this to be important and a responsibility of their position. Ten, four users, believed this was not necessary in contrast to the seven interviewees who believed it as an important competency.

...Probably not. This would appear to be a very specialized area of expertise.

...Ideally a great idea. However, this should be addressed at the high school level as opposed to elementary. It should also be limited to those students who will be entering the job market in the future.

...No. We are not, in the elementary school, trying to educate specialists but generalists.

...N/A at the elementary level - those needs and computers themselves will undergo dramatic changes when my first grade students enter the job market in 1997 or 2001.

...Within reason this is true, however, this is why systems have guidance personnel. A principal can't be everything for all people.

Agreement between the two data sources also prevailed regarding the competency of identifying training needs of teachers and administrators related to the administrative uses of computers in education. The interviewees were almost in complete agreement, ten out of eleven, that this was a justifiable competency. Sixteen of the seventeen questionnaire respondents also agreed.

There was some agreement between the two data sources concerning whether or not principals be able to identify various alternatives for using computers in instruction. Eight questionnaire respondents, five users, agreed. Three, again all users, had reservations and three non-users were in disagreement. This was in contrast with the nine principals who agreed that the competency was important when interviewed.

The researcher concluded that there was no apparent pattern of responses concerning computer competencies from users and nonusers.

The discovery was confirmed that, in the system under study, the principals evaluated competencies in the role they play in the system and delegated the responsibilities to various departments. That determined whether or not they believed it to be a competency needed by them. In two new areas where additional data was received, the principals believed that they do not need to know how to read and write programs. However, they did believe they should be able to access information from prepackaged software programs.

The vast majority of principals confirmed the following results of those views offered by the interviewees concerning competencies needed by them.

- be able to justify the cost of educational computing
- be able to discuss values and benefits of computerization in education and society
- be able to identify possible funding sources for instructional and administrative computing
- be able to identify training needs of teachers using the computer as an object of instruction, as an instructional medium, and as a problem solving tool
- be able to demonstrate an awareness of future trends in computing as they relate to educational computing
- be able to identify training needs of teachers and administrators related to the administrative uses of computers in education
- be able to identify various alternatives for using computers in instruction

A difference of opinion appeared with respect to the following competencies:

- be able to identify funding sources for instructional and administrative computing
- be able to describe the computer training needs of students who will be entering the job market in the future.

When asked how to accomplish these competencies the questionnaire respondents offered the following suggestions: training; planning; making a commitment to utilize computers; and evaluation.

What Areas In the Public Schools Can Be Serviced? -
Cross-Check of Data

Twenty of the questionnaire respondents agreed with those interviewed that the computer can improve the way the school services its students. Two respondents elected not to answer this section of the questionnaire.

The researcher also confirmed the commitment of the interviewees in regard to their interest in office management as stated by the questionnaire respondents.

...A computerized office can store more information and retrieve this information much more quickly than traditional methods...I expect to be an active participant in what will transpire in this arena over the coming years. I'm sure that it will prove to be most interesting.

...Very definitely. In many ways school offices are in the "dark ages" in terms of communication and managing data.

...Yes - all types of data, for the effective and efficient operation of the school will become immediately available. This will allow the administrator greater flexibility to assess the data in terms of his objectives and make the necessary changes as needed.

...It would be beneficial in processing data and more efficient in regards to statistical data and the availability of programs.

In addition to office management, thirteen respondents are in agreement with the majority of those interviewed that the computer would improve curriculum management, as well as have a positive effect on learning styles. Six principals elected not to answer that section of the questionnaire and three were unsure of the effect.

The researcher concluded that the principals in the study, if not already using a microcomputer, would like the opportunity to utilize a microcomputer for managerial work in their office. The future use of computers by the principals for managerial applications is very positive. The administrators are ready to make the commitment to computerize. Careful planning, training, and involvement by this group are necessary ingredients for success. Further conclusions and recommendations concerning the study are presented in Chapter V.

C H A P T E R V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

This study evolved from a need for an understanding of the utilization of computers in public school offices. The literature and research addressing the issues of office automation in the school office, as well as in business is relatively new. The study was designed to:

- add insight as to what extent principals do make use of microcomputers and to find out the reasons they do not;
- analyze where the responsibilities lie for one to computerize an office, from the central office or from within the school building itself;
- examine the relationship in the use of centralized computers as compared to microcomputers by school building administrators in managing daily office work;
- analyze what information would be more efficient and effectively used if computerization was involved;
- and analyze the computer competencies needed by practicing administrators.

The following objectives were addressed to add insight and understanding into the circumstances and tools which will best improve managerial tasks in the school office:

- To obtain perceptions from school principals regarding problems they may be encountering in the utilization of computers in general, and more specifically, microcomputers for managerial purposes.

- To identify and examine the reasons principals do and do not utilize microcomputers for managerial purposes.
- To identify problems in methods of dissemination of information and what information may or may not be amenable to computerization in their school and school district.
- To obtain perceptions from school principals regarding the competencies and training needed by them in a technological age.

After a comprehensive review of the literature addressing three main topics: identification of possible administrative uses of microcomputers in schools; an analysis of how the growth of micro-electronics technology since 1975 has affected the administrators' workspace in public schools; and the development of the automated business office using microcomputers, the researcher utilized qualitative research methods to achieve the objectives of the study. A case study investigation involving 23 public school principals and widely accepted qualitative research methods for collecting and analyzing data were used, including:

- in-depth semi-structured interviews using an interview guide approach and a standardized open-ended approach, conducted with building principals who were directly involved with the problems and concerns of computerization of school offices;
- field observations of actual offices and their environments;
- document analysis of the school district's computerized management programs currently utilized by building principals;
- an open-ended survey questionnaire administered to the total population under study.

Conclusions

The following conclusions were formulated from the three sections of research and literature review:

- The administrative use of computers in the school office as well as those uses in the business office appear to be unending. In most cases there are programs available to meet the needs of both types of offices. Technology advances so fast that both the administrator and business manager must continually update their knowledge on hardware and software advancements.
- The attitudes of both school administrators and business managers play a major role in the utilization of the new technologies. Their role as a decision maker, makes the difference if advancements in the use of computer technology occur in their office or business.
- The school administrators' attitude towards what a larger computer (mainframe) can do for them is extremely positive. There are conflicting opinions about information as to whether the administrators' attitudes towards microcomputers is as favorable. Also, there are conflicting opinions concerning the business manager's attitude towards his use of microcomputers in the automated business office. Many principals and managers rely on the services of the Data Processing Center.

- Planning, goal setting and the identification of problems are key ingredients for the successful use of computers in an office setting. Questions, such as: What should be automated?; Who should be trained?; What hardware and software can be utilized for the end result desired?; and When should the office be automated?, are common questions that must be answered. Each advancement in the technology has to be carefully analyzed to see if it can be successfully utilized in either office setting.
- The effect of the new technology will change the role of the business manager and will influence business strategies.
- The use of computer technology will play an important role in both the school and business communities. Schools and school districts, as well as businesses, will have to reassess the way they process information as new developments are made.

All data from the interviews were analyzed and organized into a category system. The categories were developed after careful analysis of the respondents' views and the general focus of the interview manual and questionnaire. The same categories were used to cross-check the data obtained from the interviews, field observations and document analysis with the data obtained from the questionnaires. The categories are:

- The administrators' experience and perceptions concerning computers and microcomputers -- What are the opinions of

users and nonusers?

- The administrators' thoughts on the computerization of their office and use of training programs -- Who is responsible?
- The administrators' concerns and perceptions of the method of acquiring and disseminating information -- What information lends itself to computerization and what hardware would best meet the administrators' needs?
- The administrators' perception of skills needed by them in a technological age -- what competencies are required?
- The administrators' perceptions concerning the future use of computers -- what areas in the public schools can be serviced?

Based on the analysis of data the following conclusions are cited by the researcher:

- Principals, both users and nonusers in the system under study, hold positive feelings about computers. The majority of principals would like a computer assigned to their office with the secretary as the chief operator.
- At present a few of the principals use computers for managerial work in their office. A minority of principals use the computer through their secretary.
- The majority of principals, personally, do not use computers. They do not, because of three reoccurring reasons: they are not available for office use; the principals lack the experience and skill in their use; and the principals believe

- they lack the time needed to implement an automated office program.
- Training must be provided by the Central Office for principals, secretaries, assistant principals and other members of the office team. Most principals have only acquired training through programs offered through the school system. A majority of principals feel they have "quite limited" minimum skills and do not feel proficient on a computer.
 - The principals believe that training should concentrate on hardware and software use, word processing, data base information and printer use.
 - The time for training must be given special attention. The majority of principals believe no added incentives are necessary for them if they participate in the training. A small minority believe some form of compensation should accompany training especially if it takes place outside their work day.
 - Little documentation exists, outside of the Computer Systems Catalog that indicates the services available from the Data Processing Center. The use of the Data Processing Center varies greatly from K-6 building level responsibility, 7-8 building level responsibility and 9-12 building level responsibility. The latter receives the most services from the Data Processing Center.

