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THE DEVELOPMENT OF GUIDELINES FOR THE IMPLEMENTATION OF A MICROCOMPUTER-BASED ADMINISTRATION IN SELECTED SCHOOL DISTRICTS IN NEBRASKA

by

Paul R. Brochtrup

A DISSERTATION

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The Graduate College in the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Doctor of Education

Major: Interdepartmental Area of Administration, Curriculum and Instruction

Under the Supervision of Professor C. Cale Hudson

Lincoln, Nebraska

August, 1983

TITLE

THE DEVELOPMENT OF GUIDELINES FOR THE IMPLEMENTATION OF A MICROCOMPUTER-BASED ADMINISTRATION IN SELECTED SCHOOL DISTRICTS IN NEBRASKA

BY

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P.R.B.

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CHAPTER I

INTRODUCTION

The advent of the microcomputer marks the beginning of a new computer revolution in the technological society. Microcomputers are found in everything from television to washing machines, microwave ovens to automobiles, and pocket calculators to aviation avionics. Their widespread application appears to suggest that the inexpensive microcomputers may well rank as a major cultural invention that will touch almost every field of human endeavor.

The use of the microcomputer in the field of educational administration appears to be gaining recognition as a viable alternative for dealing with the enormous amounts of information produced through the day-to-day operations of a public school system. With the rapid technological advancements being made in computer hardware and software, contemporary school administrators are beginning to envision the microcomputer as an administrative tool designed to aid them in resolving increasing organizational problems.[1]

Levin indicated that the concept of using microcomputers in school administration is further enhanced by their functional abilities and cost advantages.[2] He stated that the use of microcomputers

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[1]Dan Levin, "Someday You'll Use Micros in the Central Office, Too," The Executive Educator, II (March, 1980), 22-23.

[2]Ibid.

as administrative tools in education will soon become a plausible reality because they have the capability to perform the same kinds of administrative operations as minicomputers at approximately one-fifth the cost.[3]

The need for school administrators to understand technology and to utilize it in the collection and dissemination of information within the context of the educational setting was emphasized in a lead-in statement to a report presented by Anderson at a conference in 1965 sponsored by the Association for Educational Data Systems. The statement indicated that the school administrator of the future will need to be an individual who not only has a genuine concern for the education of the children of the society, but indeed, one who has an understanding of the importance of technology and its implications for school administration. He also predicted that school administrators of future decades would no longer be discussing the feasibility or importance of technology but would be using it effectively.[4]

Gentle, in 1966, identified the computer as a management tool whose uses for data communications in a school district were limited

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[3]Ibid.

[4]G. Ernest Anderson, Jr., "Educational Data Processing in Local School Districts," The Computer in American Education, ed. Don D. Bushnell and Dwight W. Allen (New York, London, Sydney: John Wiley and Sons, Inc., 1967), p. 204.

only by the user's creative ability.[5] Hansen, Klassen, and Lindsay pointed out, however, that the use of a computer does not automatically improve the quality of management in a school district. In a report presented at the sixteenth annual convention of the Association for Educational Data Systems in 1978, they said that in school districts where careful planning is recognized as being essential for effective management, the computer becomes a valuable part of that planning process, and better planning may result. However, computer availability and use does not of itself lead to careful planning, nor does it create the desire to engage in long-range planning. They further explained that a computer is not a panacea for poor management; but it can be of infinite value to the school administrator looking for ways to manage a school system more effectively and who views computer use as a means to an end and not as an end in itself.[6]

Purpose of the Study

The purpose of this study was to develop guidelines for the implementation of a microcomputer-based administration in selected school districts in Nebraska.

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[5]Edgar C. Gentle, Jr., Data Communications in Business (New York: American Telephone and Telegraph Company, 1966), p. 24.

[6]Tom Hansen, Dan Klassen, and Jim Lindsay, "The Impact of Computer-Based Information Systems upon Schools and School District Administration" (address presented at the Sixteenth Annual Convention of the Association for Educational Data Systems, 1978), pp. 43-44.

Research Questions

The following research questions were proposed for this study:

1. What differences, if any, exist between the perceptions of superintendents about the extent to which their school boards would support a microcomputer-based administration and the extent to which the panel of data management experts agrees or disagrees that school board support is necessary for the success of a microcomputer-based administration?

2. What differences, if any, exist between the perceptions of superintendents about the level of microcomputer expertise which they possess and the extent to which the panel of data management experts agrees or disagrees about the level of microcomputer expertise which superintendents need in order to utilize a microcomputer as a management tool in school administration?

3. What differences, if any, exist between the perceptions of superintendents about the importance of utilizing a microcomputer to process selected administrative tasks and the extent to which the panel of data management experts agrees or disagrees about the capability of a 48-K microcomputer system to process selected administrative tasks in school administration?

4. What differences, if any, exist between the perceptions of superintendents and the panel of data management experts about selected cost-benefit factors which could be directly related to the implementation of a microcomputer-based administration in selected

school districts in Nebraska?

Significance of the Study

As microcomputers become an integral part of society, their impact on educational administration represents one more force which will affect school superintendents throughout the nation. School superintendents everywhere are likely to be confronted with various issues concerning the utilization of microcomputers in school management and, therefore, will need to examine information relative to the use of microcomputers in educational administration in order to support their decisions in this area. The information which results from this study may provide superintendents with a basis for making decisions about the implementation of a microcomputer-based administration.

The literature is not replete with success stories about the administrative use of microcomputers in school management. Although some school districts utilize the services of a minicomputer, many school superintendents still rely upon paper, pencil, and desk calculators as the primary tools for performing many administrative tasks.

The results of this study may also prove to be of significant value to the institutions of higher learning in the State of Nebraska which prepare individuals for school management positions. Those responsible for curriculum and instruction in such institutions can examine the results of the study to help them determine the directions and contents of future training programs for school administrator

in the study of school management.

Definition of Terms

For the purpose of this study the following operational definitions were used:

Administrative use of microcomputers. The technical and clerical tasks of school management required in the areas of curriculum and instruction, student personnel, staff personnel, budgeting, accounting, data processing, and data communications which are capable of being performed by a microcomputer.

Application program. The instructions used by a computer to solve a specific problem. A programming routine written for a particular application, e.g., budgeting, payroll accounting, inventory, and so on.

Auxiliary storage. A storage device in addition to the main storage of a computer, e.g., magnetic tape, disk, or magnetic drum. Auxiliary storage usually holds much larger amounts of information than the main storage unit and, therefore, the information is less readily accessible.

BASIC. Acronym for the computer language called Beginners All-purpose Symbolic Instruction Code; used exclusively as the program language of microcomputers.

Byte. A generic term used to indicate a measurable portion of consecutive binary digits. A group of binary digits usually operated upon as a unit, e.g., an 8-bit byte or 6-bit byte.

Central processing unit. The central processor of a computer system. It contains the main storage, performs mathematical operations, makes logical decisions governing control, and, in general, processes the data stored in the machine.

Computer. A device capable of solving problems or manipulating data by accepting data, performing prescribed operations (mathematical or logical) on the data, and supplying the results of these operations.

Cost-benefit. A term which generally refers to any monetary savings arising from some decision or systems design characteristic.

Data processing. The preparation of data or basic elements of information and the handling of such data according to precise rules or procedure to accomplish such operations as classifying, sorting, calculating, summarizing, and recording. The automation of this process can include all types of machines from simple accounting machines to computers.

Electronic data processing. Data processing that is performed by electronic equipment.

Hardware. A collection of physical parts such as mechanical and electronic devices. This includes input/output devices, main storage units, and central processing units.

I/O devices. The Input/Output devices which are part of a computer system and are used by people to communicate with the central processing unit.

K. Stands for kilo (1000). Represents 1024 bytes of

information. A symbol used to describe the memory density system of a computer.

Magnetic disk. A storage device on which information is recorded on the magnetizable surface of a rotating disk.

Magnetic tape storage. A storage device on which data are recorded. This device consists of a coated plastic tape.

Memory. A computer's storage device in which data can be stored and from which data can be recalled at a later date.

Microcomputer. A small electronic computer capable of performing the sensing, communications, and control functions of a standard-size computer.

Microcomputer-based administration. An administration which utilizes a microcomputer to process the administrative data required to support the planning and decision-making functions of school management.

Microprocessor. A central processing unit of a computer system on a single chip which, when combined with other chips for storage and control functions, forms the basic electronics of a complete computer system.

Off-line. A term used to describe a system in which the operation of the peripheral equipment of a computer system is not under the control of the central processing unit.

On-line. A term used to describe a system in which the peripheral equipment of a computer system is directly under the control of the central processing unit.

Peripheral equipment. Any auxiliary equipment of a computer system which is placed under the direct control of the central computer and may be used either on-line or off-line, e.g., card readers, card punchers, magnetic tape feeds, high-speed printers.

Software. The designs, instructions, routines, and other printed matter required for the operation of a computer. It is a general term used to describe the various levels of languages which make the computer a functional machine and includes compilers and assemblers as well as the system and application programs written for a computer.

Superintendent. The chief executive officer of the school district and the individual responsible for developing, implementing, evaluating, and managing the systems of the school district.

System. A group of interrelated parts, elements, processes, components, functions, and so on which together accomplish some specific objective.

Systems programs. The operating instructions written for CPU's, I/O devices, and storage units. Systems programs control and direct input devices, processing devices, storage units, and output devices.

Delimitations and Limitations

Delimitations

The following delimitations were imposed on this study:

1. The subjects in this study were delimited to a sample of superintendents from K-12 school districts in Nebraska with student enrollments of 1000 or less.

2. The questions in the survey instrument given to the panel of data management experts were based upon the design capabilities of a 48-K personal use microcomputer system.

3. This study was restricted to the administrative uses of a personal use microcomputer in areas generally applicable to building level and central office level administration in a public school environment.

4. The review panel was delimited to a selection of ten practicing school superintendents with five or more years of experience in the superintendency.

5. The individuals chosen for the panel of data management experts were delimited to data managers employed in the State of Nebraska and who were members of the Data Processing Management Association.

6. The microcomputer system utilized in this study was delimited to a personal use microcomputer with 48-K memory density, two disk drives, a line printer, and utilized floppy disks as storage media.

Limitations

The following limitations were imposed on this study:

1. The results of this study may be applicable only in K-12

school districts in Nebraska with student enrollments of 1000 or less.

2. Some questions pertinent to the problem may not have been included in the survey instrument because the microcomputer system used in this study was limited by its design capabilities.

3. This study did not consider any special use microcomputer, such as a microcomputer designed specifically for business use, which may be applicable to building level and central office level administration in a public school environment.

4. The work of the review panel in validating the content of the survey instruments was limited to the expertise of the membership.

5. The work of the panel of data management experts was limited to the expertise of the membership in the area of school administration.

6. The microcomputer system used in this study did not consider any microcomputers with greater or lesser memory density than 48-K.

Assumptions

The following assumptions were made for this study:

1. The superintendent of each school district was the chief executive officer of the board of education and, therefore, was familiar with the school board's feelings and attitudes toward the concept of microcomputer-based administration.

2. The superintendent of each school district was responsible for all management systems within the school district and, therefore, was familiar with the administrative tasks performed by school management personnel in Nebraska school districts.

3. The superintendents in this study were open-minded about a microcomputer-based concept.

4. The design of the microcomputer system used in this study could perform mathematical and logical operations similar to those utilized by school administrators in managing Nebraska school districts.

5. The K-12 school districts in Nebraska with a student enrollment of 1000 or less were similar in terms of the nature of the information needed to manage their affairs.

6. The K-12 school districts involved in the sample were representative of all K-12 school districts in Nebraska where the student enrollment was 1000 or less.

7. The data reported on the survey instrument were true and objective representations of each superintendent's perceptions about: (a) the extent to which the school board would support a microcomputer-based administration; (b) the superintendent's level of microcomputer expertise; (c) the importance of using a microcomputer to process selected administrative tasks; and (d) the expected cost-benefit of utilizing a microcomputer as a management tool in the school district.

8. The data reported on the survey instrument were true of objective representations of each data manager's perceptions about:

(a) the extent to which school board support is necessary for the success of microcomputer-based administration, (b) the level of microcomputer expertise which superintendents need to utilize a microcomputer as a management tool in school administration; (c) the capabilities of a 48-K microcomputer system to process selected school administrative tasks; and (d) the estimated cost-benefit of utilizing microcomputer-based administration.

Methodology

Population

The target population for this study was the superintendents from K-12 school districts in the State of Nebraska which have student enrollments of 1000 or less.[7]

Sample

The sample group consisted of superintendents from selected K-12 school districts in the State of Nebraska. In order to make the data base as large as possible, a survey instrument was mailed to superintendents in all of the 251 K-12 school districts in Nebraska which had student enrollments of 1000 or less. Although the overall sampling plan gave consideration to the total population, the sample utilized in this study consisted only of the returned survey instruments.

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[7]Nebraska Department of Education, Statistics and Facts About Nebraska Schools, I (1981-82), pp. 74-80.

Review Panel

Ten individuals were asked to review both survey instruments and to make any recommendations which would contribute to the content validity of the instruments. These individuals had five or more years of experience in the superintendency and were selected from 193 superintendents listed in the 1982-83 Directory of Nebraska Superintendents of Schools.[8] These individuals were selected by using a table of random numbers.

Panel of Data Management Experts

The panel of data management experts consisted of ten individuals who were practicing data managers in the State of Nebraska. Members of the panel were selected by using a table of random numbers and were chosen from among the 432 members of the Nebraska chapters of the Data Processing Management Association. Members of the Data Processing Management Association are top level management personnel who are knowledgeable on management information systems and the extent to which microcomputers are capable of supporting those systems.

Instrumentation

A survey instrument was developed in the form of an opinionnaire that was answered by each school superintendent from the K-12 school districts involved in this study. The survey items were based upon

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[8]Nebraska State Education Association, Directory of Nebraska Superintendents of Schools (Lincoln: The Association, 1982-83), pp. 26-34.

information obtained through a review of the literature relative to support for computer-based systems, issues of computer literacy, the kinds of administrative tasks currently being computerized by school districts, factors related to the cost-benefit of computer utilization, and upon the design of the 48-K microcomputer system selected for reference in this study and the recommendations from the members of the review panel who were chosen to review the survey instrument. The items on the survey instrument solicited responses about the school board's support for microcomputer-based administration, the superintendent's level of microcomputer expertise, the importance of using a microcomputer to process selected administrative tasks, and the cost-benefit of utilizing microcomputer-based administration.

A survey instrument was developed in the form of an opinionnaire that was answered by each data manager involved in this study. The survey items were similar to the items on the survey instrument that was sent to each superintendent from the K-12 school districts involved in this study. The survey instrument solicited responses from the data managers about the extent to which selected items relative to school board support would probably enhance the success of microcomputer-based administration, the level of microcomputer expertise which superintendents need to utilize the microcomputer as a management tool, the capability of a 48-K microcomputer system to process selected administrative tasks, and the cost-benefit of utilizing microcomputer-based administration. Space was provided on the opinionnaire for suggestions from the data managers for modifying any

part of the microcomputer system design or for facilitating the use of a microcomputer in school administration.

A copy of the opinionnaire sent to the superintendents is presented in Appendix B and a copy of the opinionnaire sent to the data managers is presented in Appendix C. The rating scales on both opinionnaires were identical. The ratings were assigned in the form of a numerical value which was equated to a subjective evaluation. The point scale used on the opinionnaires was as follows:

5 - Strongly Agree

4 - Agree

3 - No Opinion

2 - Disagree

1 - Strongly Disagree

Validation of both opinionnaires was accomplished by means of a review process during the formative stages of development. The panel of individuals selected to review the opinionnaires consisted of practicing school superintendents throughout the State of Nebraska. Information on the members of the review panel is presented in Appendix A.

Microcomputer System Design

The microcomputer system utilized for reference in this study consisted of a personal use microcomputer which utilized BASIC programming language. There was no emphasis on any particular make or model microcomputer. The hardware design consisted of a personal use

microcomputer with 48-K memory density, two disk drives, a CRT, and a line-printer. The data managers gave consideration to any application program that could be utilized within the limits of the microcomputer system design and which met the objectives of the selected administrative tasks.

Procedure

Ten individuals were chosen to participate in this study as members of the review panel. These members were selected on the basis of their years of experience in public school administration. The purpose of the review panel was to validate the survey instruments which were sent to the superintendents and panel of data management experts. Individuals chosen to serve on the review panel were selected from among practicing school superintendents throughout the State of Nebraska and were selected using a table of random numbers. Information about the members of the review panel is contained in Appendix A. In selecting the review panel members, no consideration was given to their degree of computer expertise. The recommendations made by the review panel were carefully considered in the survey instrument revisions. A copy of the revised survey instrument was then mailed to each superintendent of the K-12 school districts in the State of Nebraska with enrollments of 1000 or less.

The superintendents in each of the K-12 school districts in Nebraska with student enrollments of 1000 or less were mailed a survey instrument soliciting their perceptions about the extent to which their

school board members would support microcomputer-based administration, the superintendent's level of microcomputer expertise, the importance of using a microcomputer to process selected administrative tasks, and the expected cost-benefits of using a microcomputer-based administration. An explanatory letter was attached to each survey instrument. Included in the mailing was a self-addressed, stamped envelope. Within fifteen days of the original mailing, an effort was made to increase the data base by processing a second mailing and sending it to those superintendents who had not returned the original survey instrument. Fifteen days after the second mailing all survey instrument returns were tabulated and analyzed.

Members for the panel of data management experts were randomly selected from among the 432 members of the Nebraska chapters of the Data Processing Management Association. Members of the Data Processing Management Association are top level management personnel who are practicing data managers in the State of Nebraska. Selection was made by using a table of random numbers. The first ten members chosen were contacted by telephone and asked to participate in the study. Where a negative response was received another member was selected by using a table of random numbers. When the selection had been finalized those panel members were mailed a copy of the survey instrument. Information about the members of the panel of data management experts is contained in Appendix C. The survey instrument sent to the panel of data management experts solicited their opinions about selected items relative to school board support for microcomputer-

based administration, the level of microcomputer expertise which superintendents need to utilize a microcomputer as management tool in school administration, and the estimated cost-benefit of utilizing microcomputer-based administration in selected school districts in Nebraska. An explanatory letter was enclosed outlining the microcomputer system design that was being used as a reference in this study. A copy of the explanatory letter is contained in Appendix D. The survey instrument also provided space for any panel members to make recommendations or comments about school board support, microcomputer expertise, microcomputer capabilities, or cost-benefit. A synopsis of these comments is contained in Appendix C.

Analysis of Data

Questions 1, 2, 3, and 4 were answered by determining the "t" values of differences between the responses of the superintendents and the panel of data management experts and within the various items as called for in the specific question.

The questions were rephrased into null hypotheses and tested at both the .05 and the .01 levels of significance. The null hypotheses proposed for this study are:

1. Related to Question 1: There will be no significant difference between the superintendents' perceptions about the extent to which school boards would support microcomputer-based administration and the extent to which the panel of data management experts agrees or disagrees that school board support will likely enhance the success

of microcomputer-based administration.

2. Related to Question No. 2. There will be no significant difference between the perceptions of superintendents about their level of microcomputer expertise which they possess and the extent to which the panel of data management experts agrees or disagrees about the level of microcomputer expertise which superintendents need in order to utilize a microcomputer as a management tool in school administration.

3. Related to Question No. 3. There will be no significant difference between the superintendents' perceptions about the importance of using a microcomputer to process selected administrative tasks and the extent to which the panel of data management experts agrees or disagrees that a microcomputer system is capable of processing selected administrative tasks in school administration.

4. Related to Question No. 4. There will be no significant difference between the perceptions of superintendents about the expected cost-benefit of utilizing a microcomputer-based administration and the panel of data management experts' estimate of the cost-benefits of utilizing a microcomputer-based administration in selected Nebraska school districts.

Information from all survey instrument returns were initially analyzed by means of an SPSS computer program.[9] The information from

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[9]William R. Klecka, Norman H. Nie, and C. Hadlai Hill, Statistical Package for the Social Sciences Primer (New York: McGraw-Hill Book Company, 1975), pp. 1-134.

the returns were analyzed for all returns as a whole and according to the following variable categories: (1) School Board Support; (2) Microcomputer Expertise; (3) Administrative Applications; and (4) Cost-Benefit.

This study utilized the descriptive and inferential statistical data generated by the SPSS computer program to describe the properties of the sample group and to make inferences about the population. The descriptive statistics in this study included summarizing the responses and calculating the mean of those responses in order to determine a measure of central tendency. The standard deviation was also calculated for the responses to measure the degree of variability and to make estimates about population parameters. The descriptive statistics for each variable category on the survey instrument were also calculated.

The first step in analyzing the data was to tabulate all of the ratings given to the items contained in the survey instrument by the superintendents of the K-12 school districts involved in this study. The arithmetic mean, the median, the mode, and the standard deviation were calculated for each survey instrument items as well as for the following variable categories: (1) School Board Support; (2) Microcomputer Expertise; (3) Administrative Applications; and (4) Cost-Benefit. The statistics were calculated to determine what differences, if any, existed among the perceptions of the superintendents on each of the survey instrument items and variable categories.

The second step in the data analysis was to tabulate all of the ratings given to the items contained in the survey instrument by the data managers involved in this study. The arithmetic mean, the median, the mode, and the standard deviation for each item were calculated for all survey instrument items. The survey instrument items were categorized and the arithmetic mean, the median, the mode, and the standard deviation were calculated for the following variable categories: (1) School Board Support; (2) Microcomputer Expertise; (3) Administrative Applications; and (4) Cost-Benefit.

The third step of the data analysis was to compare the arithmetic mean from each item on the survey instrument of the panel of data management experts as a whole to the corresponding arithmetic mean of the corresponding item on the survey instrument of the superintendents of the K-12 school districts involved in this study. A t-test was used to test the difference between the mean scores of the panel of data management experts and the sample group of superintendents on each item. The arithmetic mean for each variable category which was computed for the panel of data management experts was compared to the arithmetic mean of each variable category which was computed for the superintendents from the sample group by using a t-test to determine the significance of the difference between the mean scores. The difference of the mean scores was compared at both the .05 and the .01 level of significance.

The fourth step in the data analysis was to compute the arithmetic mean, the median, the mode, and the standard deviation of the

dollar amounts in survey instrument items 73, 74, 75, and 76 of the returned survey instrument of the superintendents of the K-12 school districts involved in this study. The next step was to compare the arithmetic mean of the superintendents' survey instrument items 73, 74, 75, and 76 to the arithmetic mean of the data managers' survey instrument items 73, 74, 75, and 76.

The rating scale arbitrarily assigns value of perceptions to each item on the superintendents' survey instrument and the value of opinion to each item on the data managers' survey instrument from the subjective measure of strongly agree, agree, no opinion, disagree, and strongly disagree to the objective measures of 5, 4, 3, 2, and 1 respectively. According to Wert, Neidt, and Almann, the arbitrary assignment of values to subjective ratings in statistical treatment of data is an accepted practice in research methodology.[10]

Organization of the Remainder of the Study

A review of the related literature is presented in Chapter II. Chapter III presents the findings and an analysis of the data gathered in the conduct of this study. Chapter IV contains a summary, findings, conclusions, and recommendations resulting from this study.

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[10]James W. Wert, Charles O. Neidt, and J. Stanley Almann, Statistical Methods in Educational and Psychological Research (New York: Appleton-Century-Crofts, Inc., 1954), p. 14.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

The purpose of this chapter is to present a review of the literature related to microcomputers and the administrative uses of computers in education. The review will focus primarily on the microcomputer as a management tool and its application to the data processing requirements of school district administration.

The search for information about microcomputers and the administrative uses of computers in education included an extensive review of various literature sources relative to computers and data processing. These literature sources included books and monographs, periodical articles, journal articles, investigative studies, reports, and unpublished manuscripts.

The Historical Development of the Electronic Computer

Although the use of calculating devices can be traced back to prehistoric times, Shelly and Cashman indicated that the computer age is generally considered to have originated in 1945 with the introduction of the first electronic computer. The first large-scale electronic digital computer was built by Dr. John W. Mauchly and J. Presper Eckert, Jr., for the U.S. Army and was used basically

to calculate ballistic tables during World War II.[1]

Shelly and Cashman pointed out that computers produced between 1945 and 1951 were designed primarily to handle scientific applications.[2] According to O'Brien, however, the first general purpose electronic digital computer was introduced to the public for commercial use in 1951. These general purpose computers became popular because of their capability of handling not only scientific problems but business applications as well.[3] O'Brien further pointed out that the computers built during this generation were not without certain drawbacks. First of all, the computers were quite large and required a great deal of space. Second, computer facilities required air-conditioning because of the tremendous amount of heat generated by the thousands of vacuum tubes contained in the computers. Also, the amount of maintenance and electrical energy required by these computers proved to be a significant part of their total operational cost.[4]

The year 1959 marked the beginning of a new generation of computers. O'Brien characterized this generation of computers as being significantly smaller, faster, and more reliable than the

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[1]Gary B. Shelly and Thomas J. Cashman, Introduction to Computers and Data Processing (Fullerton, California: Anaheim Publishing Company, 1980), pp. 2.2-2.3.

[2]Ibid.

[3]James A. O'Brien, Computers in Business Management: An Introduction (Homewood, Illinois: Richard D. Irwin, Inc., 1979), pp. 31-32.

[4]Ibid.

computers which were built previously. These computers featured transistorized circuits, were less expensive than their predecessors, generated little heat, and required less power than vacuum tube circuits. O'Brien also indicated that these computers made use of magnetic disk packs as primary input and output medium as opposed to the magnetic tape used in earlier computers.[5] According to O'Brien, the concept of integrated circuitry paved the way for yet another generation of computers. The integrated circuits, which could be placed on tiny silicon chips, proved to be substantially smaller and significantly more reliable than the transistorized circuitry which they replaced. He also indicated that the technological advancements made in microelectronic circuitry greatly enhanced the speed, capacity, storage, and input/output devices of third generation computers. Third generation computers were capable of time sharing, data communications applications, and could process several programs simultaneously through multiprogramming. This generation of computers, said O'Brien, was also consequential in establishing the importance of software development as a means of operating computers more efficiently.[6]

O'Brien wrote that the trend toward microminiaturization eventually led to the use of a large-scale integration (LSI) semiconductor technology in the development of fourth generation computers.

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[5]Ibid., p. 32.

[6]Ibid., pp. 32-33.

Increased microminiaturization significantly reduced the size and power requirements of fourth generation computers while greatly increasing their processing speed in comparison to third generation computers.[7]

The use of LSI enables technologists to place 10,000 to 300,000 transistors and other electronic components on a silicon chip less than a quarter of an inch square. This technology, said O'Brien, allowed Dr. Ted Hoff of the Intel Corporation to etch all of the circuitry for the main processing unit of a computer on a single silcon chip.[8] Shelly and Cashman noted that Dr. Hoff was able to form the basic electronics of a complete computer system by simply combining this small central processing chip, called a microprocessor, with other chips to provide for computer storage and control functions and, thus, develop a microcomputer.[9]

O'Brien concluded that evolutionary developments in the electronic circuitry, storage capacity, and software of computers were some of the major characteristics which greatly enhanced the effectiveness of computers in the field of data processing. Since the introduction of the first electronic computer in 1945, advancements in computer technology have led to a reduction in computer size,

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[7]Ibid.

[8]Ibid.

[9]Shelly and Cashman, op. cit., p. 2.30.

an increase in the processing speed of computers, and a significant reduction in computer cost. These advancements, said O'Brien, have greatly increased the scope of fourth generation computers for data processing applications.[10]

The Microcomputer Revolution

According to Bylinsky, the development of the microcomputer represents a novel expansion in the field of electronics which is bound to affect almost every social enterprise. The microcomputer is a major technological development and denotes a revolutionary advancement in computer science and technology.[11] Bylinsky emphasized the importance of the impact of this revolutionary development.

> The smallest of all data-processing machines was invented six years ago, but its mass applications are just beginning to explode, setting off reverberations that will affect work and play, the profitability and productivity of corporations, and the nature of the computer industry itself. For the microcomputer provides an awesome amount of computer power in a package that in its simplest form costs less than $10 brought in quantity and easily fits inside a matchbox.[12]

Bortnick assessed the significance of the microcomputer revolution.

> The microcomputer has made possible an information revolution that could be a revolution of the same

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[10] O'Brien, op. cit., pp. 34-36.

[11] Gene Bylinsky, "Here Comes the Second Computer Revolution," Fortune, XVII (November, 1975), 135.

[12] Ibid.

> magnitude as the industrial revolution. Where the industrial revolution greatly enhanced man's ability to do physical labor, the revolution in information resulting from the new computer technology holds the potential to enhance man's ability to do mental activities.[13]

Shelly and Cashman suggested that the microcomputer revolution originated in 1974 when a small electronics company in Albuquerque, New Mexico marketed a small electronic personal use computer which could be purchased by the general public. Since that time, the small computer has progressed dramatically and has continued to have a profound impact on the society. The impact of this computer revolution is further exemplified by the fact that since 1974 the data processing industry has become one of our nation's largest and fastest growing industries.[14]

The Role of Computers in Management Information Systems

The Concept of Management Information Systems

A management information system is defined by Spencer as a system designed to provide the necessary information to support the decision-making function of management. It is a system in which data are collected, processed, and disseminated within an organization.[15]

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[13]Robert Bortnick, "Computers and the Curriculum," The School Administrator, XXXVII (October, 1980), 14.