- The majority of the K-6 building level principals use the services of the mainframe computer for attendance. Other uses include budget reporting, street listings, class lists, Basic Skills Improvement reporting results and kindergarten wrist labels. The principals believed that the information from the mainframe very often has to be updated by hand, due to their inability to access and edit the information daily at the building level. A minority of the K-6 building principals stated they have no idea what the Data Processing Center does provide.

- The K-6 building level principals offered the following uses for a computer located in their office: student profiles; total budget process; class lists; building lists; test scores; student transcripts; attendance; bus routes; street files; personal information; free and reduced lunch; emergency telephone numbers; medical and health records; curriculum management programs for instruction; inventories; personnel records; disciplinary log files; suspension lists; energy use; transfer slips; insurance lists; race and language data for students and families; enrollment projections; report cards and library use.

- Conflicting data exists concerning whether or not the K-6 principals favor a computer in their office as compared to the combination of a microcomputer accessible to the mainframe computer. However, the majority of

- principals want to computerize their office.
- The K-6 principals believed that information and functions which serve the total school population should be handled by the Data Processing Center and those tasks which deal directly with a building should be handled by an office computer.
 - The 7-8 building level principals utilize the mainframe computer for attendance but also for reporting student progress, for scheduling each student, for student information, budgetary information and labels for free and reduced lunch.
 - Immediate access was important to the 7-8 building level principals. They used the mainframe on a greater basis than did their K-6 counterparts. These principals would prefer to have the use of both the mainframe and a micro-computer in their offices to make their operation more efficient.
 - The 7-8 level building principals would like to computerize general information lists, budget and inventory information, personal records, attendance, detention, suspensions, Special Education plans and yearbook activities.
 - The 9-12 level building principals utilize and rely on the services of the mainframe computer for much of their informational needs.
 - Access is not as big a problem to the 9-12 level principals as it is for the other levels. The majority of the 9-12

principals would like to expand the use of their micro-computers which each have in their offices and interface with the mainframe.

- The majority of the principals believed the following competencies are needed by them:
 - be able to justify the cost of education computing
 - be able to discuss values and benefits of computerization in education and society
 - be able to identify possible funding sources for instructional and administrative computing
 - be able to identify training needs of teachers using the computer as an object of instruction, as an instructional medium, and as a problem solving tool
 - be able to demonstrate an awareness of future trends in computing as they relate to educational computing
 - be able to identify training needs of teachers and administrators related to the administrative uses of computers in education
 - be able to identify various alternatives for using computers in instruction
 - be able to access information from prepackaged software programs.

- The principals do not believe the following competencies are necessary:
 - be able to identify funding sources for instructional and administrative computing
 - be able to describe the computer training needs of students who will be entering the job market in the future
 - be able to read and write programs.

- The principals believe training, planning, and a commitment to utilize computers, as well as evaluations are necessary components for success.

- The majority of principals believe the computer can improve the way the school services its students through office

management, curriculum management and learning styles.

Recommendations From the Study

The researcher concluded that the following recommendations be discussed at the central office level:

- that the Data Processing Center make available to building principals the necessary documentation so all principals will understand what programs and services are available.
- that the Central Office Administrative staff develop a five year plan for the computerization of the school offices and the evaluation of new automation technologies. Building level administration participation should be included in developing the plan. The plan should address the following questions:
 - What should be automated?
 - Who should be trained?
 - What hardware and software should be used?
 - When should the plan take effect?
- that principals prioritize the information lists developed from this study and decide what information should be the responsibility of the Data Processing Center and what information should be the responsibility of the school office.

The results of the study suggest additional areas of further work. All of the following are questions that a researcher interested in

office automation might attempt to answer.

- Will the computerization of the school office allow the principal time to deal with educational matters and allow him/her more time to devote to the students and educational issues of his/her building?
- Are the majority of the conclusions drawn from this research effort likely to be the same if the research was duplicated in another unit of analysis?
- Will training programs provide the motivation needed for principals to become committed to office automation and the new technologies?
- What are the attitudes and perceptions of building secretaries and assistant principals towards the automation of the school office?
- What are the needs of central management regarding the processing of information required from school building management?
- As outside agencies become more sophisticated in processing information, will school systems and the building principal have the ability to transmit data in an efficient and timely manner without the aid of automation?

Answers to any of the above questions would add to the body of knowledge we now have concerning the automated school office.

In addition to the stated conclusions and recommendations the researcher is compelled to make the following reflections beyond the data and study in question. These reflections are based upon the researcher's experiences in the field of education, both as a teacher and an administrator. The following reflections, posed as questions, were formulated from ideas, thoughts and concerns the researcher believes will effect the growth of administrative and instructional computing:

- Does a difference exist between the relationship of administrative and instructional computing in a school? If the principal is involved in administrative computing does it follow that teachers use the technology in the classroom?
- Electronic learning and the power of effective and efficient information processing is a reality. How long will it take educators at all levels to understand the worth of the new technologies? What components will be necessary to change existing administrative and curriculum ideologies to take advantage of the new technologies to strengthen existing curricula and administrative decision making?
- Will contractual modifications be necessary to provide and mandate courses and seminars in the use of the new technologies for teachers and administrators? Will this mandate provide a school system with a vehicle by which the technology can be integrated into the curricula and

administration and help provide better services to students?

- What role should higher education play in preparing teachers and administrators for the changeover from a paper, pencil and textbook curriculum to a curriculum based on simulation, data bases, interactive video-disks and telecommunication technologies?
- What are the realities of funding sources for administrative computing? Without the funding will educational priorities be affected? Will the school administrator be overburdened by paper work from outside automated agencies to get reports and surveys completed without the aid of automation? How are public school administrators going to handle the information explosion without the aid of a computer? How will educational priorities and supervision of students be affected?
- Will the use of the technology solve the accountability problems faced by many administrators concerning budgetary problems, inventory control, and cost effective programs? Will the aid of automation allow for more detailed information to make decisions which can effect the quality of education of students and allow educational priorities to happen?
- Will information flow and communication problems overburden administrators who do not automate and therefore make them inaccessible to deal with people on a daily basis? Education

is a people business and the time saving advantage of a computer can allow the administrator the time needed to keep it that way.

- Will the teacher of the 1990's be ready for the student of the 1990's equipped with his/her lap or convertible computer, interactive videodisk and video telecommunication technology? What will education be like in 10 years when the "word processor" is a teenager?

The automation movement and information explosion is not going to go away. Planning, thinking, experimentation and evaluation will be necessary to provide optimum services to students using the new technology. The public school administrator and teacher play an important role in providing students with the skills and knowledge necessary to function in an information society. Technology surrounds the students of the 80's and it is incumbent upon all those who service public education to provide quality services to students using the best technology and methods available. The change is at our doorstep. The time is now to open the door and make it happen.

NOTES

¹The Program for the Development of the Role of the Elementary School as an Educational Leader, PRINCEPS, (New York, 1973).

²John J. Corbett, et al., "Call for Leadership - Principals Are Key to Effective Use of Computer Technology", NASSP Bulletin (May, 1982, p. 112).

³Gary A. Kehr and Nick A. Schepis, Microcomputers: Administrative Timesavers (Bethesda, MD: ERIC Reproduction Service, ED223239, 1982), pp. 95-96.

⁴David Lichtman, "Survey of Educators' Attitudes Towards Computers", Creative Computing (January, 1979), p.48.

⁵Richard J. Dennis, The School Administrator's Introduction to Computing (Bethesda, MD: ERIC Document Reproduction Service, ED183194, 1979), p.4.

⁶Ted Mims and Jim Poirot, "Computer Competencies for School Administrators", The Computing Teacher (March, 1984), pp. 38-39.

⁷Michael Quinn Patton, Qualitative Evaluation Methods (Beverly Hills: Sage Publications, 1973), p.47.

⁸Ray C. Rist, On Qualitative Research (Cornell University) p. iv.

⁹Dennis, p.4.

¹⁰Ibid.

¹¹James L. Thomas, ec., Microcomputers in the Schools (Phoenix, AZ: The Oryx Press, 1981), p.ix.

¹²Janis Cromer, ed., High Tech Schools: The Principal's Perspective (Bethesda, MD: ERIC Document Reproduction Service, ED243224, 1984), p.22.

¹³Peter Coburn et al., Practical Guide to Computers in Education (Reading, MA: Addison-Wesley Publishing Co., 1982), p.65.

¹⁴Bruce Presley, A Guide to Programming in Applesoft (New York: Lawrenceville Press, 1984), p.ix.

¹⁵Arthur W. Eve, et al., "What Is a Microcomputer?", Microcomputer Newsletter Information for Managers (Amherst, MA: Institute for Governmental Services, 1985), p.1-2.

- 16 R.M. Davis, "Evolution of Computers and Computing," Science, 1977, p.195.
- 17 James L. Poirot, Computers and Education (Manhaca, TX: Sterling Swift Publishing Company, 1980), p.1.
- 18 Presley, p.X
- 19 Science Research Associates, Inc., Computer Discovery (Chicago: Science Research Associates, Inc., 1981), p.23.
- 20 John E. Haugo, Management Applications of the Microcomputer: Promises and Pitfalls (Bethesda, MD: ERIC Document Reproduction Service, ED201410, 1981), p.130.
- 21 Alan B. Salisbury, "Computers and Education: Toward Agreement on Terminology," The Educational Technology Reviews Series, Number Nine, The Computer and Education. (Englewood Cliffs, NJ: Educational Technology Publications, 1973), p.1.
- 22 Harry F. Silberman, Applications of Computers in Education (Santa Monica, CA: System Development Corporation, March 1967).
- 23 M.H. Glauberman, "Computers in Education - An RCA Viewpoint," Educational Technology (September 1969): 63-66.
- 24 U.S. Congress, Automation and Technology in Education (A report of the Subcommittee on Economic Progress, Joint Economic Committee, Washington: Government Printing Office, 1966).
- 25 U.S. Office of Education, Department of Health, Education and Welfare, U.S. Office of Education Support of Computer Activities, (Washington: Government Printing Office, 1969).
- 26 Karl L. Zinn, "Instructional Uses of Interactive Computer Systems," Datamation (September 1968): 22-27.
- 27 Salisbury, p.2.
- 28 Madeline Baun and Richard J. Dennis, ed., Teacher's Introduction to Administrative Uses of Computers (Bethesda, MD: ERIC Document Reproduction Service, ED183193, 1979), pp.1-5.
- 29 Doug LaChance and Keith Stokka, Using A Microcomputer With a Large Data Base (Bethesda, MD: ERIC Document Reproduction Service, ED243224, p.171-3.

³⁰Haugo, p.130.

³¹Robert W. Coombs, et al., Microcomputer Selection Guidelines for Administrators (Bethesda, MD: ERIC Document Reproduction Service, ED238412, 1983), p.4.

³²Alan L. Roecks, "How Many Ways Can the Computer Be Used in Education?" Educational Technology (September, 1981), p.16.

³³John J. Corbett, et al., "Call for Leadership - Principals Are Key to Effective Use of Computer Technology," NASSP Bulletin (May, 1982) p.112.

³⁴Kenneth C. Brown, The Administrator's Use of Microcomputer Systems (Bethesda, MD: ERIC Document Reproduction Service, ED234729, 1983), p.2.

³⁵"Managing Microcomputers: What the Principal Needs to Consider," Practitioner (Bethesda, MD: ERIC Document Reproduction Service, ED242005, 1983), p.5.

³⁶Dennis, p.1.

³⁷Ibid., p.7.

³⁸Ibid., p.1.

³⁹Lichtman, p.48.

⁴⁰Ibid., p.50.

⁴¹LaChance, p.172.

⁴²Roecks, p.16.

⁴³Haugo, p.131.

⁴⁴Ibid., p.132.

⁴⁵Keher, pp.95-96.

⁴⁶Ibid., p.96.

⁴⁷Larry Bowers, The Impact of Microcomputing on Secondary School Administrators (Bethesda, MD: ERIC Document Reproduction Service, ED223239, 1982), p.154.

⁴⁸Corbett, p.111.

⁴⁹Ibid.

⁵⁰Diane E. Cutts et al., "Administrator Microliteracy: A Challenge for the '80's," NASSP Bulletin (September, 1982): p.54.

Cromer, p.10-12.

Todd Hoover and Sandra Gould, "Computerizing the School Office: The Hidden Cost," NASSP Bulletin (September, 1982), pp. 87-89.

⁵¹Brenda Anthony Bolton, "Solving Administrative Problems: Student Scheduling and Tracking System for the Microcomputer," Educational Computer Magazine (March/April, 1982), pp.24-26.

Stanley Pogrow, "Beating the Paperwork," School Administrator (April, 1983), pp.11-13.

D.G. Marshall, "The School Administrator and the Microcomputer," Education Canada (Summer, 1982), pp.4-10.

Shirley Boes Neill, How to Plan for Effective Instructional Use of Microcomputers, Tips for Principals from NASSP (Bethesda, MD: ERIC Document Reproduction Service, ED236769,1983), pp.1-4.

Elizabeth H. Brady and Shirley Hill, "Young Children and Microcomputers - Research Issues and Directions," Young Children (March, 1984): 49-59.

Brown, p.6.

Coombs, p.6-12.

⁵²George E. Uhlig, "Electronic Education: Dimensions and Directions," Education (1982): 106-111.

⁵³Brown, p.2-6.

⁵⁴Ibid.

⁵⁵ibid.

⁵⁶Cromer, p.10-12.

⁵⁷Mims, pp.38-39.

⁵⁸Donald R. Johnson, "The Office of the Future", American School and University (September, 1985), pp.24-32.

⁵⁹Jay R. Galbraith and Robert K. Kazanjian, "Developing Technologies: R and D Strategies of Office Product Firms", Columbia Journal of World Business, (Spring, 1983), p.37.

⁶⁰Willoughby Ann Walshe, "1983 is Emerging as the Year of the Executive Computer", Office Administration and Automation (July, 1983), p.7.

⁶¹Ibid.

⁶²Walter A. Kleinschrod, "A State of OA Report: Partly a State of Confusion", Office Administration and Automation (November, 1983), p.7.

⁶³Ibid.

⁶⁴Ibid.

⁶⁵Ibid.

⁶⁶Walter A. Kleinschrod, "Why Automate? No One Knows Better Than You"., Office Administration and Automation (May, 1983), p.7.

⁶⁷Eugene Raudsepp, "Building Team Spirit", Office Administration and Automation (October, 1983), pp.29-31.

⁶⁸Patrick Flanagan, "Fitting PC's Into Your OA Plan, How the Personal Computer Shifts Office Strategies", Office Administration and Automation (September, 1983), pp.26-38.

⁶⁹Ibid., p.28.

⁷⁰Ibid.

⁷¹Ibid., p.29

⁷²James M. West, "Living the Automated Office", Office Administration and Automation (June, 1983), p.104.

⁷³Ibid., pp.104-105.

⁷⁴Walter A. Kleinschrod, "Yes There's Confusion. Take Comfort In It", Office Administration and Automation (December, 1983) p.7.

⁷⁵Ibid.

⁷⁶Lawrence W. Lynett, "Introduction to New Office Automation Technology Cries Out for a TEAM of Managers, Users, and DP Staff", Office Administration and Automation (January, 1984), p.8.

⁷⁷Ibid.

⁷⁸Patrick Flanagan, "What I Use My PC For", Office Administration and Automation (February, 1984), p.26.

⁷⁹Ibid.

⁸⁰David Steinbrecher, "How the PC Improves My Operation", Office Administration and Automation (September, 1984), p.30.

⁸¹Flanagan, p.57.

⁸²Garret Van Seters, "Your Business and Computers", Business and Economic Review (April, 1984, p.6.

⁸³Ibid., p.7.

⁸⁴Ibid., p.9.

⁸⁵William A. Olcott, "Office Automation: Is the Message Getting Through to American Business?", Office Administration and Automation (May, 1984), p.7.

⁸⁶Kathleen Foley Curley, "Are There Any Real Benefits from Office Automation?", Business Horizons (July-August, 1984), p.37.

⁸⁷Larry L. Hamilton, "Will the New Technology Manage Us?", Business and Economic Review (July, 1984), p.37.

⁸⁸Betty Jo Licata, New Technology Implementation and Use: Workers' Attitudes and Behaviors (Bethesda, MD: ERIC Document Reproduction Service, ED246270, 1984), p.3.

⁸⁹Dr. Edward J. Lias, "Should Businesses Buy Microcomputers for Their Employees?", Computers and People (March-April, 1984), p.21.

⁹⁰Belden Menkus, "How Office Automation Is Altering the Executive Workplace", Dun's Business Month (March, 1985), p.75.

⁹¹Jennifer E. Beaver, "Rethinking Your Approach to OA", Computer Decisions (July 30, 1985), p.60.

⁹²Ibid.

⁹³William A. Olcott, "Many Executives and Managers Resist Computers - Can Anything Be Done to Turn This Around?", Office Administration and Automation (June, 1985), p.7.

⁹⁴Ibid.

⁹⁵Susan Foster Bryant, "Corporate Micro Users Speak Out", Computer Decisions (July 2, 1985), pp.30,34.

⁹⁶Darold R. Klauk, "The Office of the Future", Business and Economic Review (April, 1985), p.30.