[14]Shelly and Cashman, op. cit., p. 1.20.

[15]Donald D. Spencer, The Illustrated Computer Dictionary (Columbus: Charles E. Merrill Publishing Company, 1980), p. 87.

The concept of management information systems (MIS) originated in the 1960's and was developed to optimize computer use. Prior to the MIS concept the business applications of the computer were generally limited to simple clerical and record keeping tasks. The MIS concept, however, provided management with the opportunity to use the computer to perform a valuable support service.[16]

A report presented by Hansen, Klassen and Lindsay at the 1978 convention of the Association for Education Data Systems emphasized the importance of the management information concept in utilizing the computer in educational administration. They indicated that a management information system serves as a systems framework for organizing administrative computer applications into an interrelated and integrated information system. Also, since the goal of a computer-based information system is the support of management decision making, the management information concept tends to emphasize the management orientation of electronic data processing in educational administration. The management information concept, they claimed, helps management utilize the computer as a meaningful administrative tool and not merely as a mechnical device for processing data generated by day-to-day operations in educational administration.[17]

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[16] O'Brien, op. cit., p. 316.

[17] Tom Hansen, Dan Klassen, and Jim Lindsay, "The Impact of Computer-Based Information Systems upon Schools and School District Administration" (paper presented at the Sixteenth Annual Convention of the Association for Educational Data Systems, May, 1978), pp. 43-44.

Microcomputers and Data Processing in the Public School Sector

Pedersen stated that the history of data processing in public school administration is not replete with success stories. In general, said Pedersen, the private sector is far ahead of school systems in the effective utilization of electronic data processing systems.[18] A review of the literature by Pedersen indicates that there has never been a comprehensive national survey conducted to determine the extent of computer utilization in school administration.[19] Therefore, in the absence of any meaningful empirical data, Pedersen, in a paper presented at the 1980 convention of the Association for Educational Data Systems, submitted the following generalizations describing the status of data processing in public school administration: (1) small school systems make very little use, if any, of administrative data processing; (2) most school administrators utilize a calculator, rather than a computer, for computing data, (3) data files are rarely interrelated and integrated within a management information concept; (4) personnel turnover and lack of meaningful in-service programs hinder any attempt to improve data processing systems; (5) generally, most computer personnel have a limited perspective of computer technology; (6) hardware purchased by a school system several years

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[18]Neil G. Pedersen, "Employing Data-Management Packages to Modernize Your Planning Department" (paper presented at the Eighteenth Annual Cnvention of the Association for Educational Data Systems, April, 1980), p. 161.

[19]Ibid.

ago is now outdated and can no longer be used effectively; (7) school systems which contract for computer services often find such arrangements to be unsatisfactory; and (8) there is a lack of effective communication between educators and computer specialists because educators lack sufficient data processing staff.[20]

The need for educational administrators to develop a basic understanding of computer technology, data processing, and information systems is evident. First of all, there is an imminent need to utilize information in order to make better use of the limited supplies of materials and energy sources. Secondly, the impact of the computer revolution forces persons to become cognizant of the implications of computer usage and the potential for harnessing the information resource. Thirdly, the proper flow of information is vital to the success of any social organization such as a public school system. Consequently, data processing represents an integral component of educational administration when used to provide a major source of information needed for effective decision making by those responsible for the management of public schools.[21]

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[20] Ibid.

[21] O'Brien, op. cit., pp. 4-5.

The Computer as an Administrative Tool

Introduction

Hardin felt that the majority of computer applications in school systems have been in the area of educational administration, because many administrative procedures can be easily automated.[22] According to Hardin, educational administrators must perceive the computer as a facilitator of education and not merely as a device for automating programs. They must realize that the computer's promise for education does not lie in the amount of programs that can be automated but, rather, in the opportunity it provides for them to analyze and to understand better the very processes they automate.[23]

The effective utilization of modern day computers is not contingent upon the quantity of programs that can be computerized but, rather, upon the quality of the programs that are computerized. Shelly and Cashman noted that the basic cycle of input, process, and output has remained the same throughout the generations of computers. However, the method of input, the speed of processing, and the variety of output have greatly altered the way in which computers are used. Although the basic cycle of computers has remained unchanged, the variety of computers available, their usability, versatility, and increased capacity greatly enhance the computer's

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[22]Howard Hardin, "We Can't Do without the Computer," School Business Affairs, XLII (June, 1976), 139.

[23]Ibid.

ability to perform as a viable administrative tool in solving modern complex organizational problems.[24]

Strengths of the Microcomputer

The development of the microprocessor has led to substantial changes in the design and use of computers. Zander stated that the modern world microcomputers have proven to be architecturally sound, more sophisticated, and utilize support features that once belonged only to their ancestors. Most microcomputers are designed to handle data applications requiring a moderate amount of computational or high-speed input/output capability and do not require a great deal of word memories.[25]

Shelly and Cashman indicated that the use of special interface hardware makes it possible to utilize the microcomputer as an "intelligent" terminal in data communications. This means that the microcomputer is not only capable of communicating with a larger computer but can also process data without the power of the larger computer.[26]

The microcomputer has added a new dimension to the field of "word processing." Nord felt that a word processing system built around an on-site microcomputer could significantly reduce cost and add versatility to a data communications system. If additional

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[24]Shelly and Cashman, op. cit., p. 2.31.

[25]Edward J. Zander, "Are Microcomputers Always a Bargain?" Data Processing Digest, XXXIII (April, 1979), 23.

[26]Shelly and Cashman, op. cit., p. 2.30.

processing requirements are needed the microcomputer can be interfaced with a mainframe computer to provide increased capacity. Also, application software is available which enables the microcomputer to perform many of the common data processing functions currently being used in business and industry.[27] Nord saw the use of magnetic disks as a definite plus for the microcomputer. Magnetic disks, as secondary storage media, provide an opportunity for the computer user to access information from the microcomputer system within a matter of seconds.[28] O'Brien reported that the small magnetic disks used with many microcomputers are excellent direct access input/output and are advantageous because they can store as much data as 6,000 of the 80-column keypunch cards used in larger computer systems.[29]

Another significant characteristic of microcomputers which is important is their ability to utilize line printers to produce output in permanent readable form.[30] O'Brien stated that the use of printing devices gives a computer system a time-saving advantage in the production of quality reports and forms.[31]

Shelly and Cashman stated that microcomputers usually contain

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[27]G. Daryl Nord, "Interfacing Word Processing and Data Processing," Business Education Forum, XXXIII (April, 1979), 21.

[28]Ibid.

[29]O'Brien, op. cit., p. 95.

[30]Nord, op. cit., p. 21.

[31]O'Brien, op. cit., p. 100.

both a RAM (Random Access Memory) and a ROM (Read Only Memory) memory system. This gives microcomputers versatility in terms of data storage. RAM is a type of memory whose contents can be read or written on directly without regard to any other memory location. ROM, on the other hand, is a type of memory where data can be stored and used but cannot be altered.[32]

Limitations of the Microcomputer

Although the microcomputer represents a remarkable achievement in the field of computer technology, it is not without limitations. Feidelman, for example, mentioned the limited memory cycle and storage capacity of the microcomputer when comparing it to its forerunner, the minicomputer:

> The microcomputer represents a reduced, low-cost version of the minicomputer whereby the complete computer with memory is placed on one to three large-scale integrated (LSI) chips, with each chip containing thousands of MOS circuits. Physical size represents one striking difference in that the microcomputer is significantly smaller, uses smaller word size . . . and with smaller storage. Also, the memory (semiconductor) cycle is more limited, and storage capacity is up to 64K bytes . . . .[33]

Feidelman reported that attachable microcomputer peripherals are limited in type and quantity. While most systems tend to use single CRT (Cathode Ray Tube) terminals, those who use multiple

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[32]Shelly and Cashman, op. cit., p. 4.19.

[33]Lawrence Feidelman, "Microcomputers Mean Business," Infosystems, XXVI (June, 1979), 79.

terminals limit on-line data entry to one terminal with another terminal performing batch type data entry or inquiry. Basically, said Feidelman, the modern day microcomputer represents a single terminal, limited capacity, transaction oriented system.[34]

O'Brien indicated that the use of magnetic tape as an input/output medium in a microcomputer system significantly increases the amount of time required for the microcomputer to access the data file because the entire tape may need to be read in order to find one particular piece of information on the tape. Also, magnetic tapes are especially vulnerable to dust particles and stray magnetic fields which tend to distort or destroy the information stored on the tapes.[35] O'Brien noted that magnetic disks are comparatively more expensive than magnetic tape. They are also slower and more inefficient than magnetic tape when used as an input/output medium in handling batch processing applications in a microcomputer system. Microcomputer systems which utilize magnetic disks lose previously stored data when a magnetic disk file is updated because of exact space which is reserved for each file on a magnetic disk.[36]

O'Brien noted the use of printing devices presents two contradictory problems. On the one hand the high speed printers used in mircrocomputer systems are not fast enough output devices for most

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[34]Ibid.

[35]O'Brien, op. cit., p. 94.

[36]Ibid., pp. 94-96.

on-line computer systems. On the other hand, great volumes of computer printouts may actually hinder management personnel in their ability to utilize the information they receive in a meaningful way.[37]

Feidelman cited the relative lack of available software as another microcomputer limitation. This situation is particularly acute in the area of application software which is needed to direct the processing of specified applications, such as a payroll program.[38] Additionally, Moore felt that the cost of such programs should be a factor for consideration in looking at microcomputer limitations. He suggested that required program performance bears a direct relationship to cost. In other words, as program performance requirements increase, whether for a systems program or application program, software costs also increase significantly.[39]

Finally, consideration must be given to BASIC, the program language used by microcomputers, and its implications for limited microcomputer use. Shelly and Cashman related that BASIC, which stands for Beginner's All-Purpose Symbolic Instruction Code, is a programming language that was developed at Dartmouth College in 1965. Although BASIC is the primary programming language of microcomputer systems, individual manufacturers have developed extensions to the

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[37]Ibid., p. 100.

[38]Feidelman, op. cit., p. 79.

[39]Al Moore, "Microcomputers," Digital Digest, X (January, 1980), 34.

BASIC language and these extensions have created programming problems for microcomputer systems in terms of compatibility. In other words, a BASIC program written for one computer may not necessarily run on another computer because the BASIC compilers and interpreters of the machines may have different manufactured components.[40] According to Sanders, BASIC programming language is also limited in its ability to handle large data file processing applications.[41]

Regardless of the inherent strengths and limitations of the microcomputer, the importance of understanding its technological implications for education was emphasized by Bortnick.

> It must, therefore, be concluded that computers hold the promise and potential for a substantial impact on education. There are also barriers and problems to face. Ultimately, the computer can serve the educator well. It is the educator who will determine whether computers come to represent a tool, a master or just another educational panacea collecting dust in our increasingly vacant classrooms.[42]

Computer Applications in Educational Administration

Anderson indicated that determining the extent to which school districts utilize computer-based data processing is difficult because of the diversity that exists between local school districts. The utilization of data processing equipment in school districts ranges

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[40]Shelly and Cashman, op. cit., pp. 12.14-12.15.

[41]Donald Sanders, Computer Essentials for Business (New York: McGraw-Hill, Inc., 1978), p. 222.

[42]Bortnick, op. cit., p. 15.

from the use of very simple data processing equipment to the most sophisticated machinery available. These variations exist because of the differences in district size, administrative organization, educational objectives, resources available for data processing, and the ways data processing is perceived by educational administrators.[43]

Further findings by Anderson indicated that those school districts which utilized data processing procedures categorized their data as either business information or student-personnel information. However, he did concede that there may be some instances where some of the data could be considered in both categories. The justification for separating data into these two categories was based on the assumption that business data processing is well developed and understood, well defined, very specific, rigidly controllable, and can be readily justified in economic terms alone.[44] Based upon his findings, Anderson presented the following description of the spectrum of business applications relative to data processing in various school districts at a conference sponsored by the Association for Educational Data Systems and the Stanford School of Education:

I. Budgeting and accounting:
   (a) Analysis of requests and estimates
   (b) Allocation to specific categories
   (c) Establishment of amount available in each category and maintenance of amount remaining after each transaction affecting that category

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[43] G. Ernest Anderson, Jr., "Educational Data Processing in Local Social Districts," The Computer in American Education, ed. Don D. Bushnell and Dwight W. Allen (New York, London, Sydney: John Wiley and Sons, Inc., 1967), p. 204.

[44] Ibid., p. 206.

(d) Detail accounting of how monies in each category were spent.
(e) Cost analyses of goods and services and of programs.
(f) Projected costs in each budget category of proposed courses of action.

II. Payroll:
(a) Preparation of salary checks.
(b) Maintenance of employee accounts of amount paid, taxes withheld, health and other insurance, retirement, etc.
(c) Preparation of accounting documents for tax, retirement, and insurance officials.
(d) Withholding tax statements.

III. Purchasing:
(a) Batching requisitions for quantity discounts.
(b) Fund encumberance and release when payment made.
(c) Follow-up uncompleted purchase orders.
(d) Prompt payment to earn discounts.
(e) Analysis of product consumption.
(f) Analysis of vendor performance.
(g) Analysis of disposition of purchased goods and services.

IV. Supplies and inventory:
(a) Requisition procedures for stock items.
(b) Automatic reorder of stock items at a certain level.
(c) Allocation of costs to budget categories and projects.
(d) Delivery routing.
(e) Inventory of materials stocked or in use.

V. Accounts payable and receivable:
(a) Generation of bills.
(b) Crediting and debiting of proper accounts.
(c) Follow-up for bills not paid promptly.

VI. Maintenance:
(a) Preventive maintenance schedule.
(b) Repair scheduling and costing.
(c) Replacement scheduling.
(d) Analysis of product durability.[45]

Anderson noted that the business applications of data processing being utilized in school districts throughout the country were somewhat limited in scope to finance and property management. Consequently, he proposed an expansion of data processing applications

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[45]Ibid., pp. 206-207.

into the areas of student and staff personnel management. He reported that electronic data processing procedures could easily be used to process information about staff members regarding their qualifications, job performance, income, earned college credits, absenteeism, and other pertinent demographic data. The possible applications of electronic data processing to student personnel management could include not only demographic information but, also, student schedules, attendance accounting and reporting, grade reporting and analysis, handling of test data, and various other curricular and non-curricular areas.[46]

Andrew cited the services provided to school districts in Iowa by the Mid-Iowa Computer Center as an example of the ways in which some school districts are making use of computerized data processing. He said that the Mid-Iowa Computer Center offers school districts in Iowa the opportunity to computerize data for financial accounting, payroll accounting, personnel data, salary simulation, test scoring and analysis, student progress reports, equipment inventory, attendance accounting, census, student grading, inventory ordering and distribution, lunchroom accounting, media cataloging and reservation, cooperative purchasing, special education accounting and, in addition, the Center offers a variety of statistical packages for statistical analysis work.[47]

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[46]Ibid., pp. 209-214.

[47]Donald E. Andrew, "Mid-Iowa Computer Center: A Successful Data Processing Cooperative," School Business Affairs, XLVI (May, 1980), 11-12.

An article in School Business Affairs presented another example of computer utilization in school district administration. The Carlsbad Unified School District in California used the computer to perform such building level administrative tasks as student attendance accounting and reporting, grade reporting, transcript processing, and student scheduling. At the district level the computer was used to handle budgeting, receipts and disbursements, and general ledger accounting. The Carlsbad School District was in the process of developing application programs to process information regarding personnel, inventory, library indexing, and for payroll accounting.[48]

Holley cited the Pattonville Schools in Maryland Heights, Missouri, as an example of a school district which makes administrative use of a computer system. This computer system provided the Board of Education with a hardcopy of the district's monthly financial statement and list of disbursements. The Pattonville School District also used the computer for budget preparation and reporting, retirement analysis, social security and income tax reporting, and building level financial reporting. Holley noted that the school district was considering the possibility of computerizing textbook and library book inventories and various food service items.[49]

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[48]"Computer Earns an A-Plus at California School District," School Business Affairs, XLVI (May, 1980), 14-15.

[49]Darrell L. Holley, "Computer Helps Missouri District in Many Ways," School Business Affairs, XLII (November, 1976), 275-276.

An intermediate school district in Michigan has implemented a computer system which utilizes "intelligent" terminals at the local district level. This gives its local districts their own computing power for processing local financial data, budget information, accounts payable, and other miscellaneous data when the main computer is unavailable.[50]

Dyson and Wolf indicated that school districts which do employ a computer system do so mainly to satisfy their operational requirements in the areas of staff personnel, student personnel, curriculum and instruction, maintenance, inventory, transportation, and for various other operational tasks. In other words, computers are used to perform simple clerical computational administrative tasks.[51]

Hansen, Klassen, and Lindsay reported that while the concept of computer-based management information systems may be gaining favor in school districts across the nation, little, if any, computer usage was geared toward functions of management control and strategic planning. They stated that the results of a study by the Minnesota Educational Computing Consortium indicated that most applications of computers in school administration have typically been geared to the performance of day-to-day clerical and computational tasks. These operational tasks, they found, were used frequently and on a regular

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[50]"Computer System Gives Local Districts a Daily Budgeting Tool," School Business Affairs, XLII (November, 1976), 302.

[51]Ernest Dyson and Arthur E. Wolf, "Computer 'Goes Beyond'," School Business Affairs, XLII (December, 1976), 302.

basis by most of the districts involved in the Minnesota study. There appeared to be only a negligible amount of computer use for the purposes of management control and strategic planning.[52]

Dyson and Wolf suggested that regardless of how computers are used in the administrative environment of school districts, computer technology has played a significant role in revolutionizing the administrative operations in school districts throughout the nation. The growing number of school districts which are utilizing computer services is an indication that computers can be utilized as a viable management tool which can help provide solutions to the various administrative problems of school management.[53]

The Microcomputer: Implications for Educational Administration

Computer technology has developed microcomputers which cover a wide range of applications. The capabilities of microcomputers range all the way from the performance of simple control tasks to the performance of high-speed computational tasks which equals or exceeds that of the microcomputer.[54] Levin suggested that since there are microcomputers available with the capacity to perform a variety of administrative tasks, school administrators can no longer afford to

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[52]Hansen, Klassen, and Lindsay, op. cit., p. 41.

[53]Dyson and Wolf, op. cit., p. 302.

[54]Bylinsky, op. cit., p. 182.

ignore the possibility of using the microcomputer as an administrative tool.[55]

Delf noted that the use of electronic data processing in school districts has grown significantly in recent years and will probably continue to grow because of the technological advancements being made in computer hardware and software. He suggested that this would force contemporary school administrators to make decisions as to how this expanding technology can be utilized in the most efficient and effective manner.[56]

In Minnesota, the influx of a large number of APPLE II microcomputers into school districts has led to an increased awareness among school administrators of the potential administrative capabilities of microcomputers. Because of this awareness, some Minnesota school administrators have expressed an interest in the possibility of using APPLE II microcomputers to handle some administrative tasks.[57] In a study conducted by the Minnesota Educational Computing Consortium (MECC), an attempt was made to gather information regarding actual and potential microcomputer applications, needs, technical capabilities and requirements, software availability, and user evaluation of

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[55]Levin, op. cit., p. 23.

[56]Robert M. Delf, "A Better Path to Successful Computerization," School Business Affairs, XLVI (August, 1980), 29.

[57]Minnesota Educational Computing Consortium, A Feasibility Study of Administrative Uses of Microcomputers (St. Paul: Management Information Services and Project Divisions, 1979), p. 1. Hereafter this study is cited as MECC.

applications. This information, according to the MECC, was gathered from a variety of individuals who were knowledgeable in the area of microcomputer hardware and software.[58] The MECC reported that the information which was gathered from the individuals selected for its study was combined with the list of computer applications derived through the National Institute of Education Computer Impact Study (MECC, 1977) to develop a master list of potential microcomputer applications. This master list which was developed as a result of the MECC study identified the following potential microcomputer 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

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[58]Ibid., pp. 4-5.

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 Larger Data Files[59]

The results of the MECC study led to the recommendations that the MECC should: (1) investigate the possibility of using the APPLE II as a terminal device; (2) look at the possibility of MECC serving as

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[59]Ibid., pp. 7-8.

a clearinghouse for microcomputer-based MIS software; (3) develop a list of applications relating microcomputer use to MIS; (4) keep administrators informed about the technological advancements in microcomputer hardware and software; (5) seek funding for further research and development of MIS uses of microcomputers; (6) conduct an in-depth study of the feasibility of the use of microcomputers for MIS purposes; and (7) MECC should serve as the coordinating agency for microcomputer uses.[60]

The MECC stated that the recommendations drawn from the results of this study clearly imply the need and desire to explore further the possibility of using the microcomputer as a management tool in school administration. The issues which need to be more fully explored, according to the MECC, are (1) the use of the microcomputer as a part of a management information system, (2) the use of the microcomputer as an "intelligent" terminal device for a larger computer, and (3) the availability of software for MIS purposes.[61]

The Microcomputer: Hardware and Software Considerations

Since the role of computers in management information systems has been presented earlier in this chapter, the need for further discussion at this point seems unnecessary. Therefore, attention will be directed toward the use of microcomputers as terminal devices and

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[60] Ibid., pp. 23-24.

[61] Ibid.

the availability and selection of software packages for microcomputer systems.

Shelly and Cashman defined a terminal device as an input/output device capable of communicating data. A "dummy terminal" is one which communicates directly with a mainframe computer and is capable only of transmitting data to and receiving data from a computer system. It does not process data in any way and is powerless without sending the data to the mainframe computer. Devices such as the microcomputer, which can be used as intelligent terminals, contain the same CRT visual display peripheral as the dummy terminals. However, Shelly and Cashman reported that microcomputer systems also contain printers, input/output medium, and computer storage which allows the microcomputer to process data under its own power.[62]

The other issue for consideration is the availability and selection of appropriate software. Feidelman indicated that the relative newness of the microcomputer has created problems in securing appropriate application software. He suggested that while there may be a void of manufactured application software, those in need of specific application software may consider the alternative of purchasing the services of a computer programmer to write specific programs for them.[63] However, Delf said that if a district decides to write its own software packages, consideration should be given to the investment

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[62]Shelly and Cashman, op. cit., p. 5.17.

[63]Feidelman, op. cit., p. 79.

in personnel to design and write the software, the quality of their work, the flexibility of the software, future performance requirements, and current software performance.[64]

The most difficult task in selecting software was the decision whether a given software product was adequate to meet present and future school district needs. Delf also implied that the chances of selecting quality software programs increased significantly when consideration was given to vendor reputation, the software's track record, the availability of a maintenance agreement, program flexibility, ease of administering the program, and usability.[65]

The importance of software selection was further emphasized by Klein who noted that most manufactured software products then available were sufficient to meet school district needs in the areas of accounting, budgeting, and finance. He said that it was extremely important to select software packages which were easy to use, maintain, and easily comprehensible.[66]

Considerations in Implementing a Microcomputer System

The impact of the advancements in computer technology has led many school administrators to believe that the computer offers a

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[64]Delf, op. cit., p. 29.

[65]Ibid.

[66]Peter Klein, "Selecting Accounting Software for Educational Institutions," School Business Affairs, XLVI (May, 1980), 26.

panacea for the daily clerical and data processing chores which arise in school administration. However, Kent said the deciding factor in computer implementation should be the degree to which such a microcomputer system or any computer system helps achieve organizational goals and not on the accomplishment of simple operational tasks.[67]

Kent noted that any consideration of implementing a computer system should involve an in-depth analysis of staff needs, facility requirements, and a list of the materials needed for any given period of time. Based on the results of such an analysis the computer should be able to generate staff schedules, student schedules, facility schedules, purchasing of materials, receipts and disbursements, and a list of assumed needs which have not been met.[68] Kent also noted that the computer, as a management tool, should be capable of monitoring student progress, supporting the decision making function of school management, and of providing for the more efficient and effective use of fixed resources. It should also provide school administrators with a way of evaluating the system itself and for making any necessary revisions within the system.[69]

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[67]Arthur E. Kent, "Some Ideas for the Future," School Business Affairs, XLVI (June, 1980), 35.

[68]Ibid.

[69]Ibid.

Summary

The foregoing review of the literature describes the evolutionary development of computers and their role in management operations. The administrative uses of computers in education included a variety of applications to operational control tasks performed in the areas of curriculum and instruction, staff personnel, student personnel, budget and accounting, and various general purpose applications. The operational control tasks performed in these areas focused primarily on the data processing requirement of word processing, data storage, data retrieval, and some computational uses for accounting, budgeting, salary simulation, and program costs. Very little emphasis was placed on the use of the computer regarding management control and strategic planning.

The review of literature revealed that there is a growing trend toward microminiaturization in the computer field and that the advent of the microcomputer provides administrative personnel with the opportunity to utilize a low-cost, business transaction-oriented computer which performs the same functions as large-scale computers. The literature also indicated that the microcomputer has certain inherent weaknesses which include the limitations of the BASIC program language, limited storage capacity, and relative lack of available application software. Beyond that, however, the potential applications of the microcomputer as a management tool in educational administration are limited only to the ingenuity of the user.

CHAPTER III

PRESENTATION AND ANALYSIS OF DATA

The task objective of this chapter is to present, with appropriate analysis, the data which were generated by the responses of the sample population and the panel of data management experts to the survey instruments.

This study was concerned with the development of guidelines for the implementation of a microcomputer-based administration in selected school districts in Nebraska. One of the procedures used in the development of these guidelines included an investigation of the statistical relationships that existed: (1) among the superintendents' responses to the survey instrument items, and (2) between the superintendents' responses to the survey instrument items and the panel of data management experts' responses to the survey instrument items.

Development of the Survey Instruments

The Superintendents' Survey Instrument

The initial step in this study was to search the literature related to computers and the administrative uses of computers in education. This search provided the basis for the development of a survey instrument which was used to ascertain the perceptions of practicing school superintendents in selected school districts in Nebraska about microcomputer-based administration in K-12 school districts with student enrollments of 1000 or less. The survey

instrument items were grouped as follows:

1. Statements one through twelve were intended to solicit the superintendents' responses about the extent to which their school board would support microcomputer-based administration. Statements one through five dealt with human characteristics and statements six through twelve dealt with financial characteristics.

2. Statements 13 through 24 were intended to solicit the superintendents' responses about their level of microcomputer expertise.

3. Statements 25 through 61 were intended to solicit the superintendents' responses about the importance of using a microcomputer to perform selected administrative tasks in their school district.

4. Statements 62 through 76 were intended to solicit the superintendents' responses about their expectations of cost-benefit of utilizing a microcomputer-based administration. Statements 62 through 72 dealt with benefits related to the savings in terms of human and non-human resources as a result of utilizing microcomputer-based administration. Statements 73 through 76 asked for dollar amounts which the school districts would be willing to spend for the implementation of a microcomputer-based administration.

The Data Managers' Survey Instrument

A survey instrument was developed to ascertain the opinions of a panel of data management experts about microcomputer-based administration in selected school districts in Nebraska. The survey

instrument items were similar to the items on the survey instrument which was sent to the superintendents of the K-12 school districts involved in this study. The survey instrument items were grouped as follows:

1. Statements one through twelve were intended to solicit panel members' opinions about the extent to which school board support is necessary for the probable success of microcomputer-based administration. Statements one through five dealt with the human characteristics and statements six through twelve deal with financial characteristics.

2. Statements 13 through 24 were intended to solicit the panel members' opinions about the level of microcomputer expertise which superintendents need in order to utilize a microcomputer as a management tool in school administration.

3. Statements 25 through 61 were intended to solicit the panel members' opinions about the extent to which a 48-K microcomputer is capable of processing selected administrative tasks in school administration.

4. Statements 62 through 76 were intended to solicit the panel members' opinions about the estimated cost-benefit of utilizing microcomputer-based administration. Statements 62 through 72 dealt with benefits related to the savings in terms of human and non-human resources as a result of utilizing microcomputer-based administration. Statements 73 through 76 asked for estimated dollar amounts which school districts could reasonably expect to spend for the implementation of a microcomputer-based administration.

Results

The results of this study were organized for presentation in two parts. The first section reported the descriptive analysis of the responses to the survey instrument items by the superintendents and the panel of data management experts. The second section reported the comparisons between the responses of the superintendents and the panel of data management experts on corresponding survey instrument items.

Descriptive Analysis of Survey Instrument Items

Data from the survey instruments which were sent to the superintendents involved in this study were keypunched and initially analyzed for standard descriptive statistics by means of an SPSS[1] computer program. Each item included in the survey instrument was examined separately to determine a measure of central tendency of the superintendents' responses to the item and to examine the extent of variability of those responses to each survey instrument item. The individual items were grouped according to the variable categories of School Board Support, Microcomputer Expertise, Administrative Applications of the Microcomputer, and Cost-Benefit for the purpose of this report.

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[1]William R. Klecka, Norman H. Nie, and C. Hadlai Hull, Statistical Package for the Social Sciences Primer (New York: McGraw-Hill Book Company, 1975), pp. 1-134.

Survey instruments were sent to the superintendents of the 251 K-12 school districts in Nebraska which had student enrollments of 1000 or less. The 201 returns utilized as the sample for this study represented 80.1 percent of the K-12 school districts in the State of Nebraska with student enrollments of 1000 or less.