- ⁹⁷Ibid.
- ⁹⁸Ibid.
- ⁹⁹Ibid.
- ¹⁰⁰Lamont Wood, "Users Mold OA", Computer Decisions (January 29, 1985), p.132.
- ¹⁰¹Ibid., pp.128-129.
- ¹⁰²Ibid., p.130.
- ¹⁰³Thomas L. McDole, Management Planning Requirements for Implementing Office Automation (Bethesda, MD: ERIC Document Reproduction Service, ED257940, 1985).
- ¹⁰⁴James A. Henderson, Jr., "The IRM Manager", Business and Economic Review (January, 1985), p.37.
- ¹⁰⁵William R. King, "Information Technology and Corporate Growth", Columbia Journal of World Business (Summer, 1985), p.29.
- ¹⁰⁶W. Douglas King, "Electronic Banking", Business and Economic Review (January-March, 1986), pp.40-41.
- ¹⁰⁷Ronald L. Aldrich, Jr., "The Insurance Information Bank", Business and Economic Review (October, 1985), p.40.
- ¹⁰⁸Thomas G. Faulds, "Redesigning the Insurance Industry", Business and Economic Review (July, 1985), p.36.
- ¹⁰⁹Federic G. Withington, "Key Technologies for Computers: Limits", Computers and People (July-August, 1985), p.14.
- ¹¹⁰Dr. Ralph T. Hocking, "Personal Computers and Analogous Development of Technology", Computers and People (November-December, 1985), p.24.
- ¹¹¹Fred V. Guterl, "Here Comes the Computer CD", Dun's Business Month (September, 1985), pp.63-65.
- ¹¹²Don S. Johnson, "Gazing Through a Dusty Crystal Ball: What's Ahead in OA", Administrative Management (January, 1986), p.7.
- ¹¹³Glenn H. Keitel, "The Minicomputer: A Key to an Integrated OA Strategy", Office Administration and Automation (September, 1985), pp.22-28.

114 Larry Fujitani, "Laser Optical Disk: The Coming Revolution In On-Line Storage", Communications of the ACM (June, 1984), p.546.

115 David Steinbrecher, "Proprietary Chip Technology May Lead to Better Computers...", Office Administration and Automation (February, 1985), p.10.

116 John Voltmer, "Taming the Paper Tiger", Computer Decisions (December, 1985), p.54-60.

117 John Lofland, Analyzing Social Settings (Belmont, CA: Wadsworth Publishing Co., 1971), p.13.

Patton, p.22.

W.J. Filstead, "Qualitative Methods: A Needed Perspective in Evaluation Research," in Cook, T.D. and C.S. Reichardt, eds., "Qualitative and Quantitative Methods in Evaluation Research", (Beverly Hills: Sage Publications, 1979), pp.33-48.

118 Patton, p.20.

119 Patton, p.22.

120 Patton, pp.60-62,64

Egon G. Guba, Toward a Methodology of Naturalistic Inquiry in Educational Evaluation (Center for the Study of Evaluation, UCLA Graduate School of Education, University of California, Los Angeles: 1978), pp.3-5.

Claire Selltiz et.al., Research Methods in Social Relations (New York, Holt and Company, 1959), p.60.

121 L.R.Gay, Educational Research: Competencies for Analysis & Application (Columbus, Ohio, Charles E. Merrill Publ. Co., 1981) pp.85-87.

122 George A. Lundbert, Social Research (New York, Greenwood Press, 1968), p.140.

123 Patton, p.11,100.

124 Leonard Schatzman and Anselm L. Strauss, Field Research, Strategies for a Natural Sociology (Englewood Cliffs, New Jersey, Prentice Hall, Inc., 1973), pp.38-39.

- ¹²⁵Marlene E. Henerson and Lynn Lyons, Morris and Carol Taylor Fitzgibbon, How to Measure Attitudes (Beverly Hills, Sage Publications, 1978), p.25.
- ¹²⁶Patton, pp.200-204.
- ¹²⁷Lofland, pp.76-85.
- ¹²⁸Patton, p.247.
- ¹²⁹Lofland, p.89.
- ¹³⁰Guba, pp.49,53.
- ¹³¹Robert Bogdan and Steven J. Taylor, Introduction to Qualitative Research Methods (New York, John Wiley and Sons, 1975), pp.68-69.
- ¹³²Klaus Krippendorff, Content Analysis, An Introduction to Its Methodology (Beverly Hill, Sage Publications, 1980), p.21.
- ¹³³Ibid., p.109.
- ¹³⁴Patton, p.152.
- ¹³⁵Patton, p.
- ¹³⁶Ibid., pp.330-331.

APPENDIX

Appendix A

The following list helps in understanding the division and the method for selecting those principals who were interviewed.

K-6 Schools with populations below 600.

Franklin
Gilmore
Huntington
Paine
Whitman
Winthrop

K-6 Schools with populations 600 or above.

Arnone
Ashfield
Brookfield
Davis
Downey
Hancock
Kennedy
Raymond

Grades 7 - 8

North Jr. High School
South Jr. High School
East Jr. High School
West Jr. High School

Grades 9 - 12 - High School

Red House
Yellow House
Green House
Azure House
Core House

Appendix B

Date

Name and address of participant

Dear - - - - - :

The advancement of computer technology during the past several years has presented a wide range of improvements as to the methods of managing information. Because the advancements have reduced the cost and increased the availability of computer technology, administrators in the public schools now have a valuable resource with which to improve the way they manage educational matters.

I am currently engaged in research at the University of Massachusetts at Amherst. It is the goal of my research effort to understand the circumstances and tools which will best improve managerial tasks in the school office. Mr. George, our superintendent, has given me permission to acquire the necessary data to complete the study. Four objectives are being addressed:

1. To obtain perceptions from school principals regarding problems they may be encountering in the utilization of computers in general, and more specifically, microcomputers for managerial purposes.
2. To identify and examine the reasons principals do and do not utilize microcomputers for managerial purposes.
3. To identify problem areas as to methods of dissemination of information and what information may or may not be amenable to computerization in their school and school district.
4. To obtain perceptions from school principals regarding the competencies and training needed by them in a technological age.

The first step in the process involves the administration of an interview guide. You have been randomly selected as a participant. If you agree, your name and your involvement will be held in strict confidence.

I will be calling you to confirm your willingness to participate in this part of the Study, and if so, to arrange an appointment for a convenient time and place where the interview can take place.

Thank you for your cooperation.

Sincerely,

John J. Kelley

Appendix C

INTERVIEWER MANUAL

EVALUATION OF TECHNOLOGY IN PUBLIC SCHOOL ADMINISTRATION

INTRODUCTION:

Purpose of the interview: I am here to see what impact the computer is having on you and on managerial functions within your building and also to assess the impact a microcomputer can have on the managerial function of your building.

Ethics: I would like to tape record this interview, only for the purpose of validating the accuracy of my questions. The tape recorded interview will only be heard by me. Your name will never be mentioned nor will any particular response be connected to you at any time.

Topics to be covered in this interview: My questions will center around what sort of differences have occurred in your school building since computers were introduced. I am interested in any changes which have happened to a) you, b) your job, c) the way the school serves its students, d) the office organizational structure, and e) any differences you have noticed in the work conditions or attitudes in your building since the computers have been in operation. I am also interested in your view points concerning the expansion of the use of microcomputers in your school building for managerial purposes.

Concerns of the person being interviewed: Do you have any questions or concerns before I begin?

Questions Concerning the Individual's Current Job:

1. Would you please describe your role and major responsibilities as a principal/housemaster in this school and school system.
2. How long have you been working as principal/housemaster of this school?
3. Have you had any prior experience with a microcomputer?
Please describe.
4. Do you personally use a microcomputer in your work?

IF THE ANSWER IS 'YES', PLEASE CONTINUE TO QUESTIONS 5A THROUGH 7A.

IF THE ANSWER IS 'NO', PLEASE CONTINUE TO QUESTIONS 5B THROUGH 7B.

- 5A. Where is the microcomputer/terminal located?

Is that a convenient place?

- 6A. How many hours a week do you use the microcomputer?

- 7A. What do you use the microcomputer for?

- What type of work do you do with it?

- What type of information do you need from it?

- 5B. Would you like the opportunity to use a microcomputer in your office?

- Did you ever pursue the channels to acquire one?

IF THE FIRST ANSWER IS 'YES' CONTINUE WITH 6B and 7B.

IF THE FIRST ANSWER IS 'NO' CONTINUE TO QUESTION 8.

6B. Where would you locate the microcomputer?

7B. What would you use it for?

- What type of work would you do with it?
 - What type of information would you need from it?
-

8. Do you use the services of a computer that is located outside your school or school district?

- What type of work do you use it for?
- What type of information do you need from it?

9. Do you use information that another person can get from the computer housed in your building?

- Outside your building?

10. What type of information do you feel should be generated from an inhouse computer as compared to the one outside your building?

11. How often do you request such information (times / week / month / yearly)?

- From your inhouse computer?
- From the computer located outside your building?

12. Has the inhouse computer changed the way you do your job?

Please describe.

- What about such work habits as pace, efficiency, etc.?
- The way you approach/think about the job you have to do?
- Possible changes in your professional attitude.

13. Has the computer housed outside your building changed the way you do your job?

Please describe.

- What about such work habits as pace, efficiency, etc.?
 - The way you approach/think about the job you have to do?
 - Possible changes in your professional attitude?
14. Which computer, inhouse or the one located outside your building (or both) is really necessary for the job you do?
- Please describe.
 - Which would you prefer?
15. Do you think you have changed any since the inhouse computers have been in your building?
- Change in personnel attitudes?

Questions Concerning the Introduction of the Computers in Your Building:

16. How long have the present computer(s) been in operation here?
17. Would you please describe the particular events/information which preceded the present use of computers in your building.
18. Was there a needs assessment done?
- Please describe some of the major topics included in that needs assessment.
19. How was the decision made to introduce the present computers?
- Were people within the school consulted about the decision?
 - Who were they?
20. Was there some training accompanying the introduction of the present computers?

IF THE ANSWER IS 'YES' CONTINUE WITH THE FOLLOWING PROBES

IF THE ANSWER IS 'NO' OR 'DON'T KNOW' PROCEED TO QUESTION 23

- Please describe what it was like.
 - Was it mandatory or voluntary?
 - Who was involved in the training?
21. Were there any incentives offered if you took the training?
- If yes, please describe them.
 - If no, would there have been some you would have liked?
22. Would you have liked the training to have been done differently?
- Please describe.
23. Is there anything about the present computers in your building that bothers you?
- Please explain.
-

Questions Concerning Changes Within the School: Personnel Decisions:

24. Has the acquisition of computer skills by your staff had any effect on personnel decision you have made?
25. Do you believe that all teachers should be computer competent in the following areas:
- be able to read and write simple programs?
 - have experience using educational application software and documentation?
 - have a working knowledge of computer terminology?
 - know by example some type of problems that are and some types of problems that are not currently amenable to computer solution?
 - be able to discuss the history of computing as it relates to education?
 - be able to discuss moral or human impact issues of computing in society and education?

26. Do you believe all building principals should be computer competent in the following areas:
- be able to justify the cost of educational computing?
 - be able to discuss values and benefits of computerization in education and society?
 - be able to identify possible funding sources for instructional and administrative computing?
 - be able to identify training needs of teachers using the computer as an object of instruction, as an instructional medium, and as a problem-solving tool?
 - be able to demonstrate an awareness of future trends in computing as they relate to educational computing?
 - be able to describe the computer training needs of students who will be entering the job market in the future?
 - be able to identify training needs of teachers and administrators related to the administrative uses of computers in education?
 - be able to identify various alternatives for using computers in instruction?

If any part of Question 26 is Yes continue; if all No continue to Question 28.

27. What do you believe would be the best way to accomplish this goal?
-

Questions Concerning the Future Use of Computers:

28. Do you feel that the computer can improve the way the school services its students?

Please describe

- In office management?
 - In curriculum management?
 - In learning styles?
29. Is there anything else you'd like to mention regarding the possible directions you would like to see the computer take in your school, specifically in your workspace?

30. Gender: Female Male
31. Into which of the following categories does your age fall?
- 25 to 29 years
- 30 to 34 years
- 35 to 39 years
- 40 to 44 years
- 45 to 49 years
- 50 to 54 years
- 55 to 59 years
- 60 to 64 years
- 65 years or older
32. What is the highest level of education you have completed?
- Masters
- Masters +
- C.A.G.S.
- Doctorate

THE INTERVIEW IS OVER AND I CERTAINLY WANT TO THANK YOU FOR YOUR TIME AND FOR ANSWERING THE QUESTIONS.

Appendix D

Date

Name and address of participant

Dear -----:

The advancement of computer technology during the past several years has presented a wide range of improvements as to the methods of managing information. Because the advancements have reduced the cost and increased the availability of computer technology, administrators in the public schools now have a valuable resource with which to improve the way they manage educational matters.

I am currently engaged in research at the University of Massachusetts at Amherst. It is the goal of my research effort to understand the circumstances and tools which will best improve managerial tasks in the school office. Mr. George, our superintendent, has given me permission to acquire the necessary data to complete the study. Four objectives are being addressed:

1. To obtain perceptions from school principals regarding problems they may be encountering in the utilization of computers in general, and more specifically, microcomputers for managerial purposes.
2. To identify and examine the reasons principals do and do not utilize microcomputers for managerial purposes.
3. To identify problems in methods of dissemination of information and what information may or may not be amenable to computerization in their school and school district.
4. To obtain perceptions from school principals regarding the competencies and training needed by them in a technological age.

One step in the process involves the administration of a questionnaire. The data collected will be used to support existing data or to open up new areas of inquiry. Your input is critical for the identification and understanding of building needs..

Thank you for your cooperation.

Sincerely,

John J. Kelley

Appendix E

QUESTIONNAIRE

EVALUATION OF TECHNOLOGY IN PUBLIC SCHOOL ADMINISTRATION

INTRODUCTION:

Purpose of the questionnaire: The results of the questionnaire will be used to assess what impact the computer is having on the managerial functions within your building and also to assess the impact a microcomputer can have or is having on the managerial functions of your building. The data collected will be used to support existing data or to open up new areas of inquiry. Your input is critical for the identification and understanding of building needs.

Ethics: The questionnaire will only be read by me. Your name will never be mentioned nor will any particular response be connected to you at any time. I have coded the questionnaire in order that I may be able to contact you concerning further inquiry, if necessary.

Topics to be covered in this interview: The questions will center around what sort of differences have occurred in your school building since computers were introduced. I am interested in any changes that have happened to you, your job, the way the school serves its students, the office organizational structure and any differences you have noticed in the work conditions or attitudes in your building since the computer(s) have been in operation. I am also interested in your viewpoints concerning the expansion of the use of microcomputers in your building for managerial purposes.

Questions Concerning the Individual's Current Job:

1. Would you please describe your role and major responsibilities as a principal/housemaster in this school and school system.

2. How long have you been working as a principal/housemaster? (Total years of experience in such a position.)

3. Please describe your experience (s) using a microcomputer.

4. Do you personally use a microcomputer in your work? (If yes, please describe how you use it. If no, please explain why you do not.)

5. Would you like the opportunity to use a microcomputer in your office? (If yes, who would be the chief operator of the computer, and for what purpose would it be used?)

6. Please list all the services you receive from the mainframe computer through the data processing center at the high school.

7. Please list the services you would like to receive from the data processing center or from a computer located in your office. Please specify.

8. What type of information do you feel should be generated from a computer in your office as distinguished from the computer at the data processing center at the high school?

9. What type of information, in addition to that already computerized, do you feel should be computerized?

10. Which computer, the one located in your office, the one located at the data processing center, or both, is necessary for you to function effectively and efficiently in your job as principal/housemaster? Please explain.

Questions Concerning Introduction of the Computers into the Office:

11. What type of training, if any, do you believe is necessary for the introduction of a computer into your office? Please describe.

12. Who should be involved in the training?

13. When should it be offered?

14. In what areas do you feel training should be offered?
(e.g. Wordprocessing, Database management, Introduction to
hardware and software use, etc.)

15. Should any incentives accompany the completion of the training?
Please describe.

Questions Concerning Computer Competencies Needed by Administrators:

16. Please express your ideas and concerns for each of the following
areas.

All building principals should:

A. be able to read and write simple programs.

B. be able to access information from prepackaged software programs.

C. be able to justify the cost of educational computing.

D. be able to discuss values and benefits of computerization in education and society.

E. be able to identify possible funding sources for instructional and administrative computing.

F. be able to identify training needs of teachers using the computer as an object of instruction, as an instructional medium and as a problem-solving tool.

- G. be able to demonstrate an awareness of future trends in computing as they relate to educational computing.

- H. be able to describe the computer training needs of students who will be entering the job market in the future.

- I. be able to identify training needs of teachers and administrators related to the administrative uses of computers in education.

- J. be able to identify various alternatives for using computers in instruction.

17. What do you believe would be the best way to accomplish these goals?

Questions Concerning the Future Use of Computers:

18. Do you feel that the computer can improve the way the school services its students? Please explain.

In office management:

In curriculum management:

In learning styles:

19. Is there anything else you'd like to mention regarding the possible directions you would like to see the computer take in your school, and specifically, in your office?

Demographic Information:

20. Gender: _____ Female _____ Male

Into which of the following categories does your age fall?

- _____ 25 to 29 years
- _____ 30 to 34 years
- _____ 35 to 39 years
- _____ 40 to 44 years
- _____ 45 to 49 years
- _____ 50 to 54 years
- _____ 55 to 59 years
- _____ 60 to 64 years
- _____ 65 years or older

What is the highest level of education you have completed?

- _____ Masters
- _____ Masters+
- _____ C.A.G.S.
- _____ Doctorate

THANK YOU FOR YOUR TIME AND INPUT. IT IS DEEPLY APPRECIATED.

Appendix F

COMPUTER SYSTEMS CATALOG

Monthly Attendance

Transaction Edit
 MA State Register Print
 Marking Summary Record Create
 Master File Attendance Update
 EOY Report
 Exception Report
 Master File Update
 Summary Report
 Student Activity Report
 Monthly Attendance Transaction
 Load
 Data Bank Extract
 School Summary File Creation

Bus Routing

Dime File Print
 Street Intersection List
 Mode Description List
 Alpha Street List
 Creates Two Recs. For Each
 Dime Rec.
 Alpha List of Street Names
 Standardize Street Spelling
 Street Segment Name List
 Standardize Street Spelling
 Inserts Geocodes
 Inserts Census Tract and Block
 Nickel File List
 Update Nickel File
 Route Settings
 Stop List
 Updates Route Segment
 Route Reports

Basic Skills

Edit and Update
 Student Achievement on Min STDS
 Student Not Achieving Min STDS

Daily Attendance

Absence Load and Edit
 Updates Load and Edit
 Attendance Update
 Bulletin Print
 Principal's and Housemaster's
 Report
 Class Cut Load and Edit
 Class Cut Report to Housemasters
 Class Cut Report to Floor
 Teachers
 Pouch Recovery, Cycle Tape
 Extract
 Attendance Totals Recap
 File Print
 Monthly Extraction
 Monthly Interface
 Class Cut Date Correction

Route Segment Schedule
 Create Route File
 Create Pupil File
 Students Not Assigned
 Passenger List
 Assigns Bus Stop Codes
 Contents of Pupil File List
 Updates Pupil File
 Assigns Pupil Counts
 Prints Stop Totals
 Route Segment Report
 Edit and Load Stop Desc. File
 Stop Desc. File List
 Updates Stop Desc. File
 Create Centroids File
 School Distances List
 School/Geocode Distance Calc.