The median, mode, and mean scores were calculated for each survey instrument item and for each variable category on the superintendents' survey instrument to obtain an index of central tendency by which the data could be described in terms of average value. The standard deviation was calculated for each item and variable category to determine variability of the responses. Applying appropriate data to a graphic representation revealed the cumulative mean scores of the superintendents as they related to the survey instrument items in the variable categories of School Board Support, Microcomputer Expertise, Administrative Applications of the Microcomputer, and Cost-Benefit.

The construct of analyzing the data generated from the graph was to attend to each research question individually. The graphic figure presentations or the tabular configurations were used to indicate acceptance or rejection of the null hypothesis at the proper level of significance.

A summary of superintendents' responses in the variable category of School Board Support is presented in Table 1-A. Statements 1 through 5 in this variable category relate to the human characteristics of support for a microcomputer-based administration.

TABLE 1-A

Summary of Superintendents' Responses in the Variable Category of School Board Support for Microcomputer-Based Administration, 1983 (Human Characteristics)

Survey Instrument Items	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
In general, I think that my school board feels that:									
1. a computer could probably add to the quality of administration in this school district.	52	108	25	13	3	4.051	4.000	3.960	.882
2. computers should be used by school administrators more than they are now.	63	99	23	14	2	4.121	4.000	4.030	.894
3. the purchase of a micrcomputer for administrative use should be a low budget priority.	9	38	22	103	29	2.194	2.000	2.487	1.091
4. a microcomputer would be an unnecessary luxury for our school administration.	6	21	23	102	49	2.005	2.000	2.169	1.011
5. our school administration should learn more about computers and how to use them as problem-solving tools.	60	114	19	7	1	4.145	4.000	4.119	.752

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Survey instrument items 3 and 4 show the lowest mean score and the greatest amount of variability in the responses among the items of human characteristics. The frequency distribution for item 3 on the survey instrument, however, indicates that 132 of the 201 superintendents who returned the survey instruments either disagreed or strongly disagreed with the statement that their school board felt the purchase of a microcomputer for administrative use should be a low budget priority. Likewise, 151 of the 201 superintendents who who returned the survey instruments indicated in item 4 of the survey instrument that they either disagreed or strongly disagreed with the statement that their school boards felt a microcomputer would be an unnecessary luxury for their school administration.

Survey instrument items 6 through 12 in the variable category of School Board Support relate to the financial aspects of support and are presented in Table 1-B. Items 6, 7, and 8 on the survey instrument received the lowest mean scores and the highest standard deviations among the financial characteristics of school board support. The frequency distribution for item 6 indicates that 136 of the 201 superintendents involved in the sample agreed or strongly agreed with the statement that their school board would provide the money to purchase at least one 48-K microcomputer for administrative use. The frequency distribution for item 7 indicates that 133 of the 201 superintendents agreed or strongly agreed that their school board would purchase a line-printer to produce hardcopy reports. The frequency distribution for item 8 shows that 148 of the 201

TABLE 1-B

Summary of Superintendents' Responses in the Variable Category of School Board Support for Microcomputer-Based Administration, 1983 (Financial Characteristics)

Survey Instrument Items	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
In general, I feel that my school board would provide the financial support for:									
6. the purchase of at least one 48-K microcomputer for administrative use.	50	86	19	39	7	3.913	4.000	3.662	1.151
7. the purchase of a line-printer to produce hardcopy reports.	46	87	23	39	6	3.874	4.000	3.637	1.124
8. the purchase of the management software programs which I feel would be most appropriate for administrative use in our school district.	46	102	21	28	4	3.966	4.000	3.786	1.014
9. the training to teach me how to operate a microcomputer for management purposes.	44	109	19	25	4	3.982	4.000	3.816	.980
10. the annual costs of microcomputer maintenance and supplies.	47	109	19	23	3	4.009	4.000	3.866	.952
11. the in-service costs to keep me informed about the availability of management software and advancements in microcomputer technology.	39	117	20	21	4	3.974	4.000	3.826	.930

TABLE 1-B (continued)

Survey Instrument Items	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
12. any miscellaneous costs related to the administrative use of a microcomputer which may occur throughout the year.	41	112	24	20	4	3.969	4.000	3.826	.935

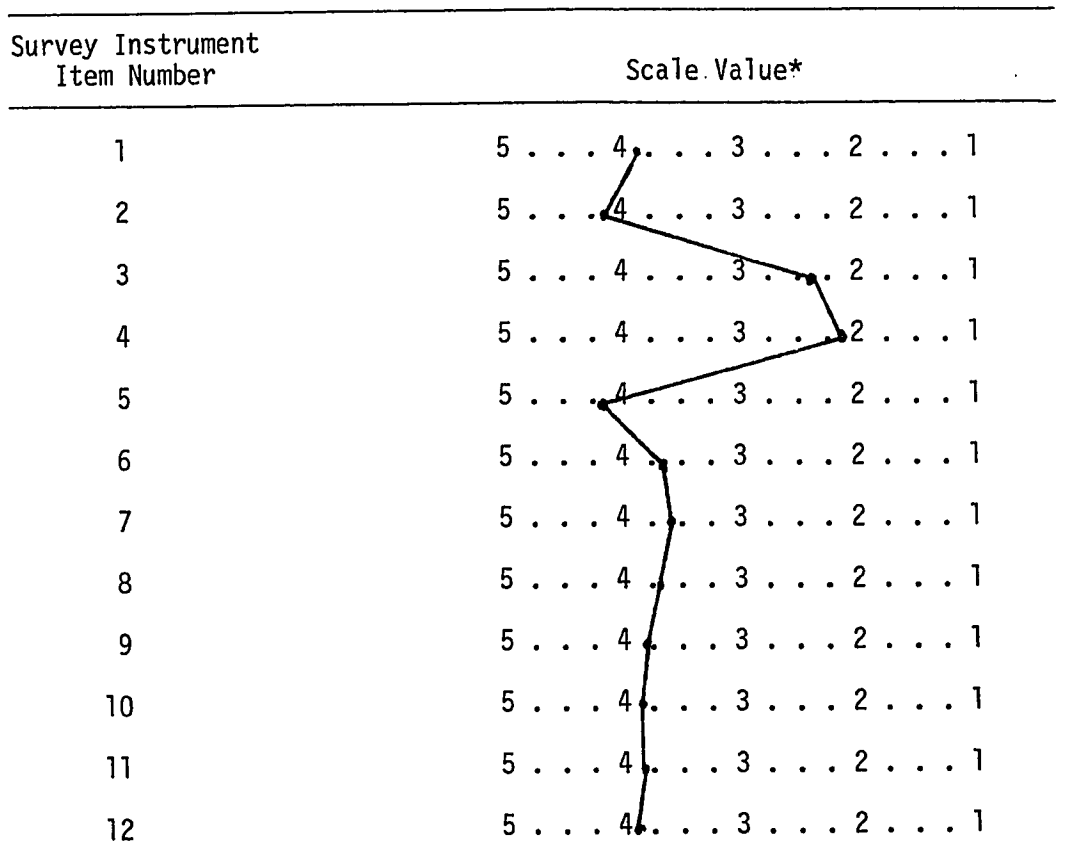
*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

superintendents involved in this study agreed or strongly agreed that their school board would provide the money to purchase management software programs which the superintendent felt would be most appropriate for administrative use in the school district.

Figure 1 demonstrates the cumulative responses of the 201 superintendents involved in this study as they perceived the degree of support which their school boards would give to a microcomputer-based administration in terms of human and financial characteristics.

Figure 1 indicates that superintendents perceived their school boards as being relatively supportive of the concept of microcomputer-based administration. Although the figure shows a considerable drop in the mean scores on items 3 and 4, this was expected because of the design of the survey instrument items. A low mean score on these two items reflects a favorable perception on the part of the superintendents because it indicates that their school boards did not place a low budget priority on the purchase of a microcomputer for administrative use nor did they feel that a microcomputer would be an unnecessary luxury for their school administration.

A summary of the superintendents' responses in the variable category of Microcomputer Expertise is presented in Table 2. Items 17, 18, 21, and 22 of the survey instrument received the lowest mean score ratings of the twelve items in this variable category. These survey instrument items related to the understanding of microcomputer error messages, data base and data file concepts, BASIC programming language, and knowledge of management software availability respectively.



*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 1. A Graphic Illustration of the Mean Scores from Tables 1-A and 1-B Related to Superintendents' Responses to the Items in the Variable Category of School Board Support for Microcomputer-Based Administration, 1983.

TABLE 2

Summary of Superintendents' Responses to the Items in the Variable Category of Microcomputer Expertise Which Are Indicative of the Perceptions of Superintendents About Their Current Level of Microcomputer Expertise, 1983

Survey Instrument Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
Generally speaking, I would say that:									
13. I probably understand enough about microcomputer hardware to turn the microcomputer on, insert a disk into the disk drive, and load a program into the computer.	63	91	5	32	10	4.088	4.000	3.821	1.182
14. I probably understand enough about monitor commands to make the microcomputer hardware operational.	56	72	11	50	12	3.882	4.000	3.547	1.292
15. I probably understand enough about BASIC systems commands to allow me to make use of almost any management software program.	41	50	20	74	16	3.025	2.000	3.129	1.320
16. I probably have sufficient microcomputer skills to be able to "save" the management programs or data on a disk for future use.	42	57	17	67	18	3.412	2.000	3.189	1.336

TABLE 2 (continued)

Survey Instrument Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
17. I probably understand enough about microcomputer error messages to know what course of action to take to correct most situations.	32	43	19	82	25	2.421	2.000	2.876	1.323
18. I probably understand enough about memory density to know when and how I can use a data base concept or data file concept.	20	41	10	100	30	2.205	2.000	2.607	1.245
19. I could probably select the general purpose software which could best be used to meet the management needs of this school district.	29	109	16	37	10	3.844	4.000	3.547	1.100
20. I could probably select the specific application programs (i.e., payroll, financial accounting, etc.) which could best be used to meet the management needs of this school district.	31	102	18	43	7	3.819	4.000	3.532	1.096
21. I probably have enough understanding of BASIC programming language to write some simple microcomputer programs for my own administrative use in this school district.	18	33	18	93	39	2.161	2.000	2.493	1.229

TABLE 2 (continued)

Survey Instrument Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
22. I consider myself to be well informed about availability of software programs that could be used to help me to better manage the affairs of this school district.	12	52	16	99	22	2.293	2.000	2.667	1.150
23. I feel that I am very familiar with the role which a microcomputer could play in supporting management decisions in this school district.	18	86	18	68	11	3.541	4.000	3.159	1.151
24. I feel that I am well aware of the advancements being made in computer technology and the potential impact of the microcomputer on educational administration.	30	96	20	48	7	3.766	4.000	3.468	1.114

No item on the survey instrument in this variable category received a standard deviation of less than 1.096. Standard deviations ranged from 1.096 to 1.336 for the survey instrument items in this category.

Figure 2 is a graphic representation of the mean score responses of the superintendents on the survey instrument items in the variable category of Microcomputer Expertise. The figure indicates a relative trend toward low perceptions of superintendents about their degree of microcomputer expertise.

A summary of superintendents' responses in the variable category of the Administrative Applications of the Microcomputer is found in Table 3. Survey instrument items 25 through 61 represent selected administrative tasks which are common to most school districts throughout the State of Nebraska. The superintendents involved in this study were asked to consider the importance of the microcomputer as an administrative tool in their districts in terms of the tasks it would need to perform. Item 37 was related to the projection of negotiations costs and received the highest mean score rating (4.348). Item 42 dealt with the calculation of building utilization and received the lowest mean score rating (3.527).

Figure 3 illustrates that superintendents perceived the selected administrative tasks as being relatively important in determining the value of the microcomputer as an administrative tool in school management. As the superintendents reflected upon the selected administrative tasks in relation to the microcomputer there appeared to be considerable favor for utilizing the microcomputer to perform many of

Survey Instrument Item Number	Scale Value*
13	5 . . . 4 . . . 3 . . . 2 . . . 1
14	5 . . . 4 . . . 3 . . . 2 . . . 1
15	5 . . . 4 . . . 3 . . . 2 . . . 1
16	5 . . . 4 . . . 3 . . . 2 . . . 1
17	5 . . . 4 . . . 3 . . . 2 . . . 1
18	5 . . . 4 . . . 3 . . . 2 . . . 1
19	5 . . . 4 . . . 3 . . . 2 . . . 1
20	5 . . . 4 . . . 3 . . . 2 . . . 1
21	5 . . . 4 . . . 3 . . . 2 . . . 1
22	5 . . . 4 . . . 3 . . . 2 . . . 1
23	5 . . . 4 . . . 3 . . . 2 . . . 1
24	5 . . . 4 . . . 3 . . . 2 . . . 1

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 2. A Graphic Illustration of the Mean Scores from Table 2 Related to Superintendents' Responses to the Items in the Variable Category of Microcomputer Expertise, 1983.

TABLE 3

Summary of Superintendents' Responses Relative to the Importance of Using a Microcomputer to Process the Administrative Tasks in the Variable Category of the Administrative Applications of the Microcomputer, 1983

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
I would probably consider a micrcomputer to be an important administrative tool in managing this school district if it could be used to:									
25. maintain student records.	61	118	12	9	1	4.165	4.000	4.139	.755
26. process family census.	51	124	18	7	1	4.101	4.000	4.080	.724
27. calculate enrollment projections.	34	104	32	27	4	3.861	4.000	3.682	.974
28. keep student attendance records.	58	112	19	10	2	4.121	4.000	4.065	.819
29. maintain athletic eligibility lists.	31	99	37	30	4	3.798	4.000	3.612	.984
30. maintain student health records.	42	121	19	15	4	4.017	4.000	3.905	.881
31. compute and report student grades.	48	122	18	12	1	4.070	4.000	4.015	.784
32. schedule students into classes.	50	105	23	19	4	4.019	4.000	3.886	.955
33. computer transportation costs (route/activity buses).	43	117	19	20	2	4.009	4.000	3.891	.888
34. store guidance records.	38	110	27	23	3	3.932	4.000	3.781	.934

TABLE 3 (continued)

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
35. score and analyze tests.	31	104	40	23	3	3.832	4.000	3.682	.921
36. maintain staff personnel records (certification, seniority, etc.).	46	111	20	21	3	4.009	4.000	3.876	.932
37. project negotiations costs (salary simulations, etc.).	85	108	3	3	2	4.356	4.000	4.348	.684
38. process payroll related reports (sick leave, retirement, etc.).	66	115	5	12	3	4.200	4.000	4.139	.843
39. calculate payroll checks and process a payroll register.	71	97	13	17	3	4.196	4.000	4.075	.943
40. maintain facilities and equipment inventories.	70	118	6	5	2	4.242	4.000	4.239	.716
41. account of energy use.	41	112	30	13	5	3.969	4.000	3.851	.904
42. calculate percent of building utilization.	24	99	42	31	5	3.727	4.000	3.527	.975
43. process general accounting tasks (budgeting, receipts, expenditures).	69	113	5	14	0	4.221	4.000	4.179	.786
44. process accounts receivable/payable.	64	105	16	14	2	4.152	4.000	4.070	.875
45. forecast financial information.	49	119	21	10	2	4.067	4.000	4.010	.800
46. process lunch program information (lunch counts, inventory, reports).	54	117	21	8	1	4.103	4.000	4.070	.758
47. process activity fund accounts.	54	120	14	12	1	4.112	4.000	4.065	.788

TABLE 3 (continued)

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
48. process certificates of deposit and investment information.	41	105	25	27	3	3.933	4.000	3.766	.975
49. process general ledger information.	52	112	18	18	1	4.067	4.000	3.975	.869
50. handle special education plans and budget information.	39	117	22	21	2	3.974	4.000	3.856	.889
51. perform statistical analysis (research activities).	34	98	43	23	3	3.821	4.000	3.682	.937
52. process library circulation tasks.	26	94	51	26	4	3.707	4.000	3.557	.942
53. reserve media (equipment, scheduling, inventory).	25	93	51	30	2	3.688	4.000	3.542	.927
54. plan projects and budgets (budget forecasting, etc.).	53	120	18	10	0	4.104	4.000	4.075	.741
55. process newsletters and other written correspondence (Word Processing).	49	101	31	19	1	3.990	4.000	3.886	.901
56. schedule activities (extra-curricular).	28	102	39	26	6	3.789	4.000	3.597	.981
57. process mailing lists/ labels (students, parents, staff, etc.).	62	110	20	9	0	4.150	4.000	4.119	.759
58. store and retrieve information.	67	117	12	5	0	4.214	4.000	4.224	.667
59. gather data from larger data failes (a mainframe computer).	33	88	45	32	3	3.733	4.000	3.577	.993

TABLE 3 (continued)

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
60. process data for various financial reports required by the Nebraska Department of Education.	63	116	15	7	0	4.177	4.000	4.169	.708
61. process special education information such as test scores, IEP's, etc.	40	112	29	17	3	3.960	4.000	3.841	.891

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Survey Instrument Item Number	Scale Value*
25	5 . . . 4 . . . 3 . . . 2 . . . 1
26	5 . . . 4 . . . 3 . . . 2 . . . 1
27	5 . . . 4 . . . 3 . . . 2 . . . 1
28	5 . . . 4 . . . 3 . . . 2 . . . 1
29	5 . . . 4 . . . 3 . . . 2 . . . 1
30	5 . . . 4 . . . 3 . . . 2 . . . 1
31	5 . . . 4 . . . 3 . . . 2 . . . 1
32	5 . . . 4 . . . 3 . . . 2 . . . 1
33	5 . . . 4 . . . 3 . . . 2 . . . 1
34	5 . . . 4 . . . 3 . . . 2 . . . 1
35	5 . . . 4 . . . 3 . . . 2 . . . 1
36	5 . . . 4 . . . 3 . . . 2 . . . 1
37	5 . . . 4 . . . 3 . . . 2 . . . 1
38	5 . . . 4 . . . 3 . . . 2 . . . 1
39	5 . . . 4 . . . 3 . . . 2 . . . 1
40	5 . . . 4 . . . 3 . . . 2 . . . 1
41	5 . . . 4 . . . 3 . . . 2 . . . 1
42	5 . . . 4 . . . 3 . . . 2 . . . 1
43	5 . . . 4 . . . 3 . . . 2 . . . 1
44	5 . . . 4 . . . 3 . . . 2 . . . 1
45	5 . . . 4 . . . 3 . . . 2 . . . 1
46	5 . . . 4 . . . 3 . . . 2 . . . 1
47	5 . . . 4 . . . 3 . . . 2 . . . 1
48	5 . . . 4 . . . 3 . . . 2 . . . 1
49	5 . . . 4 . . . 3 . . . 2 . . . 1
50	5 . . . 4 . . . 3 . . . 2 . . . 1
51	5 . . . 4 . . . 3 . . . 2 . . . 1
52	5 . . . 4 . . . 3 . . . 2 . . . 1
53	5 . . . 4 . . . 3 . . . 2 . . . 1
54	5 . . . 4 . . . 3 . . . 2 . . . 1
55	5 . . . 4 . . . 3 . . . 2 . . . 1
56	5 . . . 4 . . . 3 . . . 2 . . . 1
57	5 . . . 4 . . . 3 . . . 2 . . . 1
58	5 . . . 4 . . . 3 . . . 2 . . . 1
59	5 . . . 4 . . . 3 . . . 2 . . . 1
60	5 . . . 4 . . . 3 . . . 2 . . . 1
61	5 . . . 4 . . . 3 . . . 2 . . . 1

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 3. A Graphic Illustration of the Mean Scores from Table 3 Related to Superintendents' Responses to the Items in the Variable Category of the Administrative Applications of the Microcomputer, 1983.

the clerical, forecasting, and planning tasks involved in school administration. Figure 3 represents the superintendents' mean scores found in Table 3.

A summary of the superintendents' responses to items 62 through 72 in the variable category of Cost-Benefit is presented in Table 4-A. Items 62 and 64 on the survey instrument received the lowest mean score ratings. Item 62 was related to the importance of the microcomputer diminishing certain personnel costs and item 64 dealt with the importance of the microcomputer being able to help superintendents to better meet deadlines.

Figure 4 represents a graphic illustration of the superintendents' mean score responses shown in Table 4-A on the survey instrument items 62 through 72 in the variable category of Cost-Benefit. The graph indicates that most of the superintendents involved in this study agreed or strongly agreed that they would support a microcomputer-based administration concept if the microcomputer could effectuate results in many of the survey instrument items 62 through 72.

Table 4-B illustrates the dollar amounts which the superintendents felt that their school boards would be willing to spend, or had already spent, for microcomputer hardware, software, consultant fees, and miscellaneous items. Not all superintendents involved in the study responded to each of the survey instrument items 73 through 76. The amount of money which superintendents indicated that their school boards would be willing to spend for the initial purchase of

TABLE 4-A

Summary of Superintendents' Responses to the Items in the Variable Category of Cost-Benefit Which Relate to the Expected Results of Implementing Microcomputer-Based Administration, 1983

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
I would support the concept of microcomputer-based administration in my school district if the microcomputer could:									
62. diminish certain personnel costs.	51	90	40	19	1	3.950	4.000	3.851	.926
63. optimize inventory levels and control.	57	112	28	4	0	4.112	4.000	4.104	.703
64. help me to better meet deadlines.	50	109	27	14	1	4.037	4.000	3.960	.842
65. provide me with more and better information for decision making and planning.	67	116	17	1	0	4.211	4.000	4.239	.619
66. improve accuracy in word processing and computational problems.	56	114	24	6	1	4.110	4.000	4.085	.747
67. save filing space.	62	107	27	5	0	4.140	4.000	4.124	.728
68. improve data communications.	53	116	29	3	0	4.091	4.000	4.090	.680
69. diminish the time which I spend doing clerical tasks so that I may spend more time on more productive tasks.	71	110	15	4	1	4.232	4.000	4.224	.710

TABLE 4-A (continued)

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
70. improve the utilization of school district resources.	69	111	19	2	0	4.216	4.000	4.229	.654
71. provide me with more managerial control of the school district.	63	115	18	5	0	4.174	4.000	4.174	.689
72. centralize the organization of data in this school district.	54	119	21	6	0	4.113	4.000	4.105	.697

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Survey Instrument Item Number	Scale Value*
62	5 . . . 4 . . . 3 . . . 2 . . . 1
63	5 . . . 4 . . . 3 . . . 2 . . . 1
64	5 . . . 4 . . . 3 . . . 2 . . . 1
65	5 . . . 4 . . . 3 . . . 2 . . . 1
66	5 . . . 4 . . . 3 . . . 2 . . . 1
67	5 . . . 4 . . . 3 . . . 2 . . . 1
68	5 . . . 4 . . . 3 . . . 2 . . . 1
69	5 . . . 4 . . . 3 . . . 2 . . . 1
70	5 . . . 4 . . . 3 . . . 2 . . . 1
71	5 . . . 4 . . . 3 . . . 2 . . . 1
72	5 . . . 4 . . . 3 . . . 2 . . . 1

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 4. A Graphic Illustration of the Mean Scores from Table 4-A Related to Superintendents' Responses to the Items in the Variable Category of Cost-Benefit Regarding Expected Results of Implementing Microcomputer-Based Administration, 1983.

TABLE 4-B

Summary of Superintendents' Responses to the Items in the Variable Category of Cost-Benefit Which Relate to the Estimated Dollar Amount Which Their Boards Would be Willing to Spend to Implement Microcomputer-Based Administration, 1983

Questionnaire Item	Range	Median	Mode	Mean	Standard Deviation
Please indicate your best estimate of the amount of money that your school district would be willing to spend, or has already spent, for:					
73. the initial purchase of a microcomputer hardware system (microcomputer with 48-K memory, dual disk drive, monitor, and line-printer).	$500-$50,000	$3500*	$3000*	$5466*	$5591*
74. the initial purchase of some management software programs which you feel could best meet the administrative needs of your school district.	$ 35-$20,000**	$ 509**	$ 500**	$1025**	$1807**
75. the fees to provide for a consultant to come into your school district to help you set up a microcomputer-based administration.	$ 50-$ 2,400***	$ 279***	$ 500***	$ 414***	$ 381***

TABLE 4-B (continued)

Questionnaire Item	Range	Median	Mode	Mean	Standard Deviation
76. recurring costs such as supplies, depreciation, in-service training, telephone line service, etc.	$100-$10000****	$ 510****	$ 500****	$ 849***	$1062****

*Valid Cases = 176; Missing Cases = 25
**Valid Cases = 159; Missing Cases = 42
***Valid Cases = 107; Missing Cases = 94
****Valid Cases = 147; Missing Cases = 54

a 48-K microcomputer hardware system ranged from $500 to $50,000. The mean dollar amount of the superintendents' estimates was $5,466. The allotment for the initial purchase of some management software began at $35 and went up as high as $20,000. The mean was $1,025. The superintendents involved in this study indicated that their school boards were willing to spend as little as $50 and as much as $2,400 to bring a consultant into the district to help the superintendent set up a microcomputer-based administration. The mean dollar amount that the boards were willing to spend was $414. The dollar amount the superintendents indicated that their boards would be willing to spend for recurring costs ranged from a low amount of $100 to a high of $10,000. The mean dollar amount was $849. There were 176 superintendents who provided a dollar estimate for item 73 on the survey instrument, 159 superintendents provided a dollar estimate for item 74, 107 superintendents provided a dollar estimate for item 75, and 147 superintendents reponded to item 76.

A summary of the superintendents' responses in the variable categories of School Board Support, Microcomputer Expertise, the Administrative Applications of the Microcomputer, and Cost-Benefit is presented in Table 5. The variable category with the highest standard deviation was Microcomputer Expertise. It was also the variable category with the lowest mean score rating (3.170).

Figure 5 illustrates a graphic view of the superintendents' mean score responses for Table 5 in each of the variable categories of School Board Support, Microcomputer Expertise, the Administrative

TABLE 5

Summary of Responses of Superintendents in Each of the Variable Categories Related to the Implementation of Microcomputer-Based Administration, 1983

Survey Instrument Items and Variable Categories	Median*	Mode*	Mean*	Standard Deviation
1-12 Board Support	3.673	3.667	3.598	.570
13-24 Microcomputer Expertise	3.073	2.667	3.170	.927
25-61 Administrative Applications	3.946	4.000	3.920	.560
62-72 Cost-Benefit	4.007	4.000	4.106	.543

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Survey Instrument Items and Variable Categories	Scale Value*
1-12 Board Support	5 . . . 4 . . . 3 . . . 2 . . . 1
13-24 Microcomputer Expertise	5 . . . 4 . . . 3 . . . 2 . . . 1
25-61 Administrative Applications	5 . . . 4 . . . 3 . . . 2 . . . 1
62-72 Cost-Benefit	5 . . . 4 . . . 3 . . . 2 . . . 1

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 5. A Graphic Illustration of the Mean Scores from Table 5 Related to Superintendents' Responses to Each of the Items in the Variable Categories Regarding the Implementation of Microcomputer-Based Administration, 1983.

Applications of the Microcomputer, and Cost-Benefit. It appears that the variable category of Microcomputer Expertise is relatively low in comparison to the other variable categories of School Board Support, the Administrative Applications of the Microcomputer, and Cost-Benefit.

The median, mode, and mean scores were calculated for each item and each variable category on the data managers' survey instrument to obtain an index of central tendency by which the data could be described in terms of average value. The standard deviation was calculated for each item and variable category to determine variability of the responses by item and by category. Applying appropriate data to a graph revealed the cumulative mean scores of the data managers as they relate to the survey instrument items in the variable categories of School Board Support, Microcomputer Expertise, Administrative Applications of the Microcomputer, and Cost-Benefit.

The construct of analyzing the data generated from the graph was to attend to each research question individually. Either the graphic figure presentation or the tabular configurations was used to indicate acceptance or rejection of the null hypothesis at the proper level of significance.

A summary of data managers' responses in the variable category of School Board Support is presented in Table 6-A. Statements 1 through 5 in this category relate to the human characteristics of support for a microcomputer based-administration. Survey instrument items 3 and 4 showed the lowest mean scores among the items of human

TABLE 6-A

Summary of Data Managers' Responses in the Variable Category of School Board Support for Microcomputer-Based Administration, 1983 (Human Characteristics)

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
In my opinion, the implementation of a microcomputer-based administration would likely succeed if a school board felt that:									
1. a computer could probably add to the quality of administration in the school district.	3	6	1	0	0	4.167	4.000	4.200	.632
2. computers should be used by school administrators more than they are now.	2	6	2	0	0	4.000	4.000	4.000	.667
3. the purchase of a microcomputer for administrative use should receive low budget priority.	0	0	2	7	1	2.071	2.000	2.100	.568
4. a microcomputer would be an unnecessary luxury for our school administration.	0	0	1	7	2	1.929	2.000	1.900	.568
5. school administrators should learn more about microcomputers and how to use them as problem-solving tools.	4	5	1	0	0	4.300	4.000	4.300	.675

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Agree

characteristics. The frequency distribution for item 3 on the survey instrument, however, indicates that eight of the ten data managers who participated in this study either disagreed or strongly disagreed with the statement that a school board should feel the purchase of a microcomputer for administrative use should receive a low budget priority. The data managers who participated in this study indicated on item 4 of the survey instrument that they either disagreed or strongly disagreed with the statement that a school board should view the microcomputer as an unnecessary luxury for the school administration in their districts.