Annual Report
 Two Up Labels

School Budget

YTD Detail Budget Expend. A & B
 Vendor List and Report
 Support Registers A-G
 P. O. Listing
 Master Record List for Next
 Fiscal Year
 Vendor Labels
 Main Menu
 Maintenance of Master File
 Maintenance of Vendor File
 Create Next Year's File From
 Current Year File
 Public Law 874

Master File Conver. From Tape
 To Disk
 Master File Conver. From Disk
 To Tape
 B.P.S. Master Current Year
 Inquiry
 B.P.S. Vendor File Inquiry
 B.P.S. Master, Previous Year
 Inquiry
 B.P.S. Master, Next Year Inquiry
 F.P.L. Master, Current Year
 Inquiry
 F.P.L. Master, Previous Year
 Inquiry
 F.P.L. Master, Next Year Inquiry

Cafeteria Accounting

Load and Edit
 Update Program
 Weekly Reconciliation Tally

Payments to City Treasurer
 Financial Tally By School
 Monthly Recap Report

Enrollment

Creates Enrollment Master File
 Enrollment Report

Age and Sex Distribution Report
 Load 5 and 8 Data Cards

School Library

Loads IRC Media Transactions
 Updates Media Master File
 Media Listings
 Media Master Card Request
 '4' Up Labels

Data Extract/Build OVDUE Skeleton
 Master
 Extract and Update OVDUE Skeleton
 Master
 Overdue Notices and List by House
 Badge Card Print

Marking

Mark Card Load
 Report Card Print
 Mark Distribution
 Recommendation Distribution
 Computes Honor Roll
 Honor Roll Print
 Edits and Overlays Report
 Card Load File
 Report Card Summary

I's, F's, W's Report
 GPA Calculations
 Assign Rank in Class
 GPA and RIC Reports
 Comment Usage Tally
 Load and Edit Department Cards
 Department Record List
 Non-Match Previous Report Card
 Records

Marking (Cont.)

Grade to Absences Correlation
 Load and Edit Marking File
 Updates
 Update Marking File
 Load Type 'M' For Marking File
 Update
 Permanent Record Label
 Temporary Attendance and
 Department Labels

Class Lists
 Generate Type '7' Cards From
 Att. Master
 Report Card Load File Merge
 Physical Education List
 Teacher Header Card Load and Edit
 Teacher Header Card List
 GPA and RIC List
 YOG Mark Correlation

Payroll

Validate Pay Data
 Calculate Gross and Net Pay
 Print Gross Pay Details
 Print Payroll Checks
 Print Payroll Checks (Free Form)
 Print Earnings Statements
 Print Earns Stmt. (Free Form)
 Print Bank Deposit Summary
 Print Payroll Register
 Extract Deduction Data
 Print Deduction Register
 Extract Retirement Date
 Update YTD Pay Ele/Ded File
 YTD Pay Ele/Ded Report Generator
 Transcribe Auto Alloc Data
 Extract Labor Distribution Data
 Labor Dist Report Generator
 Sort Payroll Extract File
 Print Payroll Worksheets (Form)
 Print Worksheets (Stock Paper)
 Print YTD Earnings Register
 Print Employee Status
 Payroll/Budget Interface For
 School
 Payroll/Budget Interface for City
 Bi-Weekly School Summary
 Weekly School Summary
 Weekly City Summary
 Bi-Weekly City Summary
 Monthly Pensioners Summary
 Print Time Sheets

Additional Pay Work Sheets
 Payroll Deduction Report
 Print Certified Retirement
 Name and Address Listing
 Monthly Labor Distribution
 Extract
 Extract Quarterly Data
 Print Tax Deducted Report
 Print 941A's
 Print Employee Quarterly Report
 Print Tax Wage Report
 Print W-2's
 Print W-2 Balance List
 Print W-2's for Terminees
 Print W-2's for Pensioners
 Print 1099's
 Print Tax Deduction Analysis
 Print Employee Number Book
 Print Data Base Status (Tape)
 Print Data Base Status (Disk)
 Print Employee Profiles
 General Change Update
 Print Payroll Labels
 Print Earnings Records
 Pay Raise Projections
 Employee Number List
 Print Name and Address Labels
 Recover YTD Data
 Print Sys. Narratives and File
 Lays
 Community School Conversion

Student Scheduling

Cluster Prog Module of Scrm 09
 Arena Entry Sequence Generator
 Arena Scheduling Punch
 Arena Card Conversion
 Student Schedule Print (SERVTS
 Ver)
 Pupil Avail. Report
 Course Causing Difficulty
 Course Cluster
 Homeroom and Locker Report
 Student Changes (Ind. Updates)
 Potential Conflicts
 "Posh" Schedule Listing
 Schedule Lockin List
 Homeroom and Locker Assign.
 Student Mailing Labels
 Closing Sequence Listing
 Teacher Utilization Disk File
 Room Utilization File
 Print Schedule, Room, Student,
 Teacher
 Class List. (Total Only)
 Posh Card Conversion
 Student Verification Listing
 Study Hall Assignment Emts.
 Study Hall Section List
 Study Hall Class List
 Free Period List (Guide)
 Class List (Total by Sex)
 Load and Update Master Schedule
 Load Header File
 Date Pack by School
 Load Course File
 Load Teacher File
 Load Student File
 Convert 5 and 8 to S1 and S2
 PRC Load

Convert PCR to S3 - S5
 Match S1 and S2 to S3 - S5
 Load Class File
 Student Changes (Ind. Upd.)
 Student Changes (MA)
 Pupil Course Req. Verif.
 Reversed Verification
 Simple Tally
 Conflict Matrix
 Simple Tally by Stanine and
 Location
 Common Program Eval.
 Pre-scheduled Edit
 Main Scheduler
 Manual Scheduler
 Scheduled and Rej. List
 Master Schedule Listing
 Teacher Utilization Report
 Room Utilization Report
 Semester Balancing and Mult.
 DPT Req.
 Class List
 Course Substitution
 Room and Teacher Update (Posh)
 Changes to Student File C1 and C2
 Student Study and Schedule Merge
 Master Schedule Update or Load
 Marking File Punch
 Create Student Schedule Disk File
 Scheduling Density Report
 Course Directory
 Course Cluster Input File
 Card Image Tape 5 and 8 or
 M1, M2, M3 Punch
 Student Schedule List
 Student Grade Change
 Create 5 and 8 File

Special Needs

Edit and Extend Team Eval Trans.
 Update the Eval Master File
 Edit and Sort Pam Trans.
 Update Pupil Accounting Master
 (PAM)
 PAM Special Needs Extract
 Print Spec Needs Student Profiles
 Print Spec Needs Student Register

Print Spec Needs Summary Reports
 Merge Elem. and Sec. PAM Files
 Print Stud. Status Code Change
 Report
 Print Team Eval. by Stud. w/Costs
 Print Team Eval. by Participants
 Summ.

Special Needs (Cont.)

Print Team Eval. Statistics
 Special Needs Stud. Reg. by
 School and Homeroom
 Print Monthly Enrollment Register
 Edit and Sort Occ. Ed. Parameter
 Cards
 Occ. Ed. Interface
 Edit and Sort Type of Service
 Rate Cards
 Cost of Service and F.T.E. Report
 EOY Eval. Master File Update
 Grade/Prototype
 Cost of Evaluation Report
 Special Needs Student Due for
 Anniversary Review
 PAM File End of Year Processing

Print Occ. Ed. Student Listing
 Print Bilingual Student Listing
 Load and Print Spec. Needs School
 Dictionary
 Load and Edit City/Town Codes
 Edit and Merge Transfers and
 Sel. State Wards
 State Ward Report
 Select Students for Eval. Review
 Eval. Review File Stud ID Changes
 Update Eval. Review File w/Curr.
 Student Info
 Print Student Eval. Review Report
 Occ. Ed. Summaries
 Eval. Master File Conv. Grade
 Level/Job Class

Utility Programs

Student Street Address Listing
 School Election Tally
 Type 5 and 8 List or Cards
 Print Kindergarten Wrist Band
 Labels
 Mailing Labels
 Pouch Labels
 Label Print (Stud Name & Add)
 Type 5 Card Load
 Homeroom Listing
 Street Address Listing
 Stud. Master Card Listing Type 5
 Non Enter and With. Student List
 (Stencil)
 School DPT Listing and Labels
 Sel. Type 5 and/or 8 Punch or 8
 File Create
 Punch PCR Type 1 From SMF
 Convert Spool File to Print Tape
 Sub Routine for Utiol8
 80/80 Card Image Listing (VAR
 Space)

Selective Physical Education
 4 x 6 Cards
 Physical Education Listing
 Label Print PRC
 List SMF
 Student ID Number Listing
 Student Master File Listing
 Street Listing
 Telephone Distr. List
 Street Address List w/Select.
 School/Grades
 Mailing Labels
 Student Census Cards
 Type 7, 8 and 9 or 5 and 6 Group
 Check
 Type 1, 5, 8 Record Match
 Label Print (Tape Curved at 1x5)
 Questionnaire Tally
 One Time RPG or COBOL Programs
 Convert Source for Libs
 Payroll Test Tape Build
 System Catalog
 Tape Merge (Attend. Sys.)