Survey instrument items 6 through 13 in the variable category of School Board Support relate to the financial aspects of support and are presented in Table 6-B. Items 6 and 8 on the survey instrument received the lowest mean score ratings and had the highest standard deviations. The frequency distribution of item 6 indicated that eight of ten data managers agreed or strongly agreed that a school board should be willing to purchase at least one 48-K microcomputer for administrative use. The frequency distribution of item 8, however, indicates that six of the ten data managers involved in this study agreed or strongly agreed that a school district should be willing to purchase the management software programs which the superintendent feels are most appropriate for administrative use in the school district.

Figure 6 demonstrates the cumulative responses from Tables 6-A and 6-B of the data managers involved in this study relative to the degree of support which a school board should give to a

TABLE 6-B

Summary of Data Managers' Responses in the Variable Category of School Board Support for Microcomputer-Based Administration, 1983 (Financial Characteristics)

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
In my opinion, a school board must be willing to provide the financial support for:									
6. the purchase of at least one 48-K microcomputer for administrative use.	2	6	1	0	1	4.000	4.000	3.800	1.135
7. the purchase of a line-printer to produce hardcopy reports.	4	5	1	0	0	4.300	4.000	4.300	.675
8. the purchase of the management software programs which the superintendent feels would be most appropriate for administrative use in the school district.	1	5	2	1	1	3.700	4.000	3.400	1.174
9. the training need to teach the superintendent how to operate a microcomputer for management purposes.	3	4	2	1	0	4.000	4.000	3.900	.994

TABLE 6-B (continued)

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
10. the annual costs for microcomputer maintenance and supplies.	2	7	1	0	0	4.071	4.000	4.100	.568
11. the in-service costs to keep the superintendent informed about the availability of management software and advancements in microcomputer technology.	2	7	1	0	0	4.071	4.000	4.100	.568
12. any miscellaneous costs related to the administrative use of a microcomputer which may occur throughout the year.	1	8	1	0	0	4.000	4.000	4.000	.471

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Survey Instrument Item Number	Scale Value*
1	5 . . . 4 . . . 3 . . . 2 . . . 1
2	5 . . . 4 . . . 3 . . . 2 . . . 1
3	5 . . . 4 . . . 3 . . . 2 . . . 1
4	5 . . . 4 . . . 3 . . . 2 . . . 1
5	5 . . . 4 . . . 3 . . . 2 . . . 1
6	5 . . . 4 . . . 3 . . . 2 . . . 1
7	5 . . . 4 . . . 3 . . . 2 . . . 1
8	5 . . . 4 . . . 3 . . . 2 . . . 1
9	5 . . . 4 . . . 3 . . . 2 . . . 1
10	5 . . . 4 . . . 3 . . . 2 . . . 1
11	5 . . . 4 . . . 3 . . . 2 . . . 1
12	5 . . . 4 . . . 3 . . . 2 . . . 1

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 6. A Graphic Illustration of the Mean Scores from Tables 6-A and 6-B Related to Data Managers' Responses to the Items in the Variable Category of School Board Support for Microcomputer-Based Administration, 1983.

microcomputer-based administration in terms of human and financial characteristics. It indicates that, in their opinions, school boards should be relatively supportive of microcomputer-based administration. Although the graph shows a considerable drop in the mean scores on items 3 and 4, this was expected because of the design of the survey instrument items. A low mean score on these two items reflects a favorable opinion on the part of the data managers because it indicates that they felt school boards should not place a low budget priority on the purchase of a microcomputer for administrative use nor did they believe that a microcomputer should be viewed as an unnecessary luxury for school administration.

A summary of the data managers' responses in the variable category of Microcomputer Expertise is presented in Table 7. Items 15, 18, and 21 on the survey instrument indicate the highest degree of variability. Item 15 revealed a mean score of 4.000 and had a standard deviation of 1.155. An examination of the frequency distribution shows that eight of the 10 data managers involved in this study either agreed or strongly agreed that an individual who uses a microcomputer as a management tool should have enough understanding about BASIC systems commands to allow him or her to make use of almost any management software program. Item 18 on the survey instrument dealt with the issue of whether an individual who uses a microcomputer as a management tool should have enough understanding about memory density to know when and how to use a data base concept or a data file concept. There were six data managers who agreed or strongly agreed

TABLE 7

Summary of Data Managers' Responses to the Items in the Variable Category of Microcomputer Expertise Which Indicate Their Opinions of the Level of Computer Expertise Required of Superintendents to Use the Microcomputer as a Management Tool, 1983

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
In my opinion, an individual who uses a microcomputer as a management tool should:									
13. understand enough about microcomputer hardware to turn the microcomputer on, insert a disk into the disk drive, and load a program into the computer.	3	6	0	1	0	4.161	4.000	4.100	.876
14. understand enough about monitor commands to make the microcomputer hardware operational.	3	6	0	1	0	4.167	4.000	4.100	.876
15. understand enough about BASIC systems commands to allow him or her to make use of almost any management software program.	4	4	0	2	0	4.250	4.000	4.000	1.155
16. have sufficient microcomputer skills to be able to "save" management programs or data on a disk for future use.	2	7	0	1	0	4.071	4.000	4.000	.816

TABLE 7 (continued)

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
17. understand enough about microcomputer error messages to know what course of action to take to correct most situations.	2	7	1	0	0	4.071	4.000	4.100	.568
18. understand enough about memory density to know when and how to use a data base concept or a data file concept.	1	5	2	1	1	3.700	4.000	3.400	1.174
19. be able to select the general purpose software which could best be used to meet the management needs of the school district.	1	9	0	0	0	4.056	4.000	4.100	.316
20. be able to select the specific application programs (i.e., payroll, financial accounting, etc.) which could best be used to meet the management needs of the school district.	1	7	1	1	0	3.929	4.000	3.800	.789
21. understand enough about BASIC programming language to write some simple microcomputer programs for school district administrative use.	2	5	1	2	0	3.900	4.000	3.700	1.059

TABLE 7 (continued)

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
22. be well informed about the availability of software programs that could be used to help better manage school district affairs.	2	7	1	0	0	4.071	4.000	4.100	.568
23. be familiar with the role which a microcomputer plays in supporting management decisions in a school district.	1	8	1	0	0	4.000	4.000	4.000	.471
24. be aware of the advancements being made in computer technology and the potential impact of the microcomputer on educational administration.	0	8	2	0	0	3.875	4.000	3.800	.423

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

with item 18. Item 21 on the data managers' survey instrument was related to whether an individual who uses a microcomputer as a management tool should have enough understanding about BASIC programming language to write some simple microcomputer programs for school district administration use. There were seven of the 10 data managers who either agreed or strongly agreed that microcomputer users should have some programming skills.

Figure 7 illustrates the mean score responses from Table 7 of the data managers on items 13 through 24 of the variable category Microcomputer Expertise. With the exception of item 18, the graph indicates that the data managers opinions of the degree of microcomputer skills and literacy needed tends to be relatively high.

A summary of the data managers' responses to the survey instrument items in the variable category of Administrative Applications of the Microcomputer is presented in Table 8. Item 35 on the survey instrument received the lowest mean score rating in the variable category of Administrative Applications of the Microcomputer. This item dealt with scoring and analyzing tests and a review of the frequency distribution indicated that seven of the ten data managers either had no opinion, disagreed, or strongly disagreed about the use of a microcomputer to score and analyze tests. The lowest standard deviations were recorded for items 41, 42, and 59. These items related to the use of a microcomputer to account for energy use, calculate percent of building utilization, and gather data from larger files respectively.

Survey Instrument Item Number	Scale Value*
13	5 . . . 4 . . . 3 . . . 2 . . . 1
14	5 . . . 4 . . . 3 . . . 2 . . . 1
15	5 . . . 4 . . . 3 . . . 2 . . . 1
16	5 . . . 4 . . . 3 . . . 2 . . . 1
17	5 . . . 4 . . . 3 . . . 2 . . . 1
18	5 . . . 4 . . . 3 . . . 2 . . . 1
19	5 . . . 4 . . . 3 . . . 2 . . . 1
20	5 . . . 4 . . . 3 . . . 2 . . . 1
21	5 . . . 4 . . . 3 . . . 2 . . . 1
22	5 . . . 4 . . . 3 . . . 2 . . . 1
23	5 . . . 4 . . . 3 . . . 2 . . . 1
24	5 . . . 4 . . . 3 . . . 2 . . . 1

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 7. A Graphic Illustration of the Mean Scores from Table 7 Related to Data Managers' Responses to the Items in the Variable Category of Microcomputer Expertise, 1983.

TABLE 8

Summary of Data Managers' Responses Relative to the Capability of a 48-K Microcomputer to Process the Administrative Tasks in the Variable Category of the Administrative Applications of the Microcomputer, 1983

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
In my opinion, a 48-K microcomputer with two disk drives would probably be sufficient to perform the following administrative tasks in school districts were the student enrollment is 1000 or less:									
25. maintain student records.	2	5	2	0	1	3.900	4.000	3.700	1.160
26. process family census.	1	6	2	0	1	3.833	4.000	3.600	1.075
27. calculate enrollment projections.	2	3	3	1	1	3.500	3.000	3.400	1.265
28. keep student attendance records.	2	6	1	0	1	4.000	4.000	3.800	1.135
29. maintain athletic eligibility lists;	2	5	2	0	1	3.900	4.000	3.700	1.160
30. maintain student health records.	2	4	1	2	1	3.750	4.000	3.400	1.350
31. compute and report student grades.	2	6	1	0	1	4.000	4.000	3.800	1.135
32. schedule students into classes.	2	3	3	1	1	3.500	3.000	3.400	1.265
33. compute transportation costs (route/activity buses).	2	4	1	2	1	3.750	4.000	3.400	1.350
34. store guidance records.	1	3	3	2	1	3.167	3.000	3.100	1.197

TABLE 8 (continued)

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
35. score and analyze tests.	0	3	3	3	1	2.833	2.000	2.800	1.033
36. maintain staff personnel records (certification, seniority, etc.).	2	6	1	0	1	4.000	4.000	3.800	1.135
37. project negotiations costs (salary simulation, etc.).	2	4	3	0	1	3.750	4.000	3.600	1.174
38. process payroll related reports (sick leave, retirement, etc.).	2	6	1	0	1	4.000	4.000	3.800	1.135
39. calculate payroll checks and process a payroll register.	2	6	1	0	1	4.000	4.000	3.800	1.135
40. maintain facilities and equipment inventories.	2	6	1	0	1	4.000	4.000	3.800	1.135
41. account for energy use.	0	6	3	0	1	3.667	4.000	3.400	.966
42. calculate percent of building utilization.	0	5	4	0	1	3.500	4.000	3.300	.949
43. process general accounting tasks (budgeting, receipts, expenditures).	1	5	2	1	1	3.700	4.000	3.400	1.174
44. process accounts receivable/ payable.	2	5	1	1	1	3.900	4.000	3.600	1.265
45. forecast financial information.	1	3	3	2	1	3.167	3.000	3.100	1.197
46. process lunch program information (lunch counts, inventory, reports).	2	5	2	0	1	3.900	4.000	3.700	1.160
47. process activity fund accounts.	2	4	3	0	1	3.750	4.000	3.600	1.174

TABLE 8 (continued)

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
48. process certificates of deposit and investment information.	2	4	2	1	1	3.750	4.000	3.500	1.269
49. process general ledger information.	2	5	1	1	1	3.900	4.000	3.600	1.265
50. handle special education plans and budget accounting.	0	5	3	1	1	3.500	4.000	3.200	1.033
51. perform statistical analysis (research activities).	0	5	3	1	1	3.500	4.000	3.200	1.033
52. process library circulation tasks.	1	5	3	0	1	3.700	4.000	3.500	1.080
53. reserve media (equipment, scheduling, inventory).	2	4	3	0	1	3.750	4.000	3.600	1.174
54. plan projects and budgets (budget forecasting, etc.).	1	6	1	1	1	3.833	4.000	3.500	1.179
55. process newsletters and other written correspondence (Word Processing).	1	7	1	0	1	3.929	4.000	3.700	1.059
56. schedule activities (extracurricular).	2	3	3	1	1	3.500	3.000	3.400	1.265
57. process mailing lists/labels (students, staff, parents, etc.).	2	7	0	0	1	4.071	4.000	3.900	1.101
58. store and retrieve information.	2	7	0	0	1	4.071	4.000	3.900	1.101
59. gather data from larger files (a mainframe computer).	0	6	3	0	1	3.667	4.000	3.400	.966

TABLE 8 (continued)

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
60. process data for the various financial reports required by the Nebraska Department of Education.	2	2	5	0	1	3.300	3.000	3.400	1.174
61. process special education information such as test scores, IEP's, etc.	1	4	4	0	1	3.500	3.000	3.400	1.075

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 8 illustrates a graphic representation of the mean score responses from Table 8 of the data managers on the survey instrument items 25 through 61 contained in the variable category of Administrative Applications of the Microcomputer. The graph indicates that the opinions of the data managers about the administrative applications of a 48-K microcomputer appeared to be relatively high. The exception was item 35 which related to the use of a microcomputer for scoring and analyzing tests.

A summary of the data managers' responses to the survey instrument items in the variable category of Cost-Benefit is presented in Tables 9-A and 9-B. Items 62 through 72 of the survey instrument are presented in Table 9-A and items 73 through 76 of the survey instrument are presented in Table 9-B.

The lowest mean score for the items contained in Table 9-A was 3.200 and was calculated for item 62. This item on the survey instrument related to whether the use of a microcomputer as a management tool would diminish certain personnel costs significantly. A review of the frequency distribution indicated that five data managers agreed the use of a microcomputer would significantly diminish certain personnel costs, two expressed no opinion, and three data managers disagreed that the use of a microcomputer as a management tool would significantly diminish certain personnel costs. The highest mean score rating was given to item 65 which asked whether the use of a microcomputer as a management tool would provide superintendents with more and better information for decision making and planning.

Questionnaire Item Number	Scale Value*
25	5 . . . 4 . . . 3 . . . 2 . . . 1
26	5 . . . 4 . . . 3 . . . 2 . . . 1
27	5 . . . 4 . . . 3 . . . 2 . . . 1
28	5 . . . 4 . . . 3 . . . 2 . . . 1
29	5 . . . 4 . . . 3 . . . 2 . . . 1
30	5 . . . 4 . . . 3 . . . 2 . . . 1
31	5 . . . 4 . . . 3 . . . 2 . . . 1
32	5 . . . 4 . . . 3 . . . 2 . . . 1
33	5 . . . 4 . . . 3 . . . 2 . . . 1
34	5 . . . 4 . . . 3 . . . 2 . . . 1
35	5 . . . 4 . . . 3 . . . 2 . . . 1
36	5 . . . 4 . . . 3 . . . 2 . . . 1
37	5 . . . 4 . . . 3 . . . 2 . . . 1
38	5 . . . 4 . . . 3 . . . 2 . . . 1
39	5 . . . 4 . . . 3 . . . 2 . . . 1
40	5 . . . 4 . . . 3 . . . 2 . . . 1
41	5 . . . 4 . . . 3 . . . 2 . . . 1
42	5 . . . 4 . . . 3 . . . 2 . . . 1
43	5 . . . 4 . . . 3 . . . 2 . . . 1
44	5 . . . 4 . . . 3 . . . 2 . . . 1
45	5 . . . 4 . . . 3 . . . 2 . . . 1
46	5 . . . 4 . . . 3 . . . 2 . . . 1
47	5 . . . 4 . . . 3 . . . 2 . . . 1
48	5 . . . 4 . . . 3 . . . 2 . . . 1
49	5 . . . 4 . . . 3 . . . 2 . . . 1
50	5 . . . 4 . . . 3 . . . 2 . . . 1
51	5 . . . 4 . . . 3 . . . 2 . . . 1
52	5 . . . 4 . . . 3 . . . 2 . . . 1
53	5 . . . 4 . . . 3 . . . 2 . . . 1
54	5 . . . 4 . . . 3 . . . 2 . . . 1
55	5 . . . 4 . . . 3 . . . 2 . . . 1
56	5 . . . 4 . . . 3 . . . 2 . . . 1
57	5 . . . 4 . . . 3 . . . 2 . . . 1
58	5 . . . 4 . . . 3 . . . 2 . . . 1
59	5 . . . 4 . . . 3 . . . 2 . . . 1
60	5 . . . 4 . . . 3 . . . 2 . . . 1
61	5 . . . 4 . . . 3 . . . 2 . . . 1

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 8. A graphic Illustration of the Mean Scores from Table 8 Related to Data Managers' Responses to the Items in the Variable Category of Administrative Applications of the Microcomputer, 1983.

TABLE 9-A

Summary of Data Managers' Responses to the Items in the Variable Category of Cost-Benefit Which Relate to the Estimated Results of Implementing Microcomputer-Based Administration, 1983

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
In my opinion, the use of a microcomputer as a management tool in school district administration would probably:									
62. diminish certain personnel costs significantly.	0	5	2	3	0	3.500	4.000	3.200	.919
63. optimize inventory levels and control.	1	6	3	0	0	3.833	4.000	3.800	.632
64. help school superintendents to better meet deadlines.	1	7	2	0	0	3.929	4.000	3.900	.568
65. provide superintendents with more and better information for decision making and planning.	2	7	1	0	0	4.071	4.000	4.100	.568
66. improve accuracy in word processing and computational problems.	2	6	2	0	0	4.000	4.000	4.000	.667
67. save filing space.	2	6	1	1	0	4.000	4.000	3.900	.876
68. improve data communications.	0	6	3	1	0	3.667	4.000	3.500	.707
69. significantly diminish the time which a superintendent spends doing clerical tasks so that he may spend time on more productive tasks.	0	6	3	1	0	3.667	4.000	3.500	.707

TABLE 9-A (continued)

Questionnaire Item	Scale Value* 5	4	3	2	1	Median	Mode	Mean	Standard Deviation
70. improve the utilization of school district resources.	0	6	4	0	0	3.667	4.000	3.600	.516
71. provide school superintendents with more managerial control of the school district.	0	8	3	0	0	3.875	4.000	3.800	.422
72. centralize the organization of data in a school district.	1	7	2	0	0	3.929	4.000	3.900	.568

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 9 represents a graphic illustration of the mean score responses from Table 9-A of the data managers' responses to items 62 through 72 of the survey instrument in the variable category Cost-Benefit. The graph appears to reflect a relatively high degree of agreement among the data managers with the cost-benefit statements contained in items 62 through 72 of the data managers' survey instrument.

A summary of the data managers' responses to items 73 through 76 on the survey instrument in the variable category of Cost-Benefit is presented in Table 9-B. Not all data managers responded to each of the survey instrument items 73 through 76. Items 73 through 76 on the survey instrument asked the data managers to estimate the dollar amounts which school boards would have to allot for the initial purchase of a 48-K microcomputer hardware system, the purchase of some management software programs to meet the four or five most important management needs of a school district, a consultant to come into the school district and help the superintendent set up a microcomputer-based administration, and recurring annual costs. The amount of money which the data managers estimated would have to be budgeted for the initial purchase of a 48-K microcomputer hardware system ranged from a low of $280 to a high of $20,000. The mean amount was $6,553. The data managers indicated that the amount to be set aside for the purchase of four or five management software programs which the superintendent felt would be needed to meet the most important administrative needs

Survey Instrument Item Number	Scale Value*
62	5 . . . 4 . . . 3 . . . 2 . . . 1
63	5 . . . 4 . . . 3 . . . 2 . . . 1
64	5 . . . 4 . . . 3 . . . 2 . . . 1
65	5 . . . 4 . . . 3 . . . 2 . . . 1
66	5 . . . 4 . . . 3 . . . 2 . . . 1
67	5 . . . 4 . . . 3 . . . 2 . . . 1
68	5 . . . 4 . . . 3 . . . 2 . . . 1
69	5 . . . 4 . . . 3 . . . 2 . . . 1
70	5 . . . 4 . . . 3 . . . 2 . . . 1
71	5 . . . 4 . . . 3 . . . 2 . . . 1
72	5 . . . 4 . . . 3 . . . 2 . . . 1

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 9. A Graphic Illustration of the Mean Scores from Table 9-A Related to Data Managers' Responses to the Items in the Variable Category of Cost-Benefit Regarding the Estimated Results of Implementing Microcomputer-Based Administration, 1983.

TABLE 9-B

Summary of Data Managers' Responses to the Items in the Variable Category of Cost-Benefit Which Relate to the Estimated Dollar Amount Which School Boards Could Expect to Spend to Implement Microcomputer-Based Administration, 1983

Questionnaire Item	Range	Median	Mode	Mean	Standard Deviation
Please indicate your best estimate of what a school district with a student enrollment of 1000 or less would have to budget in order to:					
73. purchase a microcomputer hardware system (microcomputer with 48-K memory, two disk drives, monitor, and line-printer) which would satisfactorily process most administrative tasks.	$280-$20,000*	$4825*	$5000*	$6553*	$6066*
74. purchase the management software programs which a superintendent will need to meet the four or five most important administrative needs of the school district.	$ 60-$ 5000**	$3000**	$5000**	$2728**	$2022**
75. pay for a consultant to come into the district to help a superintendent set up a microcomputer-based administration.	$100-$ 7000***	$3000***	$5000***	$3177***	$2287***

TABLE 9-B (continued)

Questionnaire Item	Range	Median	Mode	Mean	Standard Deviation
76. cover annual recurring costs such as supplies, depreciation, in-service training, telephone line service, etc.	$300-$5000****	$2125****	$2000****	$2400****	$1505****

*Valid Cases = 9; Missing Cases = 1
**Valid Cases = 9; Missing Cases = 1
***Valid Cases = 9; Missing Cases = 1
****Valid Cases = 9; Missing Cases = 1

of the school district would probably range from a low of $60 to a high of $5,000. The mean dollar amount was $2,728. The responses of the data managers regarding their estimates of the amount of money to be budgeted to pay for a consultant to come into the district to help the superintendent set up a microcomputer-based administration ranged from $100 to $7,000. The mean dollar amount to be budgeted for consultant fees was $3,177. The amount of dollars which data managers estimated should be set aside for recurring annual costs ranged from $300 to $5,000. The mean amount to be budgeted for annual recurring costs was $2,400.

A summary of data managers' responses to the survey instrument items is broken down by variable category and presented in Table 10. The variable category of Administrative Applications of the Microcomputer had the lowest mean score rating and the highest standard deviation.

Figure 10 illustrates the mean score responses of the data managers to the survey instrument items broken down by variable categories of School Board Support, Microcomputer Expertise, Administrative Applications of the Microcomputer, and Cost-Benefit. The graph appears to indicate a relative trend toward agreement among the data managers' opinions in all four variable categories.

Table 11 shows the cumulated differences of the scores between the responses of the superintendents (group 1) and the data managers (group 2) in the variable category of School Board Support. A negative (-) difference between the scores in Table 11 indicates that

TABLE 10

Summary of Responses of Data Managers in the Variable Categories Relative to the Implementation of Microcomputer-Based Administration, 1983

Survey Instrument Items and Variable Categories	Median*	Mode*	Mean*	Standard Deviation
1-12 School Board Support	3.653	3.667	3.675	.330
13-24 Microcomputer Expertise	3.986	4.000	3.933	.474
25-61 Administrative Applications	3.446	1.000	3.519	1.029
62-72 Cost-Benefit	3.909	4.000	3.745	.406

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Survey Instrument Items and Variable Categories	Scale Value*
1-12 School Board Support	5 . . . 4 . . . 3 . . . 2 . . . 1
13-24 Microcomputer Expertise	5 . . . 4 . . . 3 . . . 2 . . . 1
25-61 Administrative Applications	5 . . . 4 . . . 3 . . . 2 . . . 1
62-72 Cost-Benefit	5 . . . 4 . . . 3 . . . 2 . . . 1

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 10. A Graphic Illustration of the Mean Scores from Table 10 Related to Data Managers' Responses to Each of the Items in the Variable Categories Regarding the Implementation of Microcomputer-Based Administration, 1983.

TABLE 11

A Comparison of Responses of Superintendents and Data Managers to the Items in the Variable Category of School Board Support for Microcomputer-Based Administration (Human and Financial Characteristics)

Questionnaire Item	Group**	Number	Mean Score*	Difference
1. a computer could probably add to the quality of administration in this school district.	1 2	201 10	3.9602 4.2000	-0.2398
2. computers should be used by school administrators more than they are now.	1 2	201 10	4.0299 4.0000	0.0299
3. the purchase of a microcomputer for administrative use should receive low budget priority.	1 2	201 10	2.4776 2.1000	0.3776
4. a microcomputer would be an unnecessary luxury for our school administration.	1 2	201 10	2.1692 1.9000	0.2692
5. school administrators should learn more about microcomputers and how to use them as problem-solving tools.	1 2	201 10	4.1194 4.3000	-0.1806
6. the purchase of at least one 48-K microcomputer for administrative use.	1 2	201 10	3.6617 3.8000	-0.1383
7. the purchase of a lineprinter to produce hardcopy reports.	1 2	201 10	3.6368 4.3000	-0.6632
8. the purchase of the management software programs which the superintendent feels would be most appropriate for administrative use in the school district.	1 2	201 10	3.7861 3.4000	0.3861

TABLE 11 (continued)

Questionnaire Item	Group**	Number	Mean Score*	Difference
9. the training needed to teach the superintendent how to operate a microcomputer for management purposes.	1 2	201 10	3.8159 3.9000	-0.0841
10. the annual costs for microcomputer maintenance and supplies.	1 2	201 10	3.8657 4.1000	-0.2343
11. the in-service costs to keep the superintendent informed about the availability of management software and advancements in microcomputer technology.	1 2	201 10	3.8259 4.1000	-0.2741
12. any miscellaneous costs related to the administrative use of a microcomputer which may occur throughout the year.	1 2	201 10	3.8259 4.0000	-0.1741

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

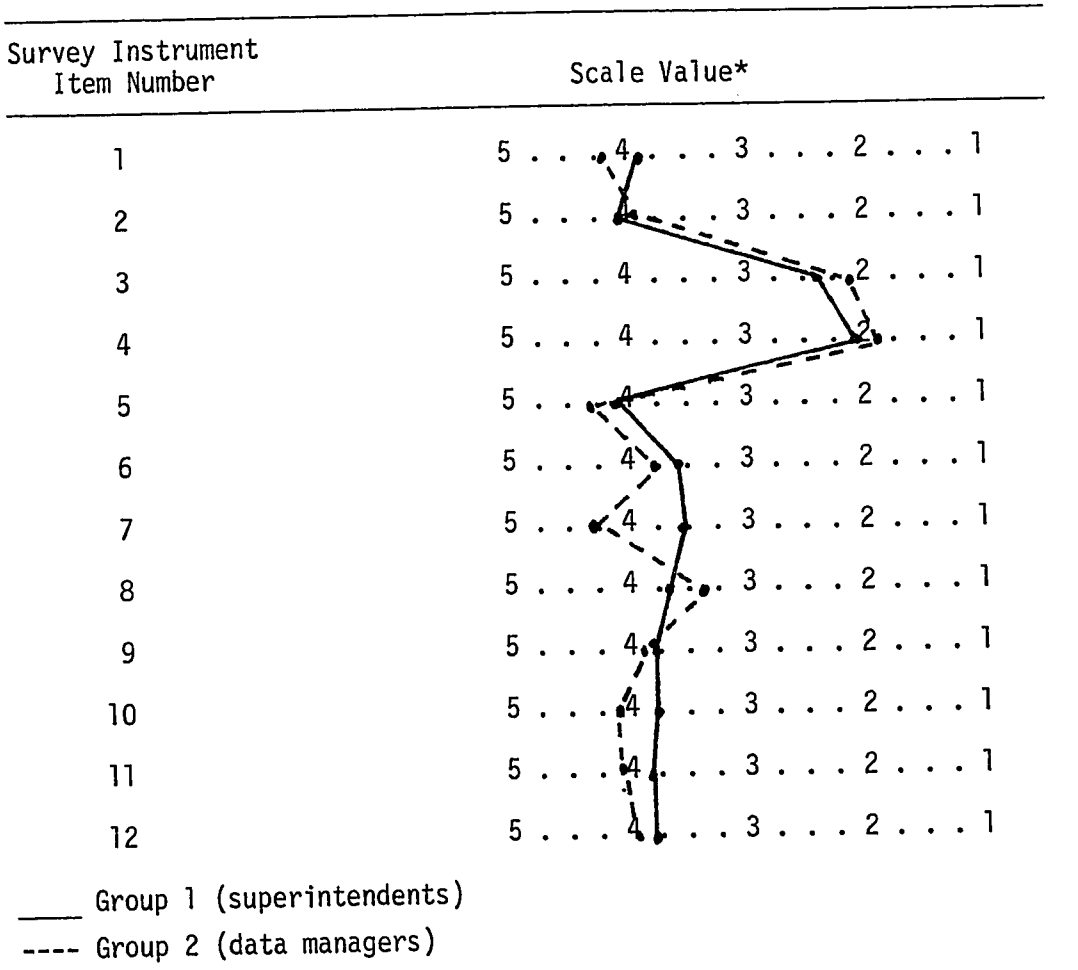
**Group 1 represents superintendents; group 2 represents data managers

the data managers had a higher mean score rating than the superintendents. A positive difference between the mean scores in Table 11 indicates that the superinendents had a higher mean score rating than did the data managers.

The greatest difference appears to be in item 7 which related to the purchase of a line-printer to produce hardcopy reports which shows a difference of -0.6632. This difference indicates that the data managers rated the purchase of a line-printer higher than did the superintendents. The two groups showed the least amount of difference on item 2 which related to the feeling that computers should be used by school administors more than they are now. On item 2, the two groups showed a difference of 0.0299 which means that the superintendents' mean score rating on this item was slightly higher than that of the data managers.