BIBLIOGRAPHY

AEDS Proceedings. Frontiers in Educational Computing. Bethesda, MD: ERIC Document Reproduction Service, ED234768, 1983.

AEDS Proceedings. The Tomorrow in New Technology; Frontiers in Administrative Computing; Adventures in Instructional Computing. Bethesda, MD: ERIC Document Reproduction Service, ED223239, 1982.

Aldrich, Ronald L. Jr. "The Insurance Information Bank". Business and Economic Review. (October, 1985): 39-40.

Ball, Marion J. and Chapp Sulvia. Be a Computer Literate. Morris Plains, NJ: Creative Computing Press, 1977.

Barrette, Pierre, ed., Microcomputers in K-12 Education. Rockville, MD: Computer Science Press, Inc., 1982.

Baun, Madeline and Dennis, J. Richard, Ed., Teacher's Introduction to Administrative Uses of Computers. Bethesda MD: ERIC Document Reproduction Service, ED183193, 1979.

Beaver, Jennifer E. "Rethinking Your Approach to OA". Computer Decisions (July 30, 1985): 60 and 94.

Bogdan, Robert and Taylor, Steven J. Introduction to Qualitative Research Methods. New York: John Wiley and Sons, 1975.

Bolton, Brenda Anthony. "Solving Administrative Problems: Student Scheduling and Tracking System for the Microcomputer". Educational Computer Magazine (Mar/Apr 1982): 24-26.

Bowers, Larry, The Impact of Microcomputing on Secondary School Administrators. Bethesda, MD: ERIC Document Reproduction Service, ED223239, 1982.

Brady, Elizabeth H. and Hill, Shirley. "Young Children and Microcomputers - Research Issues and Directions". Young Children (March 1984): 49-59.

Brown, Kenneth C., The Administrator's Use of Microcomputers Systems. Bethesda, MD: ERIC Document Reproduction Service, ED234729, 1983.

Bryant, Susan Foster. "Corporate Micro Users Speak Out". Computer Decisions (July 2, 1985): 30-34.

Bukosky, William and Korotkin, Arthur. "Computing Activities in Secondary Education". Education Technology (January, 1976).

Coburn, Peter; Kelman, Peter; Roberts, Nancy; Snyder, Thomas F.F.; Watt, Daniel H.; Weiner, Cheryl. Practical Guide to Computers in Education. Reading, MA: Addison-Wesley Publishing Co., 1982.

Coombs, Robert W. et al., Microcomputer Selection Guidelines for Administrators. Bethesda, MD: ERIC Document Reproduction Service, ED238412, 1983.

Corbett, John J.; Dunn, Robert C.; Latta, Raymond F.; Lehman, Robert A. "Call for Leadership - Principals are Key to Effective Use of Computer Technology". NASSP Bulletin (May 1982): 109-115.

Cromer, Janis, Ed. High Tech Schools: The Principal's Perspective. Bethesda, MD: ERIC Document Reproduction Service, ED243224, 1984.

Curley, Kathleen Foley. "Are There Any Real Benefits from Office Automation?". Business Horizons (July-August, 1984): 37-42.

Cutts, Dannie E.; Mathews, Walter M.; Winkle, Linda Wyrick; Nichols, James L. "Administrator Microliteracy: A Challenge for the '80's". NASSP Bulletin (September 1982): 53-59.

Davis, R.M. "Evolution of Computers and Computing". Science, 1977, p.195.

Dennis, J. Richard. The School Administrator's Introduction to Computing. Bethesda, MD: ERIC Document Reproduction Service, ED183194, 1979.

Doerr, Christine. Microcomputers and the 3 R's. Rochelle Park, NJ: Hayden Book Company, Inc., 1979.

Eve, Arthur W. et al., "What Is a Microcomputer?". Microcomputer Letter Information for Managers. Amherst, MA: Institute for Governmental Services, 1985.

Educational Technology Publications. The Educational Technology Reviews Series, Number One, Introduction to Educational Technology. Englewood Cliffs, NJ: Educational Technology Publications, 1973.

Educational Technology Publications. The Educational Technology Reviews Series, Number Three, Introduction to the Systems Approach. Englewood Cliffs, NJ: Educational Technology Publications, 1973.

Educational Technology Publications. The Educational Technology Reviews Series, Number Nine, The Computer and Education. Englewood Cliffs, NJ: Educational Technology Publications, 1973.

Educational Technology Publications. The Educational Technology Reviews Series, Number Ten, Using Programmed Instruction. Englewood Cliffs, NJ: Educational Technology Publications, 1973.

Exploring with Computers in Vikingland. AEDS-81 Convention Proceedings. Bethesda, MD: ERIC Document Reproduction Service, ED201410, 1981.

Faulds, Thomas G. "Redesigning the Insurance Industry". Business and Economic Review (July, 1985): 35-36.

Flanagan, Patrick. "Fitting PC's Into Your OA Plan, How the Personal Computer Shifts Office Strategies". Office Administration and Automation (September, 1983): 26-38.

Flanagan, Patrick. "What I Use my PC For". Office Administration and Automation (February, 1984): 26-29.

Filstead, W.J. "Qualitative Methods: A Needed Perspective in Evaluation Research". Qualitative and Quantitative Methods in Evaluation Research. Beverly Hills: Sage Publications, 1979.

Frankel, Steven. "How to Program the Principal's Office for the Computer Age" Executive Educator (March 1983): 15-18.

Fujitani, Larry. "Laser Optical Disk: The Coming Revolution in On-Line Storage". Communications of the ACM (June, 1984): 546.

Galbraith, Jay R. and Kazanjian, Robert K. "Developing Technologies: R and D Strategies of Office Product Firms". Columbia Journal of World Business (Spring, 1983): 37-44.

Gay, L.R. Educational Research Competencies for Analysis and Application. Columbus, Ohio: Charles E. Merrill Publishing Company, 1981.

Glauberman, M.H. "Computers in Education - An RCA Viewpoint". Educational Technology. (September 1969): 63-66.

Grossnickle, Donald R. and Laird, Bruce A. "Planning for the Micro-computer: Innovation Insurance May Help". NASSP Bulletin. (September 1982): 60-63.

Guba, Egon G. Toward a Methodology of Naturalistic Inquiry in Educational Evaluation. Los Angeles: Center for the Study of Evaluation, UCLA Graduate School of Education, University of California, 1978.

Guidance Associates. Computers: From Pebbles to Programs. New York: Guidance Associates, Inc., 1975.

Guterl, Fred V. "Here Comes the Computer CD". Dun's Business Month (September, 1985): 63-65.

Hamilton, Larry L. "Will the New Technology Manage Us?". Business and Economic Review (July, 1984): 36-37.

Haugo, John E. Management Applications of the Microcomputer: Promises and Pitfalls. Bethesda, MD: ERIC Document Reproduction Service, ED201410, 1981.

Henderson, James A. "The IRM Manager". Business and Economic Review (January, 1985: 37-38).

Henerson, Marlene et al., How to Measure Attitudes. Beverly Hills: Sage Publications, 1978.

Hocking, Dr. Ralph T. "Personal Computers and Analogous Developments of Technology". Computers and People (November-December, 1985): 16-24.

Hoover, Todd and Gould, Sandra. "Computerizing the School Office: The Hidden Cost". NASSP Bulletin (September 1982): 87-91.

Johnson, Donald R. "The Office of the Future". American School and University (September, 1985): 24-32.

Johnson, Don S. "Gazing Through A Dusty Crystal Ball: What's Ahead in OA". Administrative Management (January, 1986): 7.

Kapp, Ann B. and Knickerbocker, Addie H. Computer Literacy Development, A Project Report. Bethesda, MD: ERIC Document Reproduction Service, ED242984, 1983.

Kearsley, Greg. The Use of Microcomputers for Training: Business and Industry. Bethesda, MD: ERIC Document Reproduction Service, ED207598, 1981.

Keher, Gary A. and Schepis, Nick A. Microcomputers: Administrative Timesavers. Bethesda, MD: ERIC Document Reproduction Service, ED223239, 1982.

Keitel, Glenn H. "The Minicomputer: A Key to an Integrated OA Strategy". Office Administration and Automation (September, 1985): 22-28.