Figure 11 makes use of a graph which specifically illustrates the differences between the mean scores of the superintendents and data managers on items 1 through 12 in the variable category of School Board Support.

Table 12 shows the cumulated differences of scores between the responses of the superintendents and data managers on each of the survey instrument items 13 through 24 in the variable category of Microcomputer Expertise. The greatest differences appear in items 17, 21, and 22 which show differences of -1.2244, -1.2075, and 1.4333 respectively. Item 17 related to the superintendent understanding enough about microcomputer error messages to know what course of action



*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 11. A Graphic Illustration of the Mean Scores from Table 11 Comparing the Responses of Superintendents and Data Managers to the Items in the Variable Category of School Board Support, 1983.

TABLE 12

A Comparison of the Mean Score Responses of Superintendents and Data Managers to the Items in the Variable Category of Microcomputer Expertise, 1983

Questionnaire Item	Group**	Number	Mean Score*	Difference
13. understand enough about microcomputer hardware to turn the microcomputer on, insert a disk into the disk drive, and load a program into the computer.	1 2	201 10	3.8209 4.1000	-0.2791
14. understand enough about monitor commands to make the microcomputer hardware operational.	1 2	201 10	3.5473 4.1000	-0.5527
15. understand enough about BASIC systems commands to make use of almost any management software program.	1 2	201 10	3.1294 4.0000	-0.8706
16. have sufficient microcomputer skills to be able to "save" management programs or data on a disk for future use.	1 2	201 10	3.1891 4.1000	-0.8109
17. understand enough about microcomputer error messages to know what course of action to take to correct most situations.	1 2	201 10	2.8756 4.1000	-1.2244
18. understand enough about memory density to know when and how to use a data base concept or a data file concept.	1 2	201 10	2.6070 3.4000	-0.7930
19. to be able to select the general purpose software which could best be used to meet the management needs of the school district.	1 2	201 10	3.5473 4.1000	-0.5527

TABLE 12 (continued)

Questionnaire Item	Group**	Number	Mean Score*	Difference
20. to be able to select the specific application programs (i.e., payroll, financial accounting, etc.) which could best be used to meet the management needs of the school district.	1 2	201 10	3.5323 3.8000	-0.2677
21. understanding enough about BASIC programming language to write some simple microcomputer programs for school district administration.	1 2	201 10	2.4925 3.7000	-1.2075
22. be well informed about the availability of software programs that would be used to help better manage school district affairs.	1 2	201 10	2.6667 4.1000	-1.4333
23. be familiar with the role which a microcomputer plays in supporting management decisions in a school district.	1 2	201 10	3.1592 4.0000	-0.8408
24. be aware of the advancements being made in computer technology and the potential impact of the microcomputer on educational administration.	1 2	201 10	3.4677 3.8000	-0.3323

*Scale Value: 5 = Strongly agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

**Group 1 represents superintendents; group 2 represents data managers

to take to correct most situations. The difference of -1.2244 indicates that data managers rated this skill significant for microcomputer users while superintendents rated their skill in understanding computer error messages as being relatively low.

Item 21 related to the superintendent understanding enough about BASIC programming language to write some simple microcomputer programs for administrative use. The -1.2075 difference between the mean scores of the superintendents and data managers on this item indicates that the data managers placed a relatively high degree of importance on this user skill in comparison to how superintendents perceived their level of expertise in this skill.

Item 22 related to the superintendent being well informed about the availability of software programs that could be used to help manage school district affairs better. The difference between the mean scores of the two groups on this item was -1.433 and indicates that superintendents were not as well informed about the availability of management software programs as data managers felt they should be.

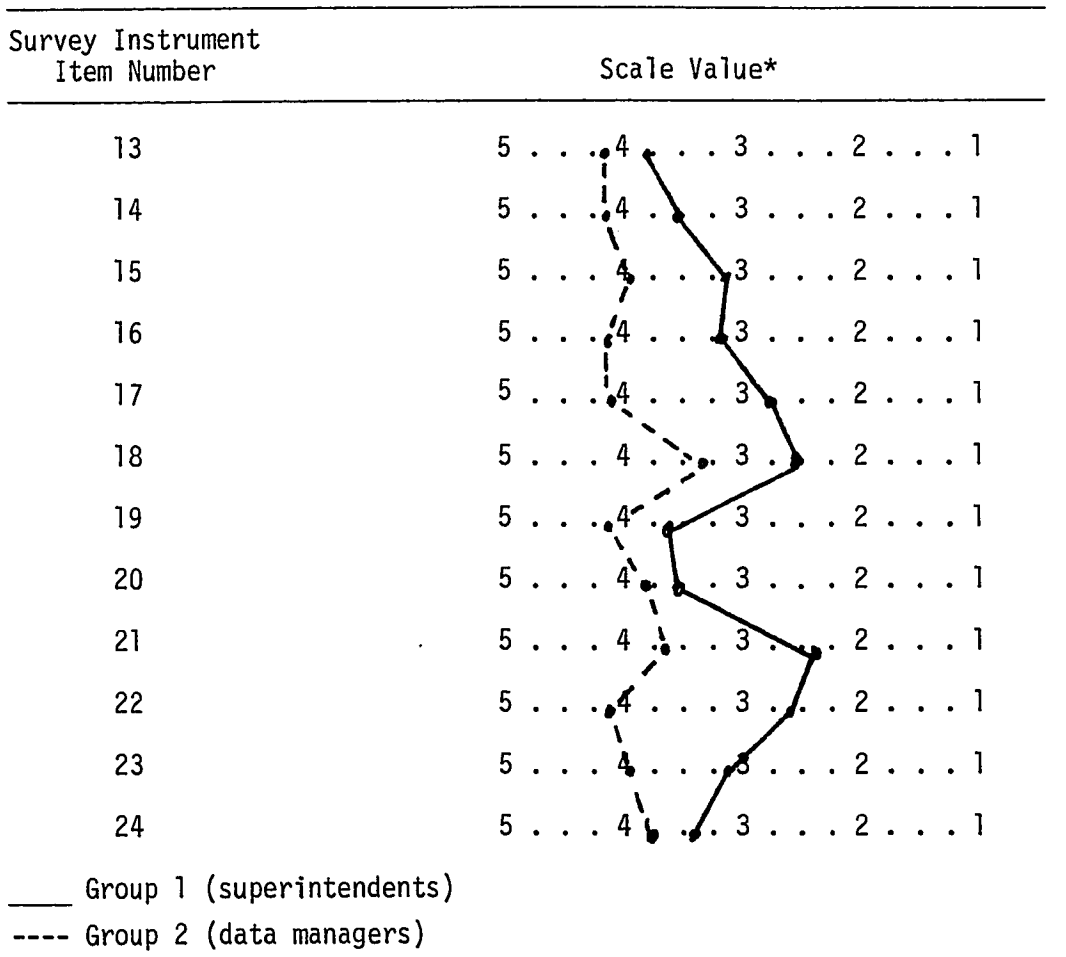
The two groups showed the least amount of differences on items 13 and 20 which showed differences of -0.2791 and -0.2677 respectively. Item 13 related to the superintendent understanding enough about microcomputer hardware to turn the microcomputer on, insert a disk into the disk drive, and load a program into the computer. The mean score of the superintendents was just slightly less than that of the data managers.

Item 20 related to the superintendent being able to select the specific application programs which could best be used to meet the management needs of the school district. The difference (-0.2677) indicates that there was very little discrepancy between the mean score of the superintendents' perceptions of their level of expertise on this item and the mean score of the data managers' opinions of the level of expertise needed by superintendents on this item.

Figure 12 illustrates a graphic comparison of the mean score responses from Table 12 of the superintendents and data managers on survey instrument items 13 through 24 in the variable category of Microcomputer Expertise. The graph appears to show a considerable difference between the superintendents' perceptions of their level of microcomputer expertise and the data managers' opinions of a user's required level of microcomputer expertise on many of the items in this variable category.

A comparison between the mean score responses of the superintendents and data managers on items 25 through 61 which were contained in the variable category of Administrative Applications of the Microcomputer is presented in Table 13. The greatest difference between the two groups appears to be on item 35 which shows a difference of of 1.8816. Item 35 related to the use of a microcomputer to score and analyze tests and receieved a higher mean score rating from superintendents than from data managers.

The two groups showed the least amount of differences on items 29, 36, 52, and 53 which showed differences of -0.0881, 0.0756,



*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 12. A Graphic Illustration of the Mean Scores from Table 12 Comparing the Responses of Superintendents and Data Managers to the Items in the Variable Category of Microcomputer Expertise, 1983.

TABLE 13

A Comparison of the Mean Score Responses of Superintendents and Data Managers to the Items in the Variable Category of Administration Applications of the Microcomputer, 1983

Questionnaire Item	Group**	Number	Mean Score*	Difference
25. maintain student records.	1	201	4.1393	0.4393
	2	10	3.7000	
26. process family census.	1	201	4.0796	0.4796
	2	10	3.6000	
27. calculate enrollment projections.	1	201	3.6816	0.2816
	2	10	3.4000	
28. keep student attendance records.	1	201	4.0647	0.2647
	2	10	3.8000	
29. maintain athletic eligibility lists.	1	201	3.6119	-0.0881
	2	10	3.7000	
30. maintain student health records.	1	201	3.9055	0.5055
	2	10	3.4000	
31. compute and report student grades.	1	201	4.0149	0.2149
	2	10	3.8000	
32. schedule students into classes.	1	201	3.8856	0.4856
	2	10	3.4000	
33. compute transportation costs (route/activity bus)	1	201	3.8905	0.4905
	2	10	3.4000	
34. store guidance records.	1	201	3.7811	0.6811
	2	10	3.1000	
35. score and analyze tests.	1	201	3.6816	1.8816
	2	10	2.8000	
36. maintain staff personnel records (certification, seniority, etc.)	1	201	3.8756	0.0756
	2	10	3.8000	

TABLE 13 (continued)

Questionnaire Item	Group**	Number	Mean Score*	Difference
37. project negotiations costs (salary simulation, etc.).	1 2	201 10	4.3483 3.6000	0.7483
38. process payroll related reports (sick leave, retirement, etc.).	1 2	201 10	4.1393 3.8000	0.3393
39. calculate payroll checks and process payroll register.	1 2	201 10	4.0746 3.8000	0.2746
40. maintain facilities and equipment inventories.	1 2	201 10	4.2388 3.8000	0.4388
41. account for energy use.	1 2	201 10	3.8507 3.4000	0.4507
42. calculate percent of building utilization.	1 2	201 10	3.5274 3.3000	0.2274
43. process general accounting tasks (budgeting, receipts, expenditures).	1 2	201 10	4.1791 3.4000	0.07791
44. process accounts receivable/payble.	1 2	201 10	4.0697 3.6000	0.4697
45. forecast financial information.	1 2	201 10	4.0100 3.1000	0.9100
46. process lunch program information (lunch counts, inventory, reports).	1 2	201 10	4.0697 3.7000	0.3697
47. process activity fund accounts.	1 2	201 10	4.0647 3.6000	0.4647
48. process certificates of deposit and investment information.	1 2	201 10	3.7662 3.5000	0.2662

TABLE 13 (continued)

Questionnaire Item	Group**	Number	Mean Score*	Difference
49. process general ledger information.	1 2	201 10	3.9751 3.6000	0.3751
50. handle special education plans and budget accounting.	1 2	201 10	3.8458 3.2000	0.6458
51. perform statistical analysis (research activities).	1 2	201 10	3.6816 3.2000	0.4816
52. process library circulation tasks.	1 2	201 10	3.5572 3.5000	0.0572
53. reserve media (equipment, scheduling, inventory).	1 2	201 10	3.5423 3.6000	-0.0577
54. plan projects and budgets (budget forecasting, etc.)	1 2	201 10	4.0746 3.5000	0.5746
55. process newsletters and other written correspondence (Word Processing).	1 2	201 10	3.8856 3.7000	0.1856
56. schedule activities (extra-curricular).	1 2	201 10	3.5790 3.4000	0.1970
57. process mailing lists/ labels (students, staff, parents, etc.).	1 2	201 10	4.1194 3.9000	0.2194
58. store and retrieve information.	1 2	201 10	4.2239 3.9000	0.3239
59. gather data from larger data files (a mainframe computer).	1 2	201 10	3.5171 3.4000	0.1171

TABLE 13 (continued)

Questionnaire Item	Group**	Number	Mean Score*	Difference
60. process data for the various financial reports required by the Nebraska Department of Education.	1	201	4.1692	0.7692
	2	10	3.4000	
61. process special education information such as test scores, IEP's, etc.	1	201	3.8048	0.4408
	2	10	3.4000	

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

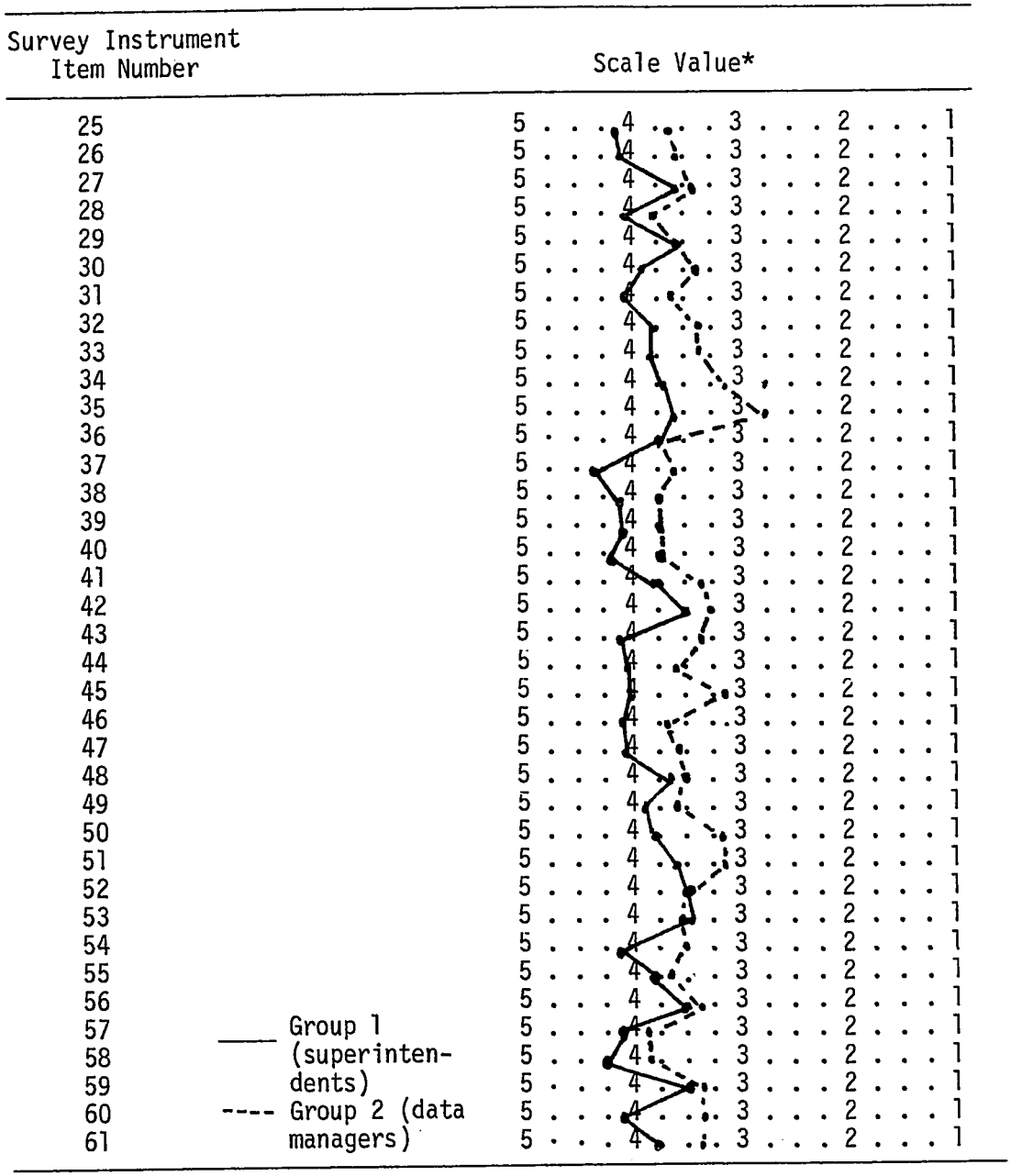
**Group 1 represents superintendents; group 2 represents data managers

-0.0572, and -0.0557 respectively. Item 29 related to the use of a microcomputer to maintain athletic eligibility lists. The mean score rating of the superintendents was slightly higher than the mean score rating of the data managers on this item.

Item 36 related to the use of a microcomputer to maintain staff personnel records. The superintendents' mean score rating about the need to computerize personnel records was slightly higher than the mean score rating of the data managers about the capabilities of the microcomputer to process personnel records.

Item 53 related to the use of a microcomputer to reserve media. The superintendents' mean score rating about the need to computerize media reservations was slightly higher than the mean score rating of the data managers about the capabilities of the microcomputer to process media reservation information.

Figure 13 illustrates a graphic comparison of the mean score responses of the superintendents and data managers on survey instrument items 25 through 61 in the variable category of Administrative Applications of the Microcomputer. The graph appears to indicate that the superintendents desired a microcomputer to perform all of the administrative tasks in items 25 through 61 to some degree. The graph also indicates that the data managers had a tendency to agree that the microcomputer is capable of performing the administrative tasks enumerated in the variable category of Administrative Applications of the Microcomputer. The graph shows the strongest difference between the two groups on item 25 which relates to the scoring and analyzing



*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 13. A Graphic Illustration of the Mean Scores from Table 13 Comparing the Responses of Superintendents and Data Managers to the Items in the Variable Category of Administrative Applications of the Microcomputer, 1983.

of tests.

Table 14-A shows the cumulated differences of scores between the responses of the superintendents and data managers on items 62 through 72 in the variable category of Cost-Benefit. The greatest difference appears in item 69 which shows a difference of 0.7239. Item 69 related to whether the use of a microcomputer as a management tool would significantly diminish the time which a superintendent spends doing clerical tasks so that he may spend time on more productive tasks. The superintendents' mean score rating about the need for a microcomputer to diminish the time which superintendents spend on clerical tasks was slightly higher than the mean score ratings of the data managers about whether the use of a microcomputer would significantly diminish the time which superintendents spend on clerical tasks.

The two groups showed the least amount of differences on items 64 and 66 which showed differences of 0.0602 and 0.0846 respectively. Item 64 related to the use of a microcomputer to help school superintendents better meet deadlines. The difference of 0.0602 in the mean score responses between the superintendents and data managers indicates that the superintendents' expectations of the microcomputer being able to help them better meet deadlines was only slightly higher than the opinions of the data managers about microcomputer usage being able to help superintendents better meet deadlines.

Item 66 related to the use of a microcomputer to improve accuracy in word processing and computational problems. The mean score rating

TABLE 14-A

A Comparison of the Mean Score Responses of Superintendents and Data Managers to the Items in the Variable Category of Cost-Benefit of Microcomputer-Based Administration, 1983

Questionnaire Item	Group**	Number	Mean Score*	Difference
62. diminish certain personnel costs significantly.	1 2	201 10	3.8507 3.2000	0.6507
63. optimize inventory levels and control.	1 2	201 10	4.1045 3.8000	0.3045
64. help school superintendents to better meet deadlines.	1 2	201 10	3.9602 3.9000	0.0602
65. provide superintendents with more and better information for decision making and planning.	1 2	201 10	4.2388 4.1000	0.1388
66. improve accuracy in word processing and computational problems.	1 2	201 10	4.0846 4.0000	0.0846
67. save filing space.	1 2	201 10	4.1244 3.9000	0.2244
68. improve data communications.	1 2	201 10	4.0896 3.5000	0.5896
69. significantly diminish the time which a superintendent spends doing clerical tasks so that he may spend time on more productive tasks.	1 2	201 10	4.2239 3.5000	0.7239
70. improve the utilization of school district resources.	1 2	210 10	4.2289 3.6000	0.6289

TABLE 14-A (continued)

Questionnaire Item	Group**	Number	Mean Score*	Difference
71. provide school superintendents with more managerial control of the school district.	1	201	4.1741	0.3741
	2	10	3.8000	
72. centralize the organization of data in a school district.	1	201	4.1050	0.2050
	2	10	3.9000	

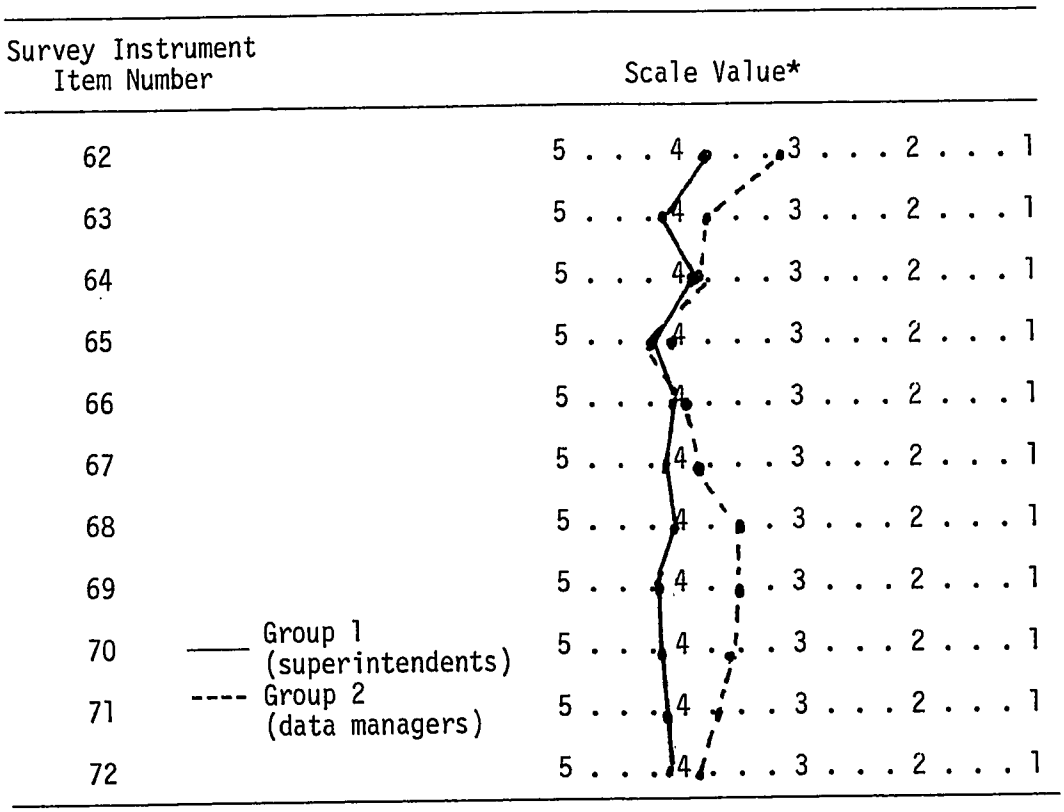
*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

**Group 1 represents superintendents; group 2 represents data managers

of the superintendents was slightly higher than that of the data managers which indicates that data managers did not think the use of a microcomputer would improve accuracy in word processing and computational problems to the extent that superintendents expected it would.

Figure 14 presents a graphic illustration of the comparison of mean score responses of the superintendents and data managers on items 62 through 73 in the variable category of Cost-Benefit. It clearly shows the strongest support of superintendents for the survey instrument statements in this category.

Table 14-B shows the cumulated differences of scores between the superintendents' responses and the data managers' responses on items 73 through 76 in the variable category of Cost-Benefit. The greatest difference appears to be on item 75 which shows a difference of -$2,763. Item 75 related to the amount of money to be budgeted to pay for a consultant to come into the district to help the superintendent set up a microcomputer-based administration. The two groups showed the least amount of difference on item 73 which shows a difference of -$1,087. Item 73 related to the amount of money to be budgeted for the initial purchase of a 48-K microcomputer hardware system.



*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

Figure 14. A Graphic Illustration of the Mean Scores from Table 14-A Comparing the Responses of Superintendents and Data Managers to the Items in the Variable Category of Cost-Benefit Regarding Expected Results of Implementing Microcomputer-Based Administration, 1983

TABLE 14-B

A Comparison of the Mean Dollar Amount Estimates of Superintendents and Data Managers About the Cost-Benefit of Implementing Microcomputer-Based Administration, 1983

Questionnaire Item	Group**	Number	Mean Score*	Difference
The amount of money needed to:				
73. purchase a microcomputer hardware system (microcomputer with 48-K memory, two disk drives, monitor, and line-printer) which would satisfactorily process most administrative tasks.	1 2	176 9	$5466 $6553	-$1807
74. purchase the management software programs which a superintendent will need to meet the four or five most important administrative needs of the school district.	1 2	159 9	$1025 $2728	-$1703
75. pay for a consultant to come into the district to help a superintendent set up a microcomputer-based administration.	1 2	107 9	$ 414 $3177	-$2763
76. cover annual recurring costs such as supplies, depreciation, in-service training, telephone line service, etc.	1 2	147 9	$ 849 $2400	-$1551

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

**Group 1 represents superintendents; group 2 represents data managers

Hypotheses

All of the research questions were rephrased into a series of null hypotheses. The hypotheses deal with the prediction that the sample group of superintendents from K-12 school districts in Nebraska with student enrollments of 1000 or less will perceive selected issues related to the implementation of a microcomputer-based administration differently than a panel of data management experts. If perceptions exist that reflect significant differences between the two groups in the variable categories of School Board Support, Microcomputer Expertise, Administrative Applications of the Microcomputer, and Cost-Benefit, there is evidence to reject the null hypotheses as rephrased.

In order to develop conclusions regarding the implementation of a microcomputer-based administration, a series of items was considered within each of the variable categories of School Board Support, Microcomputer Expertise, Administrative Applications of the Microcomputer, and Cost-Benefit. Deviations or differences evidenced by the data were tested for significance at both the .05 and .01 levels.

Hypothesis 1

Research question one sought to determine what differences, if any, exist between the perceptions of superintendents about the extent to which their school boards would support a microcomputer-based administration and the extent to which the panel of data management experts agreed or disagreed about the extent to which a school board would support the implementation of a microcomputer-based administration

and is presented in Hypothesis 1:

> There will be no significant difference between the superintendents' perceptions about the extent to which school boards would support microcomputer-based administration and the extent to which the panel of data management experts agrees or disagrees sbout the extent to which a school board should support microcomputer-based administration.

Table 15 presents the mean scores of the superintendents (group 1) and the data managers (group 2). The t-test was applied to determine the significance of difference levels. A t-ratio was computed for the mean scores of each item on the survey instrument. If the value of the computed t-ratio was less than the value required to reject the null hypothesis at the .05 level of significance, the value was classified as being "not significant" (NS) and the value recorded in the "NS" column of Table 15 under the heading of Significance Level. If the value of the t-ratio was less than the value required to reject the null hypothesis at the .01 level of significance but was equal to or greater than the value required to reject the null hypothesis at the .05 level of significance, the value was classified as being "Significant" (S) at the .05 level and the value recorded in the ".05" column under the heading of Significance Level in Table 15. If the value of the computed t-ratio was equal to or greater than the value required to reject the null hypothesis at the .01 level of significance, the value was classified as "highly significant" and the value recorded in both the ".05" and the ".01" columns under the heading of Significance Level in Table 15.

TABLE 15

A Statistical Comparison of Superintendents' Perceptions and Data Managers' Opinions in the Variable Category of School Board Support, 1983

Questionnaire Item	Group**	Number	Mean Score*	Standard Deviation	Significance Levels NS	S .05	S .01
1. a computer could probably add to the quality of administration in the school district.	1	201	3.9602	0.882	-0.85		
	2	10	4.2000	0.632			
2. computers should be used by school administrators more than they are now.	1	201	4.0299	0.894	0.10		
	2	10	4.0000	0.667			
3. the purchase of a microcomputer for administrative use should receive low budget priority.	1	201	2.4776	1.091	1.09		
	2	10	2.1000	0.568			
4. a microcomputer would be an unnecessary luxury for our school administration.	1	201	2.1692	1.011	0.83		
	2	10	1.9000	0.568			
5. school administrators should learn more about microcomputers and how to use them as problem-solving tools.	1	201	4.1194	0.752	-0.74		
	2	10	4.3000	0.675			
6. the purchase of at least one 48-K microcomputer for administrative use.	1	201	3.6617	1.151	-0.37		
	2	10	3.8000	1.135			

TABLE 15 (continued)

Questionnaire Item	Group**	Number	Mean Score*	Standard Deviation	Significance Levels NS	S .05	S .01
7. the purchase of a line-printer to produce hardcopy reports.	1 2	201 10	3.6368 4.3000	1.124 0.675	-1.85		
8. the purchase of the management software programs which the superintendent feels would be most appropriate for administrative use in the school district.	1 2	201 10	3.7861 3.4000	1.014 1.174	1.17		
9. the training needed to teach the superintendent how to operate a microcomputer for management purposes.	1 2	201 10	3.8159 3.9000	0.980 0.994	-0.26		
10. the annual costs for microcomputer maintenance and supplies.	1 2	201 10	3.8657 4.1000	0.952 0.568	-0.77		
11. the in-service costs to keep the superintendent informed about the availability of management software and advancements in microcomputer technology.	1 2	201 10	3.8259 4.1000	0.930 0.568	-0.92		

TABLE 15 (continued)

Questionnaire Item	Group**	Number	Mean Score*	Standard Deviation	Significance Levels NS	S .05	S .01
12. any miscellaneous costs related to the administrative use of a microcomputer which may occur throughout the year.	1 2	201 10	3.8259 4.0000	0.935 0.471	-0.58		
Summary for the variable category of School Board Support	1 2	201 10	3.5978 3.6750	0.570 0.330	-0.42		

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 4 = Disagree; 5 = Strongly Disagree

**Group 1 = superintendents; group 2 = data managers

Note: The value, NS, reveals a non-significance of difference between group responses. The value, S, reveals a significant difference at the .05 level or a higher degree of significance at the .01 level between group responses.

The t-ratios of items 1 through 12 on the survey instrument were computed with 209 degrees of freedom. There were no t-ratios computed for any of the items in the variable category of School Board Support which could be classified as significant at either the .05 or .01 levels of significance. The computed t-ratio (-0.42) for the variable category of School Board Support as a whole was not significant at either the .05 or .01 levels of significance and, thus, supports Hypothesis 1.

Hypothesis 2

Research question two asked what differences, if any, exist between the perceptions of superintendents about the level of microcomputer expertise which they possessed and the extent to which the panel of data management experts agreed or disagreed about the level of microcomputer expertise which superintendents needed in order to utilize the microcomputer as a management tool in school administration and is presented in Hypothesis 2:

> There will be no significant difference between the perceptions of superintendents about their level of microcomputer expertise which they possess and the extent to which the panel of data management experts agrees or disagrees about the level of microcomputer expertise which superintendents need in order to utilize the microcomputer as a management tool in school administration.

Table 16 presents the mean scores of the superintendents (group 1) and the data managers (group 2). The t-test was applied to determine the significance of difference levels. A t-ratio was computed for the mean scores of each item on the survey instrument. If the value

TABLE 16

A Statistical Comparison of Superintendents' Perceptions and Data Managers' Opinions in the Variable Category of Microcomputer Expertise, 1983

Questionnaire Item	Group**	Number	Mean Score*	Standard Deviation	Significance Level NS	Significance Level S .05	Significance Level S .01
13. understand enough about microcomputer hardware to turn the microcomputer on, insert a disk into the disk drive, and load a program into the computer.	1	201	3.8209	1.182			
	2	10	4.1000	0.876	-0.74		
14. understand enough about monitor commands to make the microcomputer hardware operational.	1	201	3.5473	1.292			
	2	10	4.1000	0.876	-1.34		
15. understand enough about BASIC systems commands to allow him or her to make use of almost any management software program.	1	201	3.1294	1.320			
	2	10	4.0000	1.155		-2.05	
16. have sufficient computer skills to be able to "save" management programs or data on a disk for future use.	1	201	3.1891	1.336			
	2	10	4.0000	0.816	-1.90		

TABLE 16 (continued)

Questionnaire Item	Group**	Number	Mean Score*	Standard Deviation	Significance Level NS	S .05	S .01
17. understand enough about micro-computer error messages to know what course of action to take to correct most situa-tions.	1	201	2.8756	1.323		-2.91	-2.91
	2	10	4.1000	0.568			
18. understand enough about memory density to know when and how to use a data base concept or a data file concept.	1	201	2.6070	1.245		-1.97	
	2	10	3.4000	1.174			
19. be able to select the general purpose software which could best be used to meet the management needs of the school district.	1	201	3.5473	1.100	-1.58		
	2	10	4.1000	0.316			
20. be able to select the specific application programs (i.e., payroll, financial accounting, etc.) which could best be used to meet the management needs of the school district.	1	201	3.5323	1.096	-0.76		
	2	10	3.8000	0.789			

TABLE 16 (continued)

Questionnaire Item	Group**	Number	Mean Score*	Standard Deviation	Significance Level NS	S .05	S .01
21. understand enough about BASIC programming language to write some simple microcomputer programs for school district administrative use.	1	201	2.4925	1.229		-3.05	-3.05
	2	10	3.7000	1.059			
22. be well informed about the availability of software programs that could be used to help better manage school district affairs.	1	201	2.6667	1.150		-3.91	-3.91
	2	10	4.1000	0.568			
23. be familiar with the role which a microcomputer plays in supporting management decisions in a school district.	1	201	3.1592	1.151		-2.30	
	2	10	4.0000	0.471			
24. be aware of the advancements being made in computer technology and the potential impact of the microcomputer on educational administration.	1	201	3.4677	1.114	-0.94		
	2	10	3.8000	0.422			
Summary for the variable category of Microcomputer Expertise	1	201	3.1696	0.927		-2.58	-2.58
	2	10	3.9333	0.474			

*Scale Value: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 4 = Disagree; 5 = Strongly Disagree

**Group 1 = superintendents; group 2 = data managers

of the computed t-ratio was less than the value required to reject the null hypothesis at the .05 level of significance, the value was classified as being "not significant" (NS) and the value recorded in the "NS" column of Table 16 under the heading of Significance Level. If the value of the t-ratio was less than the value required to reject the null hypothesis at the .01 level of significance but was equal to or greater than the value required to reject the null hypothesis at the .05 level of significance, the value was classified as being "Significant" (S) at the .05 level and the value recorded in the ".05" column under the heading of Significance Level in Table 16. If the value of the computed t-ratio was equal to or greater than the value required to reject the null hypothesis at the .01 level of significance, the value was classified as "highly significant" and the value recorded in both the ".05" and the ".01" columns under the heading of Significance Level in Table 16.

The t-ratios of items 13 through 24 on the survey instrument were computed with 209 degrees of freedom. The data revealed in Table 16 indicate that items 15, 17, 18, 21, 22, and 23 within the variable category of Microcomputer Expertise contained a significant difference between the mean scores of the two groups to warrant rejection of the null hypothesis at the .05 level of significance. Items 17, 21, and 22 contained a significant difference between the mean scores of the two groups that led to a rejection of the null hypothesis at both the .05 and .01 levels of significance.

Item 15 related to a superintendent understanding enough about BASIC systems commands to allow him to make use of almost any management software program. The mean score rating of the superintendents about their understanding of BASIC systems commands was 3.1294. The mean score rating of the data managers about the necessity of a superintendent understanding BASIC systems commands was 4.0000. The t-ratio was computed to be -2.05 which indicates that the difference between the mean scores of the superintendents and data managers was significant at the .05 level of significance and, thus, the null hypothesis is rejected.

The sample group of superintendents was not provided with a definition of terms used on the survey instrument. Therefore, a lack of understanding of the terminology used in the survey instrument should be given consideration as one factor that may have contributed significantly to the low mean score of the superintendents.

Item 17 related to the superintendent understanding enough about microcomputer error messages to know what course of action to take to correct a situation. The mean score rating by the superintendents of their understanding of microcomputer error messages was 2.8756. The mean score rating of the data managers about the necessity of a superintendent understanding enough about microcomputer error messages to know what course of action to take to correct the situation was 4.1000. The t-ratio was computed to be -2.91 which indicates that the difference between the mean score of the superintendents and the data managers was significant at both the .05 and the .01 levels of

significance and, thus, would cause the null hypothesis to be rejected on the basis of item 17.

The issue of terminology must be considered in analyzing the mean scores of the superintendents on item 17. Some microcomputer error messages are relatively simple while others are somewhat complex. The survey instrument did not specify any particular types of error messages.

Item 18 related to a superintendent understanding enough about memory density to know when and how to use a data base concept or data file concept. The mean score rating by the superintendents of their understanding about memory density so as to know when and how to use a data base concept or a data file concept was 2.6070. The mean score rating by the data managers of the necessity of a superintendent understanding enough about memory density to know when and how to use a data base concept or a data file concept was 3.4000. The t-ratio was computed to be -1.97 which indicates that the difference between the mean scores of the superintendents and the data managers was significant at the .05 level of significance and would cause the null hypothesis to be rejected. Once again, the issue of terminology must be considered as a possible variable affecting the low mean score rating of the superintendents.

Item 21 related to the superintendent understanding enough about BASIC programming language to write some simple microcomputer programs for school district administrative use. The mean score rating by the superintendents of their understanding enough about BASIC

programming language to write some simple microcomputer programs for administrative use in their school district was 2.4925. The mean score rating by the data managers about the necessity of a superintendent understanding enough about BASIC programming language to write some simple microcomputer programs for school district administrative use was 3.7000. The computed t-ratio for item 21 was -3.05 which indicates that the difference between the mean score rating of the superintendents and the data managers was significant at both the .05 and the .01 levels of significance and would cause the null hypothesis to be rejected.

Consideration must be given to the role which a superintendent is expected to play as the educational leader of the school district when analyzing the low mean score rating given to item 21 by the superintendents. The high mean score rating given to item 21 by the data managers raises the question of whether data managers are thoroughly familiar with the role and function of the superintendency.

Item 22 related to the superintendent being well informed about the availability of software programs that could help superintendents to better manage school district affairs. The mean score rating by the superintendents about being well informed about the availability of software programs that could help them to better manage school district affairs was 2.6667. The mean score rating by the data managers about the necessity of a superintendent being well informed about the availability of software programs that could help them to better manage school district affairs was 4.1000. The computed

t-ratio was -3.91 which indicated that the difference between the mean scores of the superintendents and the data managers was significant at both the .05 and the .01 levels of significance and would cause the null hypothesis to be rejected.

The literature is not replete with success stories about the administrative use of microcomputers in educational administration. In analyzing the low mean score rating given to item 22 by the superintendents, consideration must be given to the fact that microcomputer software packages designed specifically for use in educational administration are not readily available and many of the business models are not suitable for use in school administration.

Item 23 related to the superintendent being familiar with the role which a microcomputer plays in supporting management decisions in a school district. The mean score rating by the superintendents about their familiarity with the role which a microcomputer plays in supporting management decisions in a school district was 3.1592. The mean score rating by the data managers about the necessity of a superintendent being familiar with the role which a microcomputer plays in supporting management decisions in a school district was 4.0000. The computed t-ratio was -2.30 which indicates that the difference between the mean score of the superintendents and the data managers was significant at the .05 level of confidence and would cause the null hypothesis to be rejected at this level.

The low mean score rating by the superintendents of item 23 may be partially attributed to the fact the school superintendents are

the chief executive officers of boards of education and not computer specialists. Their graduate training usually focuses on the development of leadership and management skills and gives little consideration to the use of microcomputers as management tools in educational administration.

The t-ratio was computed for the variable category of Microcomputer Expertise as a whole. The computed t-ratio for this variable category was -2.58 which indicates that the difference between the mean score of the superintendents and the data managers on the items in the variable category of Microcomputer Expertise as a whole was significant at both the .05 and the .01 levels of significance and would cause the null hypothesis to be rejected at those levels.

Hypothesis 3

Research question three asked what differences, if any, exist between the perceptions of superintendents about the importance of using a microcomputer to process selected administrative tasks in school administration and the extent to which the panel of data management experts agreed or disagreed that a 48-K microcomputer system is capable of processing selected administrative tasks in school administration and is presented in Hypothesis 3:

> There will be no significant difference between the superintendents' perceptions about the importance of using a computer to process selected administrative tasks in school administration and the extent to which the panel of data management experts agrees or disagrees that a 48-K microcomputer system is capable of processing selected administrative tasks in school administration.

Table 17 presents the mean scores of the superintendents (group 1) and the data managers (group 2). The t-test was applied to determine the significance of difference levels. A t-ratio was computed for the mean scores of each item on the survey instrument. If the value of the computed t-ratio was less than the value required to reject the null hypothesis at the .05 level of significance, the value was classified as being "not significant" (NS) and the value recorded in the "NS" column of Table 17 under the heading of Significance Level. If the value of the t-ratio was less than the value required to reject the null hypothesis at the .01 level of significance but was equal to or greater than the value required to reject the null hypothesis at the .05 level of significance, the value was classified as being "significant" (S) at the .05 level and the value recorded in the ".05" columun under the heading of Significance Level in Table 17. If the value of the computed t-ratio was equal to or greater than the value required to reject the null hypothesis at the .01 level of significance, the value was classified as "highly significant" and the value recorded in both the ".05" and the ".01" columns under the heading of Significance Level in Table 17.

There were thirty-six statements related to administrative tasks performed in a school district contained in the variable category of Administrative Applications of the Microcomputer. Superintendents were asked to respond to each statement by indicating the extent to which they agreed or disagreed about the importance of using a microcomputer to perform each task. Data managers were asked to

TABLE 17

A Statistical Comparison of Superintendents' Perceptions and Data Managers' Opinions in the Variable Category of the Administrative Applications of the Microcomputer, 1983

Questionnaire Item	Group**	Number	Mean Score*	Standard Deviation	Significance Levels NS	S .05	S .01
25. maintain student records.	1	201	4.1393	0.755	1.74		
	2	10	3.7000	1.160			
26. process family census	1	201	4.0796	0.724		1.99	
	2	10	3.6000	1.075			
27. calculate enrollment projections.	1	201	3.6816	0.974	0.88		
	2	10	3.4000	1.265			
28. keep student attendance records.	1	201	4.0647	0.819	0.98		
	2	10	3.8000	1.135			
29. maintain athletic eligibility lists.	1	201	3.6119	0.984	-0.27		
	2	10	3.7000	1.160			
30. maintain student health records.	1	201	3.9055	0.881	1.72		
	2	10	3.4000	1.350			
31. compute and report student grades.	1	201	4.0149	0.784	0.83		
	2	10	3.8000	1.135			
32. schedule students into classes.	1	201	3.8856	0.955	1.54		
	2	10	3.4000	1.265			
33. compute transportation costs (route/activity buses).	1	201	3.8905	0.888	1.66		
	2	10	3.4000	1.350			

TABLE 17 (continued)

Questionnaire Item	Group**	Number	Mean Score*	Standard Deviation	Significance Levels NS	S .05	S .01
34. store guidance records.	1	201	3.7811	0.934		2.22	
	2	10	3.1000	1.197			
35. score and analyze tests.	1	201	3.6816	0.921		2.94	2.94
	2	10	2.8000	1.033			
36. maintain staff personnel records (certification, seniority, etc.).	1	201	3.8756	0.932	0.25		
	2	10	3.8000	1.135			
37. project negotiations costs (salary simulation, etc.).	1	201	4.3483	0.684		3.24	3.24
	2	10	3.6000	1.174			
38. process payroll related reports (sick leave, retirement, etc.).	1	201	4.1393	0.843	1.22		
	2	10	3.8000	1.135			
39. calculate payroll checks and process a payroll register.	1	201	4.0746	0.943	0.89		
	2	10	3.8000	1.135			
40. maintain facilities and equipment inventories.	1	201	4.2388	0.715	1.83		
	2	10	3.8000	1.135			
41. account for energy use.	1	201	3.8507	0.904	1.53		
	2	10	3.4000	0.966			
42. calculate percent of building utilization.	1	201	3.5274	0.975	0.72		
	2	10	3.3000	0.949			
43. process general accounting tasks (budgeting, receipts, expenditures).	1	201	4.1791	0.786		2.98	2.98
	2	10	3.4000	1.174			

TABLE 17 (continued)

Questionnaire Item	Group**	Number	Mean Score*	Standard Deviation	Significance Levels NS	S .05	S .01
44. process accounts receivable/payable.	1	201	4.0697	0.875	1.62		
	2	10	3.6000	1.265			
45. forecast financial information.	1	201	4.0100	0.800		3.42	3.42
	2	10	3.1000	1.197			
46. process lunch program information (lunch counts, inventory, reports).	1	201	4.0697	0.758	1.46		
	2	10	3.7000	1.160			
47. process activity fund accounts.	1	201	4.0647	0.788	1.77		
	2	10	3.6000	1.174			
48. process certificates of deposit and investment information.	1	201	3.7662	0.975	0.83		
	2	10	3.5000	1.269			
49. process general ledger information.	1	201	3.9751	0.869	1.30		
	2	10	3.6000	1.265			
50. handle special education plans and budget accounting.	1	201	3.8458	0.889		2.22	
	2	10	3.2000	1.033			
51. perform statistical analysis (research activities).	1	201	3.6816	0.937	1.58		
	2	10	3.2000	1.033			
52. process library circulation tasks.	1	201	3.5572	0.942	0.19		
	2	10	3.5000	1.080			
53. reserve media (equipment, scheduling, inventory).	1	201	3.5423	0.927	-0.19		
	2	10	3.6000	1.174			

TABLE 17 (continued)

Questionnaire Item	Group**	Number	Mean Score*	Standard Deviation	Significance Levels NS	S .05	S .01
54. plan projects and budgets (budget forecasting, etc.).	1 2	201 10	4.0746 3.5000	0.741 1.179		2.32	
55. process newsletters and other written correspondence (Word Processing).	1 2	201 10	3.8856 3.7000	0.901 1.059	0.63		
56. schedule activities (extra-curricular).	1 2	201 10	3.5970 3.4000	0.981 1.265	0.61		
57. process mailing lists/labels (students, staff, parents, etc.).	1 2	201 10	4.1194 3.9000	0.759 1.101	0.87		
58. store and retrieve information.	1 2	201 10	4.2239 3.9000	0.667 1.101	1.45		
59. gather data from larger files (a mainframe computer).	1 2	201 10	3.5771 3.4000	0.993 0.966	0.55		
60. process data for the various financial reports required by the Nebraska Department of Education.	1 2	201 10	4.1692 3.4000	0.708 1.174		3.23	3.23
61. process special education information such as test scores, IEP's, etc.	1 2	201 10	3.8408 3.4000	0.891 1.075	1.51		

TABLE 17 (continued)

Questionnaire Item	Group**	Number	Mean Score*	Standard Deviation	Significance Levels NS	S .05	S .01
Summary for the variable category of Administrative Applications of the Microcomputer	1	201	3.9200	0.560		2.11	
	2	10	3.5189	1.029			

*Scale Values: 5 = Strongly Agree; 4 = Disagree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

**Group 1 = superintendents; group 2 = data managers

respond to each statement in the variable category of Administrative Applications of the Microcomputer by indicating the extent to which they agreed or disagreed about the capability of a 48-K microcomputer system to process each of the tasks.

The t-ratio of items 25 through 61 on the survey instrument was computed with 209 degrees of freedom. The data revealed in Table 17 indicate that items 26, 34, 35, 37, 43, 45, 50, 54, and 60 within the variable category of the Administrative Applications of the Microcomputer contained a significant difference between the two groups to warrant rejection of the null hypothesis at the .05 level of significance. Items 35, 37, 43, 45, and 60 contained a significant difference between the mean scores of the two groups to reject the null hypothesis at both the .05 and .01 levels of significance.

Item 26 related to the use of a microcomputer to process family census data. The mean score rating by the superintendents about the importance of using a microcomputer to process family census data was 4.0796. The mean score rating by the data managers about the capability of a 48-K microcomputer system to process family census data was 3.6000. The t-ratio was computed to be 1.99 which indicates that the difference between the mean scores of the superintendents and the data managers was significant at the .05 level of significance and the null hypothesis would be rejected.

There were no particulars given to the data managers on their survey instrument about the nature of the census data which school districts generally maintained. Therefore, an analysis of the data in

item 26 may raise the question of how the census data are to be processed.

Item 34 related to the use of the microcomputer to store guidance records. The mean score rating by the superintendents about the importance of using a microcomputer to store guidance records was 3.7811. The mean score rating by the data managers about the capability of a 48-K microcomputer system to store guidance records was 3.1000. The t-ratio was computed to be 2.22 which indicates that the difference between the mean scores of the two groups was significant enough to reject the null hypothesis at the .05 level of significance but not at the .01 level of significance.

The question could be raised about whether data managers were familiar enough with the content of guidance records to make a valid judgment about the capability of a 48-K microcomputer system to process those records. There were no particulars set forth in the survey instrument about the kind of guidance information which needed to be processed or how such information should be processed. Therefore, the limited knowledge of the data managers about school guidance records must be taken into consideration when examining the mean scores of the two groups on item 34.

Item 35 related to the use of a microcomputer to score and analyze tests. The mean score rating of the superintendents about the importance of using a microcomputer to score and analyze tests was 3.6816. The mean score rating by the data managers about the capability of a 48-K microcomputer to score and analyze tests was 2.8000.

The t-ratio was computed to be 2.94 which indicates that the difference between the mean scores of the superintendents and data managers was significant at both the .05 and the .01 levels of significance and would cause the null hypothesis to be rejected at these levels.

Item 35 did not address the issue of the kind of peripheral equipment that was needed in order to use a microcomputer to score and analyze tests. Data managers were asked to respond to item 35 within the limits of a 48-K microcomputer system with two disk drives and a line-printer. They gave no consideration to other peripheral equipment such as an optical scanner which could be used with a microcomputer to score and analyze tests.

Item 37 related to the use of a microcomputer to project negotiations costs. The mean score rating of the superintendents about the importance of using a microcomputer to project negotiations costs was 4.3483. The mean score rating of the data managers about the capability of a 48-K microcomputer to process negotiations information was 3.6000. The t-ratio was computed to be 3.24 which indicates that the difference between the mean scores of the superintendents and data managers was significant at both the .05 and the .01 levels of significance and would cause the null hypothesis to be rejected.

The relatively high mean score of the superintendents' responses to item 37 indicates considerable interest on their part in utilizing a microcomputer in negotiations. Data managers, on the other hand, rated the capability of the 48-K microcomputer low on capability to process negotiations data. The kind of data involved

in school district negotiations and the kind of information which superintendents would expect to get from a microcomputer were not set forth in either of the survey instruments. This information may have made a difference in the responses by the data managers.

Item 43 related to processing general accounting tasks (budgeting, receipts, expenditures). The mean score rating of the superintendents about the importance of using a microcomputer to process general accounting tasks was 4.1791. The mean score rating of the data managers about the importance of using a microcomputer to process general accounting tasks was 3.4000. The t-ratio was computed to be 2.98 which indicates that the difference between the mean scores of the superintendents and data managers was significant at both the .05 and the .01 levels of significance and would cause the null hypothesis to be rejected.

Item 45 related to the use of a microcomputer to forecast school district financial information. The mean score rating of the superintendents about the importance of using a microcomputer to forecast school district financial information was 4.0100. The mean score rating of the data managers about the capability of a 48-K microcomputer system to process the necessary data to forecast school district financial information was 3.1000. The t-ratio was computed to 3.42 which indicates that the difference between the mean scores of the superintendents and the data managers was significant at both the .05 and the .01 levels of significance; thus, the null hypothesis was rejected.

Again, the issue of content should be considered in analyzing the significance of the difference between the mean scores of the two groups. The survey instruments did not specify the type or quantity of financial data that would have to be processed by a 48-K microcomputer in order to support decision making.

Item 50 related to the use of a microcomputer to handle the special education plans and budget accounting of a school district. The mean score rating by the superintendents about the use of a microcomputer to handle the special education plans and budget accounting of the school district was 3.8458. The mean score rating by the data managers about the capability of a 48-K microcomputer to handle special education plans and budget accounting of a school district was 3.200. The t-ratio was computed to be 2.22 which indicates that the difference between the mean scores of the two groups was significant at the .05 level of significance and would cause the null hypothesis to be rejected at this level.

Item 50 on the survey instruments did not explain the nature or content of special education plans and budgets. As such, the low mean score rating on this item by the data managers may be attributed partially to their limited knowledge about the kind of special education information which needed to be processed or how such information should be processed.

Item 54 related to the use of a microcomputer to plan projects and budget forecasting in a school district. The mean score rating by the superintendents about the importance of using a microcomputer

to plan district projects and to forecast budget was 4.0746. The mean score rating by the data managers about the capability of a 48-K microcomputer system in assisting superintendents to plan projects and forecast budgets was 3.5000. The t-ratio was computed to be 2.32 which indicates that the difference between the mean scores of the superintendents and the data managers was significant at the .05 level of significance; thus, the null hypothesis was rejected on item 54 at this level.

Consideration must be given to the fact that item 54 on the survey instruments was a general statement and did not specifically state the kinds of projects to be planned or the kind of budget information to be forecasted through the use of a microcomputer. The question must be considered as to the extent to which a microcomputer could be a valuable planning and forecasting tool within the limits of a specific software package.

Item 60 related to the use of a microcomputer to process data for the various financial reports required by the Nebraska Department of Education. The mean score rating by the superintendents about the importance of using a microcomputer to process data for the various financial reports required by the Nebraska Department of Education was 4.1692. The mean score rating by the data managers about the capability of a 48-K microcomputer system to process data for the various financial reports required by the Nebraska Department of Education was 3.4000. The t-ratio was computed to be 3.32 which indicates that the difference between the mean scores of the

superintendents and the data managers was significant at both the .05 and the .01 levels of significance and would cause the null hypothesis to be rejected on the basis of item 60 at both levels.

Consideration needs to be given to the data managers' level of knowledge about the kind of information that needs to be processed for the various financial reports required by the Nebraska Department of Education in analyzing this item. The relatively high mean rating given to this item by the superintendents indicates an interest on their part to computerize Department of Education financial reports. In view of this high level of interest further investigation of the capability of a 48-K microcomputer to process such reports is warranted because the question exists about whether individuals outside the field of education, such as data managers, are familiar enough with the nature and content of such reports to make valid judgments about using a microcomputer to process them.

The t-ratios which were computed for the other twenty-seven items in the variable category of Administrative Applications of the Microcomputer did not indicate that a significant difference existed between the mean scores of the superintendents and the data managers on any of the items. The t-ratio values for the items in the variable category of Administrative Applications of the Microcomputer, except for items 26, 34, 35, 37, 43, 45, 50, 54, and 60, were classified as being "not significant" (NS) and indicate that the items in the variable category of Administrative Applications, other than the aforementioned exceptions, would support the null hypothesis.

The t-ratio was computed for the variable category of Administrative Applications of the Microcomputer as a whole. The computed t-ratio for this variable category was 2.11 which indicates that the difference between the mean scores of the superintendents and the data managers on the items in the variable category of Administrative Applications of the Microcomputer as a whole was significant at the .05 level of significance but not at the .01 level of significance; thus, the null hypothesis for the variable category of Administrative Applications of the Microcomputer as a whole was rejected at the .05 level of significance and supported at the .01 level of significance.

Hypothesis 4

Research question four asked what differences, if any, exist between the perceptions of superintendents and the panel of data management experts about the cost-benefit of utilizing a microcomputer-based administration in selected school districts in Nebraska and is presented in Hypothesis 4:

> There will be no significant difference between the perceptions of superintendents about the expected cost-benefit of using a microcomputer-based administration and the panel of data management experts' estimates of the cost-benefit of using a microcomputer-based administration in selected school districts in Nebraska.

Table 18-A presents the mean scores of the superintendents (group 1) and the data managers (group 2) on items 62 through 72 in the variable category of Cost-Benefit. Table 18-B presents the mean dollar responses of the superintendents (group 1) and the data

managers (group 2) on items 73 through 76 in the variable category of Cost-Benefit. The t-test was applied to determine the significance of difference levels. A t-ratio was computed for the mean scores of each item on the survey instrument. If the value of the computed t-ratio was less than the value required to reject the null hypothesis at the .05 level of significance, the value was classified as being "not significant" (NS) and the value recorded in the "NS" columnn of Tables 18-A and 18-B under the heading of Significance Level. If the value of the t-ratio was less than the value required to reject the null hypothesis at the .01 level of significance but was equal to or greater than the value required to reject the null hypothesis at the .05 level of significance, the value was classified as being "significant" (S) at the .05 level and the recorded in the ".05" column under the heading of Significance Level in Table 18-A and 18-B. If the value of the computed t-ratio was equal to or greater than the value required to reject the null hypothesis at the .01 level of significance, the value was classified as "highly significant" and the value recorded in both the ".05" and the ".01" columns under the heading of Significance Level in Tables 18-A and 18-B.

Table 18-A represents items 62 through 72 in the variable category of Cost-Benefit. Superintendents were asked to respond to each statement by indicating the extent to which they agreed or disagreed about the expected cost-benefit to be derived from implementing microcomputer-based administration. Data managers were asked to respond to each statement in items 62 through 72 in the variable

TABLE 18-A

A Statistical Comparison of Superintendents' Perceptions and Data Managers' Opinions in the Variable Category of Cost-Benefit, 1983

Questionnaire Item	Group**	Number	Mean Score*	Standard Deviation	Significance Levels NS	S .05	S .01
62. diminish certain personnel costs significantly.	1 2	201 10	3.8507 3.2000	0.926 0.919		2.17	
63. optimize inventory levels and control.	1 2	201 10	4.1045 3.8000	0.703 0.632	1.34		
64. help school superintendents to better meet deadlines.	1 2	201 10	3.9602 3.9000	0.842 0.568	0.22		
65. provide superintendents with more and better information for decision making and planning.	1 2	201 10	4.2388 4.1000	0.619 0.568	0.69		
66. improve accuracy in word processing and computational problems.	1 2	201 10	4.0846 4.0000	0.747 0.667	0.35		
67. save filing space.	1 2	201 10	4.1244 3.9000	0.728 0.876	0.94		
68. improve data communications.	1 2	201 10	4.0896 3.5000	0.680 0.707		2.67	2.67
69. significantly diminish the time which a superintendent spends doing clerical tasks so that he may spend time on more productive tasks.	1 2	201 10	4.2239 3.5000	0.710 0.707		3.15	3.15

TABLE 18-A (continued)

Questionnaire Item	Group**	Number	Mean Score*	Standard Deviation	Significance Levels NS	.05	.01
70. improve the utilization of school district resources.	1	201	4.2289	0.654		2.99	2.99
	2	10	3.6000	0.516			
71. provide school superintendents with more managerial control of the school district.	1	201	4.1741	0.689	1.70		
	2	10	3.8000	0.422			
72. centralize the organization of data in a school district.	1	201	4.1050	0.697	0.91		
	2	10	3.9000	0.568			
Summary of questionnaire items 62 through 72 for the variable category of Cost-Benefit.	1	201	4.1058	0.543		2.07	
	2	10	3.7455	0.406			

*Scale Values: 5 = Strongly Agree; 4 = Agree; 3 = No Opinion; 2 = Disagree; 1 = Strongly Disagree

**Group 1 = superintendents; group 2 = data managers

category of Cost-Benefit by indicating the extent to which they agreed or disagreed about the expected cost-benefit to be derived from implementing microcomputer-based administration.