King, Douglas W. "Electronic Banking". Business and Economic Review (January-March, 1986): 40-41.

King, William R. "Information Technology and Corporate Growth". Columbia Journal of World Business (September, 1985): 29-33.

Klauk, Darold R. "The Office of the Future". Business and Economic Review (April, 1985: 30-32).

Klimschrod, Walter A. "A State of OA Report: Partly a State of Confusion". Office Administration and Automation (November, 1983): 7.

Klirmschrod, Walter A. "Why Automate? No One Knows Better Than You". Office Administration and Automation (May, 1983): 7.

Klirmschrod, Walter A. "Yes, There's Confusion. Take Comfort In It". Office Administration and Automation (December, 1983).

Krippendorff, Klaus. Content Analysis, An Introduction to Its Methodology. Beverly Hills: Sage Publications, 1982.

LaChance, Doug and Stokka, Keith. Using A Microcomputer With a Large Data Base. Bethesda, MD: ERIC Document Reproduction Service, ED243224, 1984.

Lantz, James. State-of-the-Art Uses of Computers in Vocational Education in Ohio. Bethesda, MD: ERIC Document Reproduction Service, ED242873, 1984.

Larter, Sylvia. The Impact of Microcomputers in Elementary Education. Bethesda, MD: ERIC Document Reproduction service, ED240983, 1983.

Lawton, Johnny and Gerschner, Vera T. "A Review of the Literature on Attitudes Towards Computers and Computerized Instruction". Journal of Research and Development in Education. (1982): 50-55.

Lias, Dr. Edward J. "Should Businesses Buy Microcomputers for Their Employees?". Computers and People (March-April, 1984): 18-21.

Libonate, George A. and Hughes, Jonathan T. "The Administratively Effective School District: The Role of the Computer". Educational Computer Magazine (July/August 1982): 10-12.

Licata, Betty Jo. New Technology Implementation and Use: Workers' Attitudes and Behaviors. Bethesda, MD: ERIC Document Reproduction Service, ED246270, 1984.

Lichtman, David. "Survey of Educator's Attitudes Toward Computers". Creative Computing. (January 1979): 48-50.

Lofland, John. Analyzing Social Settings. Belmont, CA: Wadsworth Publishing Co., 1971.

Lundbert, George A. Social Research. New York: Greenwood Press, 1968.

Lynett, Lawrence W. "Introduction of New Office Automation Technology Cries Out for a TEAM of Managers, Users, and DP Staff". Office Administration and Automation (January, 1984): 8.

"Managing Microcomputers: What the Principal Needs to Consider". Practitioner. Bethesda, MD: ERIC Document Reproduction Service, ED242005, 1983.

Marshall, D.G. "The School Administrator and the Microcomputer". Education Canada (Summer 1982): 4-10.

McDole, Thomas L. Management Planning Requirements for Implementing Office Automation. Bethesda, MD: ERIC Document Reproduction Service, ED257940, 1985.

Menkus, Belden. "How Office Automation is Altering the Executive Workplace". Dun's Business Month (March, 1985): 75-85.

Microcomputer Directory: Applications in Educational Settings. Cambridge, MA: Monroe C. Gutman Library, 1982.

Microcomputers in Today's Schools: An Administrators' Handbook. Bethesda, MD: ERIC Document Reproduction Service, ED213393, 1981.

Mims, Ted and Poirot, Jim. "Computer Competencies for School Administrators". The Computing Teacher (March 1984): 38-39.

Naiman, Adeline. Microcomputers in Education: An Introduction. Cambridge and Chelmsford, MA: Technical Education Research Center, Inc., and Northeast Regional Exchange Inc., 1982.

Neill, Shirley Boes. How to Plan for Effective Instructional Use of Microcomputers, Tips for Principals from NASSP. Bethesda, MD: ERIC Document Reproduction Service, ED236769, 1983.

Olcott, William A. "Office Automation: Is the Message Getting Through to American Business?". Office Administration and Automation (May, 1984): 7.

Olcott, William A. "Many Executives and Managers Resist Computers - Can Anything Be Done to Turn This Around?". Office Administration and Automation (June, 1985): 7.

Pastore, Carlo. "Technical Training Systems Using Microcomputers". Paper presented at the Conference on Microcomputers in Education and Training, Arlington, VA, 1979.

Parrott, Wilbur L. An Analysis of the Attitudes of Training Managers Toward the Use of Computer-Based Education. Ed.D. dissertation, Boston University, 1983.

Patten, Michael Quinn. Qualitative Evaluation Methods. Beverly Hills: Sage Publications, 1973.

Peat, Marwick, Mitchell. Transformation in Higher Education: Looking Ahead at Management Issues in the '80's. Bethesda, MD: ERIC Document Reproduction Service, ED226633, 1982.

- Pogrow, Stanley. "Beating the Paperwork". School Administrator. (April 1983): 11-13.
- Poirot, James L. Computers and Education. Manchaca, TX: Sterling Swift Publishing Company, 1980.
- Pondy, Louis R. and Huff, Anne S. Drama and Routine in the Public Schools. Bethesda, MD: ERIC Document Reproduction Service, ED209749, 1981.
- Presley, Bruce. A Guide to Programming in Applesoft. New York: Lawrenceville Press, Van Nostrand Reinhold, Inc., 1984.
- Railsback, Charles E. "Microcomputers: Solutions in Search of Problems?" Phi Delta Kappan. (October 1983): 118-120.
- Raudsepp, Eugene. "Building Team Spirit". Office Administration and Automation (October, 1983): 29-31.
- Rebuilding Education to Make it Work, Report. Bethesda, MD: ERIC Document Reproduction Service, ED220609, 1982.
- Rockart, John Fraclick and Morton, Michael S. Computers and the Learning Process in Higher Education. New York: McGraw-Hill Book Company, 1975.
- Romaniuk, E.W. et al., Computers in Schools. Bethesda, MD: ERIC Document Reproduction Service, ED240980, 1983.
- Roecks, Alan L. "How Many Ways Can the Computer Be Used in Education? A Baker's Dozen." Educational Technology (September 1981): 16.
- Rosnow, Ralph L. and Rosenthal, Robert. Understanding Behavioral Science. New York: McGraw-Hill Book Co., 1984.
- Salisbury, Alan B. "Computers and Education: Toward Agreement on Terminology". The Educational Technology Reviews Series, Number Nine, The Computer and Education. Englewood Cliffs, NJ: Educational Technology Publications, 1973.
- Schatzman, Leonard and Strauss, Anselm L. Field Research, Strategies for a Natural Sociology. Englewood Cliffs, NJ: Prentice Hall, Inc., 1973.
- Science Research Associates, Inc. Computer Discovery. Chicago, IL: Science Research Associates, Inc., 1981.
- Selltiz, Claire. Research Methods in Social Relations. New York: Holt and Company, 1959.

Silberman, Harry F. Applications of Computers in Education. Santa Monica, CA: System Development Corporation, March 1967.

Smith, P.R., ed. Computer Assisted Learning, Selected Papers from CAL81 Symposium. England: Pergamon Press, 1981.

Steinbrecher, David. "How the PC Improves My Operation". Office Administration and Automation (September, 1984): 29-31.

Steinbrecher, David. "Proprietary Chip Technology May Lead to Better Computers..." Office Administration and Automation (February, 1985): 10.

Thomas, James L., ed. Microcomputers in the Schools. Phoenix, AZ: The Oryx Press, 1981.

Truett, Carol and Gillespie, Lori. Choosing Educational Software, A Buyer's Guide. Littleton, CO: Libraries Unlimited, Inc., 1984.

Uhlig, George E. "Electronic Education: Dimensions and Directions". Education (1982): 106-111.

Uhlig, George E. Microcomputer Literacy and Teacher Education in the Southeastern United States. Bethesda, MD: ERIC Document Reproduction Service, ED226721, 1982.

U.S. Congress Automation and Technology in Education. A report of the Subcommittee on Economic Progress, Joint Economic Committee, Washington: Government Printing Office, 1966.

U.S. Office of Education, Department of Health, Education and Welfare. U.S. Office of Education Support of Computer Activities. Washington: Government Printing Office, 1969.

VanSeters, Garret. "Your Business and Computers". Business and Economic Review (April, 1984): 6-9.

Voltmer, John. "Taming the Paper Tiger". Computer Decisions (December, 1985): 54-55.

Watson, Paul G. Using the Computer in Education. Englewood Cliffs, NJ: Educational Technology Publications, 1972.

Webb, Eugene J. et al., Nonreactive Measures in the Social Sciences. Boston, MA: Houghton-Mifflin Co., 1981.

West, James M. "Living the Automated Office". Office Administration and Automation (June, 1983): 24-26.

Willoughby, Ann Walshe. "1983 is Emerging as the Year of the Executive Computer". Office Administration and Automation (July, 1983): 7.

Withington, Federic G. "Key Technologies for Computers: Limits".
Computers and People (July-August, 1985): 14-17.

Wood, Lamont. "Users Mold OA". Computer Decisions (January 29, 1985):
128-132.

Zinn, Karl L. "Instructional Uses of Interactive Computer Systems".
Datamation (September 1968): 22-27.