The t-ratio of items 62 through 72 on the survey instrument was computed with 209 degrees of freedom. The data presented in Table 18-A indicate that items 62, 68, 69, and 70 within the variable category of Cost-Benefit contained a significant difference between the two groups to warrant rejection of the null hypothesis at the .05 level of significance. Items 68, 69, and 70 contained a significant difference between the mean scores of the two groups to reject the null hypothesis at both the .05 and the .01 levels of significance.

Item 62 related to whether the use of a microcomputer would significantly diminish certain personnel costs in a school district. The mean score rating by the superintendents about the expected diminishing of certain personnel costs related to microcomputer-based administration was 3.8507. The mean score rating by the data managers about their opinion of whether a microcomputer-based administration would significantly diminish certain personnel costs in a school district was 3.2000. The t-ratio was computed to be 2.17 which indicates that the difference between the mean scores of the superintendents and the data managers was significant at the .05 level of significance and would cause the null hypothesis to be rejected.

The relatively high mean score of the superintendents on item 62 was expected by the researcher because of the problems Nebraska school districts are facing in terms of declining enrollments, inflation,

and budget limitations. Also, consideration must be given to the fact that the survey instruments did not specify what kinds of personnel costs might be diminished or whether time on tasks would be reduced enough to allow personnel to spend time more productively.

Item 68 related to the improvement of data communications through the use of a microcomputer-based administration. The mean score rating by the superintendents about the expected improvement of data communications through the use of microcomputer-based administraton was 4.0896. The mean score rating by the data managers about their opinion of whether a microcomputer would improve data communications in a school district was 3.5000. The t-ratio was computed to be 2.67 which indicates that the difference between the mean scores of the superintendents and data managers was significant at both the .05 and the .01 levels of significance and would cause the null hypothesis to be rejected on the basis of item 68.

In analyzing item 68 the question must be considered regarding the extent of the data managers' knowledge about the type or nature of data communications required in school administration. The statement in item 68 on the survey intrument was a broad general statement and gave no indication to the panel of data management experts involved in this study about the nature and content of data communications common to school districts throughout Nebraska.

Item 69 related to whether the use of a microcomputer would significantly diminish the time which a superintendent spends doing clerical tasks so that he may spend time on more productive tasks. The

mean score rating by the superintendents on the expectations of microcomputer utilization being able to significantly diminish the time which a superintendent spends doing clerical tasks so that he may spend time on more productive tasks was 4.2239. The mean score rating by the data managers about whether a microcomputer-based administration would significantly diminish the time which a superinendent spends doing clerical tasks so that he may spend time on more productive tasks was 3.5000. The t-ratio was computed to be 3.15 which indicates that the difference between the mean scores of the superintendents and the data managers was significant at both the .05 and the .01 levels of significance and would cause the null hypothesis to be rejected at these levels.

The relatively high mean score of the superintendents on item 69 tends to infer that superintendents were looking for some method of alleviating the clerical work they performed. The low mean score rating of the data managers on item 69 indicates that the data managers did not feel the microcomputer is capable of relieving superintendents of many of their clerical tasks. In analyzing the two means, however, consideration must be given to the data managers' limitations regarding knowledge of the clerical tasks which superintendents in Nebraska perform daily. Neither survey instrument specified any particular clerical task.

Item 70 related to the use of a microcomputer to improve the utilization of school district resources. The mean score rating by the superintendents about the expected benefit of microcomputer-

based administration improving the utilization of school district resources was 4.2289. The mean score rating of the data managers about whether a microcomputer-based administration would improve the utilization of school district resources was 3.6000. The t-ratio was computed to be 2.99 which indicates that the difference between the mean scores of the superintendents and data managers was significant at both the .05 and the .01 levels of significance and would cause the null hypothesis to be rejected at both levels.

Again, consideration must be given to the fact that item 70 in the survey instruments was a broad general statement. No specific resources were mentioned on either of the survey instruments.

Table 18-B represents items 73 through 76 in the variable category of Cost-Benefit. Superintendents were asked to respond to each item by estimating the dollar amount which their school boards would be willing to spend relative to the content of each item. Data managers were asked to respond to each item by estimating the dollar amount which school boards would need to budget for the content of each statement. Not all superintendents and data managers responded to each of the survey instrument items 73 through 76. Consequently, the t-ratio for these items is computed with varying degrees of freedom.

Item 73 in the variable category of Cost-Benefit was the only dollar estimate item for which the computed t-ratio did not indicate a significant difference between the mean scores of the superintendents and data managers. As such, item 73 supports the null hypothesis.

TABLE 18-B

A Statistical Comparison of Superintendents' Perceptions and Data Managers' Opinions in the Variable Category of Cost-Benefit, 1983

Questionnaire Item	Group*	Number	Mean Score	Standard Deviation	Significance Levels NS	S .05	S .01
73. the purchase of a microcomputer hardware system (microcomputer with 48-K memory, two disk drives, monitor, and line-printer) which would satisfactorily process most administrative tasks.	1	176	$5466.54	$5591.25	-0.57		
	2	9	$6553.33	$6066.84			
74. the purchase of the management software programs which a superintendent will need to meet the four or five most important administrative needs of the school district.	1	159	$1025.38	$1807.59		-2.73	-2.73
	2	9	$2728.89	$2022.75			
75. to pay for a consultant to come into the district to help a superintendent set up a microcomputer-based administration.	1	107	$ 414.95	$ 381.11		-11.23	-11.23
	2	9	$3177.78	$2287.89			

TABLE 18-B (continued)

Questionnaire Item	Group*	Number	Mean Score	Standard Deviation	Significance Levels NS	S .05	S .01
76. to cover annual recurring costs such as supplies, depreciation, in-service training, telephone line service, etc.	1	147	$ 849.32	$1062.39		-4.14	-4.14
	2	9	$2400.00	$1505.82			

*Group 1 = superintendents; group 2 = data managers

Item 74 related to the purchase of the management software programs which a superintendent will need to meet the four or five most important administrative needs of the school district. The mean dollar amount which superintendents indicated that their school boards would be willing to spend to purchase management software programs was $1,025.38. The mean dollar amount which data managers estimated that school boards would have to budget for the purchase of management software programs was $2,728.89. The t-ratio was computed to be -2.73 which indicates that the difference between the mean dollar amounts of the superintendents and the data managers was significant at both the .05 and the .01 levels of significance and would cause the null hypothesis to be rejected.

Consideration must be given to the fact that microcomputer software for school administration is relatively scarce. Also, in analyzing the superintendents' mean dollar amount response to item 74, it should be understood that this study indicates that superintendents rated themselves relatively low on item 22 in the variable category of Microcomputer Expertise regarding their knowledge about the availability of management software programs.

Item 75 related to expenditure of money for consultant fees. The mean dollar amount that superintendents indicated their school boards would be willing to spend to have a consultant come into the district to help them set up a microcomputer-based administration was $414.95. The mean dollar amount which data managers indicated that school boards would have to budget to pay for a consultant to come

into the district and help a superintendent set up a microcomputer-based administration was $3,177.78. The t-ratio was computed to be -11.23 with 114 degrees of freedom. The t-ratio of -11.23 indicates that the difference between the mean dollar amounts of the superintendents and the data managers was significant at both the .05 and the .01 levels of significance and, thus, the null hypothesis is rejected.

The question must be considered about whether superintendents are really aware of the costs involved in hiring a computer consultant. Superintendents have relatively little experience in utilizing a microcomputer-based administration and, in general, have little contact with professional consultants.

Item 76 related to the amount of money which should be set aside to cover recurring costs such as supplies, depreciation, in-service training, and telephone line service. The mean dollar amount which superintendents estimated that their school boards would be willing to spend to cover recurring costs was $894.32. The mean dollar amount which the data managers estimated that school boards should budget for recurring annual costs was $2,400.00. The t-ratio was computed to be -4.14 with 154 degrees of freedom. The t-ratio of -4.14 indicates that the difference between the mean dollar amounts of the superintendents and the data managers was significant at both the .05 and the .01 levels of significance and would cause the null hypothesis to be rejected.

Again, the issue of the superintendents' exposure to

microcomputer costs must be considered in analyzing this item. The low dollar amount estimate which school districts are willing to set aside for recurring costs may indicate that school boards are either not willing to pay for recurring costs, feel confident that recurring costs will be minimal, or that they are not aware of the expenses involved in implementing a microcomputer-based administration.

Some members of the panel of data management experts involved in this study made comments on their survey instruments relative to the data that were gathered in the conduct of this study. Those comments are recorded in Appendix C.

CHAPTER IV

MAJOR FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS OF THE STUDY

Introduction

Purpose of the Study

The purpose of this study was to develop guidelines for the implementation of a microcomputer-based administration in selected school districts in Nebraska.

Research Questions

The following research questions were proposed for this study:

1. What differences, if any, exist between the perceptions of superintendents about the extent to which their school boards would support a microcomputer-based administration and the extent to which the panel of data management experts agrees or disagrees that school board support is necessary for the success of micrcomputer-based administration?

2. What differences, if any, exist between the perceptions of superintendents about the level of microcomputer expertise which they possess and the extent to which the panel of data management experts agrees or disagrees about the level of microcomputer expertise which a superintendent needs to utilize a microcomputer as a management tool in school administration?

3. What differences, if any, exist between the perceptions of

superintendents about the importance of the microcomputer as an administrative tool based on the processing of selected administrative tasks and the extent to which the panel of data management experts agrees or disagrees that a 48-K computer system is capable of processing selected administrative tasks in school administration?

4. What differences, if any, exist between the perceptions of superintendents about the expected cost-benefit of a microcomputer-based administration and the opinions of the panel of data management experts about the estimated cost-benefit of a microcomputer-based administration in selected school districts in Nebraska?

Hypotheses

Research questions 1, 2, 3, and 4 were rephrased into null hypotheses and tested at both the .05 and .01 level of significance. The null hypotheses proposed for this study are:

1. Related to Question 1: There will be no significant difference between the superintendents' perceptions about the extent to which school boards would support microcomputer-based administration and the extent to which the panel of data management experts agrees or disagrees that school board support will likely enhance the success of microcomputer-based administration.

2. Related to Question 2: There will be no significant difference between the perceptions of superintendents about their level of microcomputer expertise which they possess and the extent to which the panel of data management experts agrees or disagrees about the

level of microcomputer expertise which superintendents need in order to utilize a microcomputer as a management tool in school administration.

3. Related to Question 3: There will be no significant difference between the superintendents' perceptions about the importance of using a microcomputer to process selected administrative tasks and the extent to which the panel of data management experts agrees or disagrees that a microcomputer system is capable of processing selected administrative tasks in school administration.

4. Related to Question 4. There will be no significant difference between the perceptions of superintendents about the expected cost-benefit of utilizing a microcomputer-based administration and the panel of data management experts' estimate of the cost-benefit of utilizing a microcomputer-based administration in selected school districts in Nebraska.

Review of the Literature

A general review of literature was conducted to identify relevant information about computers which could be helpful in developing guidelines for implementing a microcomputer system in school management. This review included a search for information relative to the role of computers as management tools, the administrative uses of computers in education, and the cost-benefit of utilizing computer-based management. The review was organized into three parts: (1) the historical development of the electronic computer; (2) the role of computers in

management information systems; and (3) the computer as an administrative tool in education. The research reviewed did not reveal any recommendations for utilizing a microcomputer in school management or any specific guidelines for implementing a microcomputer-based administration in public schools.

Methods and Procedures

The methods and procedures for collection and analysis of the data were organized into five steps. These steps included:

1. The development of an instrument to measure the perceptions of practicing school superintendents on 76 selected items related to the implementation of a microcomputer-based administration in selected school districts in Nebraska. The 76 items were grouped appropriately and placed into one of the following variable categories: School Board Support, Microcomputer Expertise, Administrative Applications of the Microcomputer, or Cost-Benefit.

2. The development of an instrument to measure the opinions of practicing data management experts on 76 selected items related to the implementation of a microcomputer-based administration in selected school districts in Nebraska. The 76 items were grouped appropriately and placed into one of the following variable categories: School Board Support, Microcomputer Expertise, Administrative Applications of the Microcomputer, or Cost-Benefit.

3. The collection and tabulation of the responses to the items on the survey instrument related to the implementation of a microcomputer-based administration by the 201 superintendents in school districts

in Nebraska with a student enrollment of 1000 or less. The responses were keypunched onto computer cards.

4. The collection and tabulation of the responses to the items on the survey instrument related to the implementation of a microcomputer-based administration in selected school districts in Nebraska by the ten data management experts chosen from the Nebraska membership of the Data Processing Management Association. The responses were keypunched onto computer cards.

5. Statistical treatment of the data. This study utilized the descriptive and inferential statistical data generated by the SPSS computer program to describe the properties of the sample group and to make inferences about the total population.[1] A t-test was applied to determine the significance of difference levels between the mean score responses of the superintendents and the mean score responses of the data managers on similar survey instrument items and by variable category.

Major Findings

Major findings from the literature and from the data that related to the purpose of the study were:

1. The arithmetic means of the ratings of the superintendents indicated general agreement among superintendents that school

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[1]William R. Klecka, Norman H. Nie, and C. Hadlai Hull, Statistical Package for the Social Sciences Primer (New York: McGraw-Hill Book Company, 1975), pp. 1-134.

boards were willing to provide the human and financial support necessary for the implementation of microcomputer-based administration. The item related to administrators learning more about computers and how to use them as problem-solving tools yielded the highest mean score rating of 4.119 and the lowest standard deviation of .752. The greatest amount of disagreement among superintendents' perceptions was on the item related to whether their school boards would purchase a 48-K computer for administrative use. The standard deviation for this item was 1.151.

2. The arithmetic mean ratings of the superintendents indicated a relatively low perception of their level of microcomputer expertise. The highest mean score rating (3.821) was found in the item which related to the superintendent's ability to turn on the microcomputer, insert a disk, and load a program into the computer. The lowest mean score rating (2.493) was on the item related to the superintendent's knowledge of programming language. The highest standard deviation (1.292) was found in the item related to the superintendent's understanding of microcomputer monitor commands. The lowest standard deviation (1.096) was found in the item which was related to the superintendent's ability to select the application software which would best meet the management needs of the school district.

3. The arithmetic means of the ratings of the superintendents indicated general agreement among superintendents about the importance of utilizing a microcomputer to process the selected administrative

applications in the variable category of Administrative Applications of the Microcomputer. The highest mean score rating (4.224) was found in the item related to the use of a microcomputer to store and retrieve information. The lowest mean score rating (3.527) was found in the item which related to the use of a microcomputer to calculate the percentage of building utilization. The highest standard deviation (.993) was found in the item related to the use of a microcomputer to gather data from larger files in a mainframe computer. The lowest degree of variability (.667) was found in the item which related to the use of a microcomputer to store and retrieve information.

4. The arithmetic mean ratings of the superintendents indicated strong agreement among superintendents on each of the items in the variable category of Cost-Benefit. Only two items in the variable category of Cost-Benefit yielded mean scores less than 4.000. The item related to supporting the concept of microcomputer-based administration if it diminished certain personnel costs yielded a mean score rating of 3.851. The item related to the support of a microcomputer-based concept if the micorcomputer could help the superintendent to better meet deadlines yielded a mean score of 3.960. No item yielded a standard deviation greater than .926 in the variable category of Cost-Benefit.

All superintendents did not respond to each of the items on the survey instrument which requested dollar amount estimates in the variable category of Cost-Benefit. The data contained in the item related to the purchase of a microcomputer hardware system

indicate a discrepancy in the amount which superintendents estimated that their school boards would be willing to spend to purchase a 48-K microcomputer for administrative use. Some school boards appeared to to be willing to pay as little as $500 while others were willing to spend as much as $50,000. The mean dollar amount that school boards appeared to be willing to spend toward the purchase of a microcomputer hardware system for administrative use was $5,466.

The amount of money that school boards appeared to be willing to set aside for the initial purchase of some management software programs ranged from a low of $35 to a high of $20,000. The mean dollar amount which school boards appeared to be willing to budget for the purchase of management software programs was $1,025.

The data generated from this study indicated that school boards appeared to be willing to spend as little as $50 and as much as $2,400 for a consultant to come into the district to help the superintendent set up a microcomputer-based administration. The mean dollar amount that school boards appeared to be willing to spend was $414 and the amount of variability within the superintendents' estimates in this category amounted to $381.

The amount of money which superintendents estimated their school boards would be willing to set aside for recurring microcomputer costs ranged from a low of $100 to a high of $10,000. The mean dollar amount generated from the data was $849 and the standard deviation was $1,062.

5. The variable category of Microcomputer Expertise yielded the lowest mean score rating of the four variable categories. The mean score rating for this category was 3.170 and the standard deviation was .927. The variable category of Cost-Benefit yielded the highest mean score rating (4.106) and the lowest standard deviation (.543) of the four variable categories.

6. The arithmetic mean ratings of the data managers did not indicate general agreement among the data managers on the items in the variable category of School Board Support. Two items yielded the highest mean score (4.300). One item related to whether school boards should feel that administrators should learn more about computers and how to use them as problem-solving tools and the other item related to whether school boards should be willing to purchase a line-printer to produce hardcopy reports.

The items related to microcomputers receiving low budget priority and microcomputers being viewed as an unnecessary luxury for school administrators received mean scores of 2.100 and 1.900 respectively. These low mean scores indicate a strong opinion on the part of data managers that microcomputers for administrative use should not be a low budget priority nor should school boards feel that microcomputers are an unnecessary luxury for administrators.

The greatest amount of variability among data managers' responses was on the items which stated that school boards should be willing to purchase at least one 48-K microcomputer for administrative use and school boards should be willing to purchase the management

software which the superintendent felt best met the management needs of the district. The amount of variability amounted to more than one standard deviation on these two questions. Some data managers qualified their response to the item about the purchase of a 48-K microcomputer by stating that they felt a 48-K microcomputer would not have enough memory density to process the administrative tasks of a school district.

7. The arithmetic mean ratings of the data managers varied from item to item in the variable category of Microcomputer Expertise. Four of the twelve items in this category received the highest mean score rating (4.100). One item yielded the lowest mean score rating (3.400). Three items in the variable category of Microcomputer Expertise yielded a standard deviation of 1.059 or greater. One item related to a microcomputer user having enough knowledge about BASIC systems commands to allow him or her to make use of almost any management software program. The second item related to a microcomputer user having enough knowledge about memory density to know when and how to use a data base concept or a data file concept. The third item related to a microcomputer user knowing enough about BASIC programming language to write some simple programs for school district management use.

8. None of the arithmetic mean ratings of the data managers was higher than 3.900 on any of the 37 items in the variable category of Administrative Applications of the Microcomputer. Only three of the 37 items yielded a variability factor of less than one standard deviation. Those items related to the use of a microcomputer to account

for energy use, calculate the percentage of building utilization, and to process data for the various financial reports required by the Nebraska Department of Education; these three items yielded standard deviations of .966, .949, and .966 respectively. Thirty-four of the 37 items in this variable category yielded a standard deviation of 1.000 or greater which indicates considerable difference of opinion among data managers about the capability of a 48-K microcomputer to process many of the selected administrative tasks.

9. There was very little variability among the opinions of data managers on each of the first eleven items in the variable category of Cost-Benefit. The highest standard deviation (.919) was computed for the item related to whether a microcomputer would significantly diminish certain personnel costs. This item also showed the lowest mean score rating (3.200). The highest mean score rating (4.100) was computed for the item which related to microcomputer-based administration as providing superintendents with more and better information for decision making and planning.

There appeared to be some general disagreement among data managers on the last four items in the variable category of Cost-Benefit. The last four items asked the data managers to estimate the dollar amounts which the school district would need to budget in order to purchase a 48-K microcomputer system, to purchase some management software programs, to pay for consultant fees, and to cover recurring costs.

The literature indicates that the microcomputer business is a highly volatile industry and that may account for one of the reasons why some data managers were very reluctant to estimate some dollar costs. However, based on the estimates of those data managers who did respond, the mean dollar amount which a school board could expect to spend to purchase a 48-K microcomputer and the required peripheral equipment was $6,553. The mean dollar amount which school boards could expect to budget for the initial purchase of needed management software programs was $2,728 and the mean dollar amount to cover the cost of consultant fees for setting up a microcomputer-based administration was $3,177. An amount of $2,400 was the mean dollar estimate which data managers felt should be set aside to cover recurring costs such as supplies and telephone line service.

10. The greatest difference between the mean scores of the superintendents and the data managers on any of the twelve items in the variable category of School Board Support was -0.6632. This indicates that what superintendents perceived in terms of school board support was relatively close to what data managers felt was an acceptable level of support to ensure the probable success of microcomputer-based administration.

11. There was a significant difference between the mean scores of the superintendents and the data managers on three of the twelve items in the variable category of Microcomputer Expertise. Those three items related to understanding microcomputer error messages, understanding of the BASIC programming language, and being informed

about the availability of management software programs. Superintendents perceived their level of microcomputer expertise to be well below the level which data managers said it should be on these three items.

12. Only one item in the variable category of Administrative Applications of the Microcomputer yielded any real difference between the mean scores of the superintendents and the data managers. This item related to the use of a 48-K microcomputer to score and analyze tests which showed a difference in mean scores of 1.8816.

13. The greatest difference between the mean scores of the superintendents and the data managers on any of the first eleven items in the variable category of Cost-Benefit was found in the item related to the use of a microcomputer as a means of diminishing certain personnel costs. This item yielded a difference of 0.6507 which indicated that superintendents had higher expectations for the microcomputer to diminish certain personnel costs than did the data managers.

The last four items in the variable category of Cost-Benefit showed disagreement between what superintendents estimated that their school boards would be willing to budget for microcomputer-based administration and what data managers estimated that school boards would have to budget for microcomputer-based administration. The data generated by this study indicated that the mean dollar amount which school boards would be willing to spend for the initial purchase of a 48-K microcomputer system for administrative use was $5,466 while

the mean dollar amount which data managers estimated that school boards would have to budget for this purpose was $6,553. The mean dollar amount which superintendents indicated that school boards would be willing to spend for the purchase of some management software packages was $1,025 and the mean dollar estimate which data managers indicated should be budgeted for this purpose was $2,728. The mean dollar amount which superintendents indicated that school boards would be willing to spend for consultative services was $415 while the mean dollar amount which data managers estimated for this purpose was $3,177. The mean dollar amount which superintendents indicated that school boards would be willing to spend for recurring costs such as telephone line service, in-service training, and depreciation was $859 while data managers estimated that the mean dollar amount to be budgeted for this purpose should be $2,400. The greatest difference between the mean dollar estimates of the superintendents and the data managers was in the item related to consultant fees.

14. A statistical analysis of the data for the items in the variable category of School Board Support supported the acceptance of the null hypothesis which stated that there would be no significant difference between the superintendents' perceptions about the extent to which school boards would support microcomputer-based administration and the extent to which data management experts agree or disagree about the extent to which school boards should support microcomputer-based administration. There were no t-ratios computed for any of the items in the variable category of School Board Support which could be

classified as being significant at either the .05 or .01 levels of significance.

15. A statistical analysis of the data for the items in the variable category of Microcomputer Expertise led to a rejection of the null hypothesis at both the .05 and .01 levels of significance. The greatest significant differences were on the items related to the superintendents' understanding of BASIC programming language and superintendents' being well informed about the availability of management software programs which yielded probability values of -3.05 and -3.91 respectively.

16. A statistical analysis of the data for the items in the variable category of the Administrative Applications of the Microcomputer led to a rejection of the null hypothesis at the .05 level of confidence and acceptance of the null hypothesis at the .01 level of confidence. Nine of the 37 items in the variable category of the Administrative Applications of the Microcomputer contained a significant difference between the mean scores of the superintendents and data managers to warrant rejection of the null hypothesis at the .05 level of significance. Four items in the variable category of the Administrative Applications of the Microcomputer contained a significant difference between the mean scores of the superintendents and the data managers to warrant rejection of the null hypothesis at both the .05 and .01 levels of significance.

17. A statistical analysis of the data for the first eleven items in the variable category of Cost-Benefit led to rejection of

of the null hypothesis at the .05 level of confidence and acceptance of the null hypothesis at the .01 level of confidence. The most significant difference between the mean scores of the superintendents and the data managers was on the item related to the use of a microcomputer to diminish certain personnel costs.

A statistical analysis of the dollar amount data of the last four items in the variable category of Cost-Benefit indicates that the null hypothesis was rejected at both the .05 and .01 levels of confidence. The greatest significant difference between the mean dollar amounts of the superintendents and the data managers was one the item related to the amount to be budgeted for consultant fees. The mean dollar amount that the superintendents indicated that school boards would be willing to pay for this service was $414.95 while data managers estimated that this cost would average $3,177.78. Only one of the last four items related to dollar amounts yielded a minimal difference and this was on the item related to the purchase of a 48-K microcomputer system for administrative use. The mean dollar amount which superintendents indicated that school boards would be willing to budget for the purchase of a 48-K microcomputer system was $5,591.25 and the mean dollar amount which data managers estimated would be necessary for the purchase of a 48-K microcomputer system was $6,066.84.

Conclusions

Conclusions of the study based on the major findings were:

1. There was general agreement among the superintendents in Nebraska school districts with student enrollments of 1000 or less that school boards were willing to provide the human and financial support necessary for the implementation of microcomputer-based administration in selected school districts in Nebraska.

2. Superintendents in Nebraska school districts with student enrollments of 1000 or less had a relatively low perception of their level of microcomputer expertise. Their greatest deficiency in microcomputer expertise appeared to be in the area of BASIC programming language skills.

3. Superintendents in Nebraska school district with student enrollments of 1000 or less had a definite interest in utilizing a microcomputer for selected administrative applications. The strongest interest on the part of superintendents in these Nebraska school districts was to utilize the microcomputer to store and retrieve information.

4. Superintendents had relatively high cost-benefit expectations for the microcomputer in terms of monetary savings to the school district. The findings also indicated that there was no general agreement among the superintendents in Nebraska school districts with student enrollments of 1000 or less about the money which their school boards were willing to spend for the purchase of a 48-K microcomputer

system, the purchase of some management software programs, consultative services, and recurring costs.

5. Superintendents showed a greater degree of difference in their responses to the items in the variable category of Microcomputer Expertise than any of the other four variable categories in this study. Agreement among superintendents in Nebraska school districts with student enrollments of 1000 or less to the items in the variable categories of School Board Support, Administrative Applications of the Microcomputer, and Cost-Benefit was relatively consistent.

6. There was general disagreement among data management experts on the various items contained in the variable category of School Board Support. The data managers particularly disagreed on the statement related to a school board purchasing a 48-K microcomputer system for administrative use. Many data managers qualified their responses to this statement by indicating they did not feel that a 48-K microcomputer had sufficient memory density to be used as an administrative tool.

7. Data managers felt that an individual who uses a microcomputer as an administrative tool should possess a relatively high degree of microcomputer expertise. Data managers felt that knowledge of memory density is not an important factor for utilizing the microcomputer as an administrative tool.

8. Data managers did not generally agree on the extent to which a 48-K microcomputer system is capable of processing all of the items in the variable category of the Administrative Applications of the Microcomputer. Data managers felt that the microcomputer could

probably be used satisfactorily by school administrators for the purpose of storing and retrieving information.

9. There was general agreement among data managers that the use of a microcomputer would result in some savings and better use of human and non-human resources in some areas of school management. However, there seemed to be no general agreement among data managers on their dollar estimates about the amount of money which school boards need to budget for the purchase of a 48-K microcomputer and peripheral equipment, the purchase of some management software, consultant fees, and recurring costs. Many data managers were very reluctant to make such estimates.

10. The findings led to the conclusion that the implementation of microcomputer-based administration could be a plausible reality to some degree in many of the K-12 school districts throughout the State of Nebraska with student enrollments of 1000 or less. There was little difference between the perceptions of superintendents about the current level of school board support for microcomputer-based administrations and the opinions of data managers about the level of school board support necessary for the successful implementation of microcomputer-based administration.

11. There is a definite need for superintendents in Nebraska school districts with student enrollments of 1000 or less to acquire a higher degree of functional computer literacy than they currently have and to develop computer skills which will enable them to utilize the microcomputer as a management tool in school administration. There

appeared to be a discrepancy between the superintendents' level of microcomputer expertise and the level of expertise which data managers felt is necessary for a microcomputer user to have in order to utilize the microcomputer as a management tool in school administration.

12. The findings led to the conclusion that a 48-K microcomputer can be utilized as a management tool to some degree in Nebraska school districts with student enrollments of 1000 or less to perform a variety of clerical administrative tasks as well as those tasks related to the functions of planning and forecasting. It was also concluded that the microcomputer should probably not be considered for scoring and analyzing tests.

13. The extent of cost-benefit derived from the utilization of microcomputer-based administration will vary according to the purposes for which a microcomputer is used in school management. Superintendents should understand that some cost-benefit outcomes will be measurable in terms of monetary value and some cost-benefit outcomes must be measured by means of value judgments.

The findings also led to the conclusion that school boards can reasonably expect to pay approximately $5,466 to $6,553 for the initial purchase of a 48-K microcomputer system which will satisfactorily process most administrative tasks. School boards should budget $1,025 to $2,728 for the initial purchase of some management software programs. The amount which school boards will pay for consultative services will be based upon school district need and will vary from $415 to $3,177. Recurring annual cost items such as in-service training,

telephone line service, and depreciation will range from $849 to $2,400.

14. School boards in Nebraska school districts with student enrollments of 1000 or less were willing to support the implementation of microcomputer-based administration. The level of school board support for microcomputer-based administration was congruent with the level which data management experts felt was necessary for the successful implementation of microcomputer-based administration.

15. Superintendents in Nebraska school districts with student enrollments of 1000 or less did not possess the level of microcomputer expertise which data managers felt was necessary for superintendents to have in order to utilize the microcomputer as a management tool in school administration. Superintendents in Nebraska school districts with student enrollments of 1000 or less did not have a satisfactory understanding of BASIC programming language and were not well informed about the availability of management software programs for school administration.

16. Superintendents in Nebraska school districts with student enrollments of 1000 or less had greater expectations about the utilization of a microcomputer to perform selected administrative tasks than what data managers felt a 48-K microcomputer system is capable of performing. However, the mean score ratings of the data managers on the items in the variable category of the Administrative Applications of the Microcomputer were relatively high and warrant strong consideration in making a decision to utilize a microcomputer to perform many of the selected administrative tasks in this category.

17. The findings indicated that superintendents had higher cost-benefit expectations of microcomputer use than did data managers. In particular, superintendents expected the use of a microcomputer to significantly diminish certain personnel costs while data managers viewed the reduction in personnel cost attributable to microcomputer use as being minimal.

The findings also led to the conclusion that superintendents and school boards may not be familiar with microcomputer costs, consultant fees, software costs, and recurring costs. The amount which superintendents indicated their school boards would be willing to spend on these items was less than what data managers estimated would be necessary for school boards to budget for each item.

Guidelines

Guidelines drawn from the study based on the major findings and conclusions were:

1. School boards in Nebraska school districts with student enrollments of 1000 or less appeared to be willing to provide the human and financial support which data management experts felt is necessary for the successful implementation of microcomputer-based administration. Superintendents in Nebraska school districts with student enrollments of 1000 or less should take advantage of their school boards' attitudes toward computer technology and explore the opportunities for utilizing the microcomputer as a management tool in school district administration.

2. Superintendents in Nebraska school districts with student enrollments of 1000 or less should determine the extent to which they, personally, will be using a microcomputer before deciding upon the level of expertise they must acquire in order to utilize the microcomputer as a management tool in their school district. A decision to pursue microcomputer skills should be made only after careful consultation with a data management expert and individuals who are knowledgeable with computer use and the functions involved in the management of Nebraska school districts with student enrollments of 1000 or less.

3. Superintendents in Nebraska school districts with student enrollments of 1000 or less should establish a continuing program of in-service training geared toward keeping them informed about the latest advancements in computer technology and their implications for educational administration. The in-service training program should also include plans to keep the superintendent aware of new and existing software management programs which could be used to help manage school district affairs.

4. Superintendents in Nebraska school districts with student enrollments of 1000 or less should carefully select the administrative tasks to be performed by a microcomputer. Some administrative tasks are not capable of being processed on a 48-K microcomputer. Before purchasing any management software packages for use in school administration a superintendent should consult a data management expert or other individuals who may be familiar with the microcomputer, the software package, and the administrative tasks to be processed

by the microcomputer.

5. Superintendents in Nebraska school districts with student enrollments of 1000 or less should consult with data management experts or other individuals who are familiar with the capabilities of microcomputers in order to gain a realistic view of the cost-benefit involved in utilizing a microcomputer-based administration. Superintendents should develop a clear understanding of the advantages and disadvantages of utilizing a microcomputer-based administration in terms of monetary and non-monetary values.

6. Superintendents in Nebraska school districts with student enrollments of 1000 or less should make an effort to carefully examine the costs involved in implementing a microcomputer-based administration. A determination must be made about the kind of microcomputer the district needs to purchase, the extent of the peripheral equipment which the district needs to purchase, the kinds of management software programs which best meet the needs of the district, and the value the school district will receive in terms of cost-benefit for the money invested in a microcomputer-based administration.

Recommendations

Results of this study indicated that superintendents' perceptions about the extent to which school boards would support microcomputer-based administration in selected school districts in Nebraska was relatively high. No research has been conducted relative to determining exactly how school board members actually feel about the

use of computer technology as an administrative tool and the extent to which they would support a microcomputer-based administration in their respective school districts. Additional research in this area could add to the limited knowledge and enhance the findings in this study regarding the superintendents' perceptions about the level of school board support for microcomputer-based administration.

Results of this study indicated that superintendents' perceptions about their level of microcomputer expertise was relatively low in comparison to what data management experts felt is necessary for an individual who uses a microcomputer as a management tool. The writer knows of no research that has been conducted to determine the reasons for the low level of microcomputer expertise which most superintendents possessed. Additional research is needed in the areas of computer literacy, computer skills, and management functions to determine why superintendents do not possess the knowledge and technical skills necessary to utilize the microcomputer as an effective management tool.

Results of this study indicated that superintendents desired the use of a microcomputer to perform a wide variety of administrative tasks. Little research has been done relative to determining whether superintendents prefer the use of a microcomputer to perform simple clerical tasks or to process information which supports management decisions in the functional areas of planning and forecasting. Additional research in this area could add to the validity of utilizing a personal use microcomputer in educational administration.

Results of the study indicated that superintendents expected relatively high savings in terms of both human and non-human resources as a result of utilizing a microcomputer in school administration. Little research, if any, has been conducted to determine exactly what kinds of savings microcomputer use will produce and whether such savings are significant in a school district to justify the expense involved. Additional research in this area could add to the limited knowledge now available.

Observations by the Writer

The writer has devoted more than two years to the study of the development of guidelines for the implementation of a microcomputer-based administration in selected school districts in Nebraska. The following thoughts and observations relate to questions and implications which this research has not answered.

The question must be considered as to whether the uses of microcomputers in school administration, as those uses are now perceived by school superintendents, really serve the best interests of either the school districts or the schools' administrators. Many of the administrative tasks which superintendents felt should be computerized were related to clerical tasks and would require a microcomputer with a considerable amount of memory density. On the other hand, very little consideration was given by superintendents to the use of a microcomputer to perform those kinds of processes which relate to the planning, forecasting, and decision-making functions of

educational administration. Because of its limited storage capacity, school superintendents may reject the concept of a microcomputer-based administration and, thus, the potential use of the microcomputer as a planning and forecasting tool may never be explored.

There is an apparent need for in-service training programs for school superintendents in the use of the microcomputer. Special workshop seminars on a regional basis conducted by colleges and universities in cooperation with their departments of educational administration would be helpful. This cooperative effort on the part of teacher training institutions could very possibly lead to the acceptance of the microcomputer as a tool designed to enhance the management skills of school superintendents.

There is an apparent need to develop an information center responsible for the dissemination of information relative to management software programs to school superintendents across the State of Nebraska. Information should also be available from this center about advancements in computer technology and the current uses of microcomputers in educational administration.

An effort needs to be made by those involved in school administration to acquaint computer and data management experts with the nature of the tasks involved in educational administration. Workshop seminars should be conducted by institutions of higher learning which could bring educational leaders and computer experts together to find meaningful ways to utilize the personal use microcomputer in school district management.

There is an apparent need for superintendents and representatives from the Nebraska Department of Education to develop common software programs which could be utilized by school districts throughout the State. The development of software packages to process district financial information, special education information, and staff personnel information could prove very helpful to all school districts.

Finally, if a decision is made by a school district to implement a microcomputer-based administration, the question must be considered as to whether the superintendent and the administrative staff is sufficiently capable of determining data creation. Computer systems depend upon the use of data created either within or outside the system. Data are created whenever any transaction takes place or when objectives are carried out. For example, data are created when a physical inventory is taken, when a disbursement is made to a vendor, when average daily membership is computed. All of this data might be of use to the system. It is the decision of the superintendent and the administrative staff as to what data are needed to produce valid and useful output. It could prove useful if those agencies which require certain kinds of information would conduct seminar workshops on data creation.

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APPENDIX A

Letter to Review Panel Members

Review Panel Background

March 14, 1983

Dear Colleague:

Enclosed you will find a copy of the questionnaire which I have designed to gather data for my doctoral dissertation study. Your help in establishing the content validity of this instrument is vital to the value of my study and is deeply appreciated.

The content validity of this instrument depends upon your judgment and the judgment of the nine other practicing school superintendents who have agreed to review this questionnaire. Therefore, I ask that you carefully and critically examine each item on the questionnaire as it relates to the following:

Questions 1 through 12 should relate to School Board Support.
Questions 13 through 24 should relate to Superintendents' Microcomputer Expertise.
Questions 26 through 61 should relate to the Importance of Administrative Tasks.
Questions 62 through 76 should relate to Cost-Benefit.

Please feel free to make any suggestions which you feel may improve the content validity of the questionnaire. You may write your comments, criticisms, and suggestions for additions or deletions anywhere on the questionnaire.

Also, I have enclosed a data sheet to gather some demographic information about you. I would like to include a brief professional description in my study of each member who served on my review panel.

Please return both the survey questionnaire and the data sheet to me at your earliest convenience.

Once again, I would like to express my deepest appreciation for the time and effort which you have put forth on my behalf.

Sincerely yours,

/s/ Paul Brochtrup

Paul Brochtrup
Superintendent of Schools

Enclosures: Survey Questionnaire
Data Sheet

Review Panel Background

W. D. Brawner. Currently Superintendent of Dix Public Schools in Dix, Nebraska. Mr. Brawner has been the Superintendent at Dix for 30 years and has a total of 30 years experience as a public school superintendent.

Melvin Doeschot. Currently Superintendent of Tekamah-Herman Public Schools in Tekamah, Nebraska. Mr. Doeschot has been the Superintendent at Tekamah-Herman for 22 years and has a total of 28 years experience as a public school superintendent.

Ronald A. Green, Ed.D. Currently Superintendent of East Butler Public Schools in Brainard, Nebraska. Dr. Green has been the Superintendent at East Butler for five years and has a total of nine years experience as a public school superintendent. The East Butler Public Schools will be implementing a microcomputer for administrative use during the 1983-84 school year to handle inventory, class scheduling, accounting, and budgeting.

Ron Hiles. Currently Superintendent of Hays Springs Public Schools in Hays Springs, Nebraska. Mr. Hiles has been Superintendent at Hays Springs for ten years and has a total of twelve years experience as a public school superintendent.

Nelson Hinkle. Currently Superintendent of Yutan Public Schools in Yutan, Nebraska. Mr. Hinkle has been the Superintendent at Yutan for five years and has a total of nine years experience as a public school superintendent. The Yutan Public Schools contracts for administrative computer services with Educational Service Unit 10 in Kearney, Nebraska and utilizes a microcomputer for educational purposes only.

L. Max Ingram. Currently Superintendent of Bartley Public Schools in Bartley, Nebraska. Mr. Ingram has been the Superintendent at Bartley for 34 years and has a total of 34 years experience as a public school superintendent.

Vaden Lane. Currently Superintendent of Blue Hill Public Schools in Blue Hill, Nebraska. Mr. Lane has been the Superintendent at Blue Hill for 15 years and has a total of 15 years experience as a public school superintendent. Blue Hill Public Schools is providing in-service training for office personnel to learn how to operate a microcomputer. Plans are being developed to utilize a microcomputer for administrative purposes.

Review Panel Background (continued)

Oscar Mussman. Currently Superintendent of Nelson Public Schools in Nelson, Nebraska. Mr. Mussman has been the Superintendent at Nelson for two years and has a total of 20 years experience as a public school superintendent.

Robert G. Pease. Currently Superintendent of Wisner-Pilger Public Schools in Wisner, Nebraska. Mr. Pease has been the Superintendent at Wisner-Pilger for ten years and has a total of 35 years experience as a public school superintendent.

Frank Williams. Currently Superintendent of St. Edward Public Schools in St. Edward, Nebraska. Mr. Williams has been the Superintendent at St. Edward for 12 years and has a total of 17 years experience as a public school superintendent.

APPENDIX B

Letter Requesting Superintendents' Participation in the Study

Superintendents' Survey Instrument

March 19, 1983

Dear Colleague:

A few years ago most of us knew little, if anything, about microcomputers. Today, however, microcomputers are an integral part of our society and we must come to grips with this growing technology and its implications for educational administration. Administrators of public schools across the nation are beginning to envision the microcomputer as a viable management tool and are searching for information about the administrative uses of microcomputers.

This study may prove to be of significant value to school administrators who are interested in learning more about microcomputers as administrative tools for school management. Specifically, the results of this study could generate the necessary information for developing guidelines which Nebraska school districts can follow in implementing a microcomputer-based administration. The development of these guidelines is the subject of a doctoral dissertation I am conducting under the auspices of the University of Nebraska-Lincoln.

The value of this study depends a great deal upon your participation and the accuracy of your responses. You have had experience with the management functions which Nebraska school superintendents perform and your expertise can lend credibility to this study. I ask you to please answer all questionnaire items, to be completely candid in your responses, and to return the questionnaire at your earliest convenience in the enclosed envelope.

The questionnaire can be completed in about ten minutes. All responses will be strictly confidential. I am interested only in statistical relationships and will under no circumstances reprint responses on an individual or school basis.

Thank you for considering this study. I would be grateful for any comments you would care to make on the back of the questionnaire.

Sincerely yours,

/s/ Paul Brochtrup

Paul Brochtrup
Superintendent of Schools

Enclosures: Questionnaire
Self-addressed, stamped envelope

SUPERINTENDENTS' QUESTIONNAIRE

INSTRUCTIONS

This questionnaire is designed to solicit your perceptions about the implementation of microcomputer based administration in your school district. The items contained in this questionnaire are designed to determine the extent to which you feel your board of education would support microcomputer based administration, your level of microcomputer expertise, the importance of computerizing selected administrative tasks in your school district, and what you expect in terms of cost-benefit as a result of using a microcomputer as a management tool in your school district. Your response to these items will help in the development of guidelines which could be used to implement microcomputer based administration in school districts of your size.

* * * *

	Strongly Agree 5	Agree 4	No Opinion 3	Disagree 2	Strongly Disagree 1
In general, I think that my school board feels that:					
1. a computer could probably add to the quality of administration in this school district.	[ ]	[ ]	[ ]	[ ]	[ ]
2. computers should be used by school administrators more than they are now.	[ ]	[ ]	[ ]	[ ]	[ ]
3. the purchase of a microcomputer for administrative use should receive low budget priority.	[ ]	[ ]	[ ]	[ ]	[ ]
4. a microcomputer would be an unnecessary luxury for our school administration.	[ ]	[ ]	[ ]	[ ]	[ ]
5. our school administrators should learn more about computers and how to use them as problem-solving tools.	[ ]	[ ]	[ ]	[ ]	[ ]
In general, I think that my school board would provide the financial support for:					
6. the purchase of at least one 48-K microcomputer for administrative use.	[ ]	[ ]	[ ]	[ ]	[ ]
7. the purchase of a line-printer to produce hardcopy reports.	[ ]	[ ]	[ ]	[ ]	[ ]
8. the purchase of the management software programs which I feel would be most appropriate for administrative use in our school district.	[ ]	[ ]	[ ]	[ ]	[ ]
9. the training needed to teach me how to operate a microcomputer for management purposes.	[ ]	[ ]	[ ]	[ ]	[ ]
10. the annual costs for microcomputer maintenance and supplies.	[ ]	[ ]	[ ]	[ ]	[ ]
11. the in-service costs to keep me informed about the availability of management software and advancements in microcomputer technology.	[ ]	[ ]	[ ]	[ ]	[ ]
12. any miscellaneous costs related to the administrative use of a microcomputer which may occur throughout the year.	[ ]	[ ]	[ ]	[ ]	[ ]
Generally speaking, I would say that:					
13. I probably understand enough about microcomputer hardware to turn the microcomputer on, insert a disk into the disk drive, and load a program into the computer.	[ ]	[ ]	[ ]	[ ]	[ ]
14. I probably understand enough about monitor commands to make the microcomputer hardware operational.	[ ]	[ ]	[ ]	[ ]	[ ]
15. I probably understand enough about BASIC systems commands to allow me to make use of almost any management software program.	[ ]	[ ]	[ ]	[ ]	[ ]
16. I probably have sufficient microcomputer skills to be able to "save" the management programs or data on a disk for future use.	[ ]	[ ]	[ ]	[ ]	[ ]
17. I probably understand enough about microcomputer error messages to know what course of action to take to correct most situations.	[ ]	[ ]	[ ]	[ ]	[ ]
18. I probably understand enough about memory density to know when and how I can use a data base concept or a data file concept.	[ ]	[ ]	[ ]	[ ]	[ ]

	Strongly Agree 5	Agree 4	No Opinion 3	Disagree 2	Strongly Disagree 1
19. I could probably select the general purpose software which could best be used to meet the management needs of this school district.	[ ]	[ ]	[ ]	[ ]	[ ]
20. I could probably select the specific application programs (i.e., payroll, financial accounting, etc.) which could best be used to meet the management needs of this school district.	[ ]	[ ]	[ ]	[ ]	[ ]
21. I probably have enough understanding of BASIC programming language to write some simple microcomputer programs for my own administrative use in this school district.	[ ]	[ ]	[ ]	[ ]	[ ]
22. I consider myself to be well informed about availability of software programs that could be used to help me to better manage the affairs of this school district.	[ ]	[ ]	[ ]	[ ]	[ ]
23. I feel that I am very familiar with the role which a microcomputer could play in supporting management decisions in this school district.	[ ]	[ ]	[ ]	[ ]	[ ]
24. I feel that I am well aware of the advancements being made in computer technology and the potential impact of the microcomputer on educational administration.	[ ]	[ ]	[ ]	[ ]	[ ]

I would probably consider a microcomputer to be an important administrative tool in managing this school district if it could be used to:

25. maintain student records.	[ ]	[ ]	[ ]	[ ]	[ ]
26. process family census.	[ ]	[ ]	[ ]	[ ]	[ ]
27. calculate enrollment projections.	[ ]	[ ]	[ ]	[ ]	[ ]
28. keep student attendance records.	[ ]	[ ]	[ ]	[ ]	[ ]
29. maintain athletic eligibility lists.	[ ]	[ ]	[ ]	[ ]	[ ]
30. maintain student health records.	[ ]	[ ]	[ ]	[ ]	[ ]
31. compute and report student grades.	[ ]	[ ]	[ ]	[ ]	[ ]
32. schedule students into classes.	[ ]	[ ]	[ ]	[ ]	[ ]
33. compute transportation costs (route buses and/or activity buses)	[ ]	[ ]	[ ]	[ ]	[ ]
34. store guidance records.	[ ]	[ ]	[ ]	[ ]	[ ]
35. score and analyze tests.	[ ]	[ ]	[ ]	[ ]	[ ]
36. maintain staff personnel records (certification, seniority, etc.).	[ ]	[ ]	[ ]	[ ]	[ ]
37. project negotiations costs (salary simulation, etc.).	[ ]	[ ]	[ ]	[ ]	[ ]
38. process payroll related reports (sick leave, retirement, etc.).	[ ]	[ ]	[ ]	[ ]	[ ]
39. calculate payroll checks and process a payroll register.	[ ]	[ ]	[ ]	[ ]	[ ]
40. maintain facilities and equipment inventories.	[ ]	[ ]	[ ]	[ ]	[ ]
41. account for energy use.	[ ]	[ ]	[ ]	[ ]	[ ]
42. calculate percent of building utilization.	[ ]	[ ]	[ ]	[ ]	[ ]

	Strongly Agree 5	Agree 4	No Opinion 3	Disagree 2	Strongly Disagree 1
43. process general accounting tasks (budgeting, receipts, expenditures).	[ ]	[ ]	[ ]	[ ]	[ ]
44. process accounts receivable/payable.	[ ]	[ ]	[ ]	[ ]	[ ]
45. forecast financial information.	[ ]	[ ]	[ ]	[ ]	[ ]
46. process lunch program information (lunch counts, inventory, reports).	[ ]	[ ]	[ ]	[ ]	[ ]
47. process activity fund accounts.	[ ]	[ ]	[ ]	[ ]	[ ]
48. process certificates of deposit and investment information.	[ ]	[ ]	[ ]	[ ]	[ ]
49. process general ledger information.	[ ]	[ ]	[ ]	[ ]	[ ]
50. handle Special Education plans and budget accounting.	[ ]	[ ]	[ ]	[ ]	[ ]
51. perform statistical analysis (research activities).	[ ]	[ ]	[ ]	[ ]	[ ]
52. process library circulation tasks.	[ ]	[ ]	[ ]	[ ]	[ ]
53. reserve media (equipment, scheduling, inventory).	[ ]	[ ]	[ ]	[ ]	[ ]
54. plan projects and budgets (budget forecasting, etc.).	[ ]	[ ]	[ ]	[ ]	[ ]
55. process newsletters and other written correspondence (Word Processing).	[ ]	[ ]	[ ]	[ ]	[ ]
56. schedule activities (extra-curricular).	[ ]	[ ]	[ ]	[ ]	[ ]
57. process mailing lists/labels (students, parents, staff, etc.).	[ ]	[ ]	[ ]	[ ]	[ ]
58. Store and retrieve information.	[ ]	[ ]	[ ]	[ ]	[ ]
59. gather data from larger data files (a mainframe computer)	[ ]	[ ]	[ ]	[ ]	[ ]
60. process data for the various financial reports required by the Nebraska Department of Education.	[ ]	[ ]	[ ]	[ ]	[ ]
61. process Special Education information such as test scores, IEP's, etc.	[ ]	[ ]	[ ]	[ ]	[ ]

I would support the concept of microcomputer based administration in my school district if the microcomputer could:

62. diminish certain personnel costs.	[ ]	[ ]	[ ]	[ ]	[ ]
63. optimize inventory levels and control.	[ ]	[ ]	[ ]	[ ]	[ ]
64. help me to better meet deadlines.	[ ]	[ ]	[ ]	[ ]	[ ]
65. provide me with more and better information for decision making and planning.	[ ]	[ ]	[ ]	[ ]	[ ]
66. improve accuracy in word processing and computational problems.	[ ]	[ ]	[ ]	[ ]	[ ]
67. save filing space.	[ ]	[ ]	[ ]	[ ]	[ ]
68. improve data communications.	[ ]	[ ]	[ ]	[ ]	[ ]
69. diminish the time which I spend doing clerical tasks so that I may spend time on more productive tasks.	[ ]	[ ]	[ ]	[ ]	[ ]
70. improve the utilization of school district resources.	[ ]	[ ]	[ ]	[ ]	[ ]
71. provide me with more managerial control of the school district.	[ ]	[ ]	[ ]	[ ]	[ ]

	Strongly Agree 5	Agree 4	No Opinion 3	Disagree 2	Strongly Disagree 1
72. centralize the organization of data in this school district.	[ ]	[ ]	[ ]	[ ]	[ ]

Please indicate your best estimate of the amount of money that your school district would be willing to spend, or has already spent, for:

73. the initial purchase of a microcomputer hardware system (microcomputer with 48-K memory, dual disk drive, monitor, and line-printer). $ _____

74. the initial purchase of some management software programs which you feel could best meet the administrative needs of your school district. $ _____

75. the fees to provide for a consultant to come into your district to help you set up a microcomputer based administration. $ _____

76. recurring costs such as supplies, depreciation, in-service training, telephone line service, etc. $ _____

Thank you very much for the time and effort you have put forth to answer this questionnaire for me.

APPENDIX C

Letter Requesting Data Managers' Participation in the Study

Background of Data Managers Who Served as the Panel of Experts for this Study

Data Managers' Survey Instrument

Data Managers' Comments Regarding Survey Instrument Items

March 31, 1983

Dear Data Manager:

A few years ago most school superintendents knew little, if anything, about microcomputers. Today, however, microcomputers are an integral part of our society and those responsible for the management of public schools are beginning to come to grips with this growing technology and its implications for educational administration. Administrators across the nation are now beginning to envision the microcomputer as a viable management tool and are searching for information about the administrative uses of microcomputers.

This study may prove to be of significant value to school administrators who are interested in learning more about microcomputers as administrative tools for school management. Specifically, the results of this study could generate the necessary information for developing guidelines which Nebraska school districts can follow in implementing a microcomputer-based administration. The development of these guidelines is the subject of a doctoral dissertation I am conducting under the auspices of the University of Nebraska-Lincoln.

The value of this study depends a great deal upon your participation and the accuracy of your responses. You have the experience and professional knowledge that can lend credibility to this study. I ask you to please answer all questionnaire items, to be completely candid in your responses, and to return the questionnaire at your earliest convenience in the enclosed envelope.

The questionnaire can be completed in about ten minutes. All responses will be strictly confidential. I am interested only in statistical relationships and will under no circumstances reprint responses on an individual basis.

Also enclosed you will find a data sheet requesting information about your professional work experience. I would like to include a brief professional background of the systems analysts who have agreed to participate in this study and I would appreciate it very much if you would return this data sheet along with your questionnaire.

Thank you very much for considering this study. I would be grateful for any comments you would care to make on the back of the questionnaire.

Sincerely yours,

/s/ Paul Brochtrup

Paul Brochtrup
Superintendent of Schools

Enclosure: Questionnaire
Self-addressed, stamped envelope
Professional data sheet

Background of Data Managers

Henry Brus, CDP. Currently employed by Commercial Federal Savings and Loan Association in Omaha, Nebraska. Mr. Brus has eight years experience in the field of data management and is a Certified Data Processor.

Jeff Busacker, D. P. Specialist. Currently employed by Compu Search in Omaha, Nebraska. Mr. Busacker has nine years of experience in the data processing industry.

Bobby R. Chandler, CDP. Currently employed by Union Pacific Railroad in Omaha, Nebraska. Mr. Chandler is a Certified Data Processor and has ten years experience in the field of data management.

Chris Chaney, CDP. Currently employed by Mutual of Omaha Insurance Company in Omaha, Nebraska as a systems analyst. Mr. Chaney is a Certified Data Processor and has ten years experience in the field of data management. From 1973 to 1979, Mr. Chaney was Assistant Professor and Head of the Information Systems Department of the School of Business and Economics at Central Missouri State University.

J. J. Davis. Currently employed by Northwestern Bell Telephone Company in Omaha, Nebraska. Mr. Davis has twenty-two years experience in the field of data management primarily with large mainframe systems.

Jim Duncan, CDP. Currently employed by Battle Creek Mutual Insurance Company and Elkhorn Valley Data Processing Services in Battle Creek, Nebraska. Mr. Duncan has eight years experience in the field of data management.

Jerry Hiclen. Currently employed by the Department of Administrative Services of the State of Nebraska in Lincoln, Nebraska. Mr. Hiclen is responsible for the central data processing at the Department of Administrative Services and has eight years experience in the field of data management.

Dennis Huber. Currently employed by Douglas County Data Processing in Omaha, Nebraska. Mr. Huber has eighteen years experience in the field of data management and is currently Regional Vice-President of the Data Processing Management Association.

Richard D. Hileman, CDP. Currently employed by InterNorth, Incorporated in Omaha, Nebraska. Mr. Hileman is a Certified Data Processor and has twenty-two years experience in the field of data management. His background includes five years as a business systems analyst and seven years as Director of Computer Operations.

Background of Data Managers (continued)

Richard D. Lininger, CDP. Currently employed by the Metropolitan Utilities District in Omaha, Nebraska. Mr. Lininger is a Certified Data Processor and has nineteen years experience in the field of data management.

DATA MANAGERS' QUESTIONNAIRE

INSTRUCTIONS

This questionnaire is designed to solicit your professional opinions about the implementation of microcomputer based administration in selected school districts in Nebraska. The items contained in this questionnaire are designed to determine the extent to which you, as a systems analysts, agree or disagree: 1) about school board support for microcomputer based administration, 2) about the level of microcomputer expertise school superintendents must possess in order to utilize microcomputer based administration, 3) about the capability of a microcomputer to perform selected administrative tasks, and 4) about the estimated cost-benefit of utilizing a microcomputer as a management tool in school district administration. Your responses to these items will help in the development of guidelines which could be used to implement microcomputer based administration in selected school districts in Nebraska.

* *

1. Please answer the questions in order. Do not skip around.

2. Questions 1 through 72 can be answered by marking an "X" in the [ ] of your choice. If you do not find the exact answer that fits your opinion, check the one that comes closest to it. Questions 73 through 76 ask you to fill in a dollar amount. PLEASE ANSWER ALL QUESTIONS.

3. Your responses to these questionnaire items should be made with regard to the strengths and limitations of a microcomputer with 48-K memory, two disk drives, a monitor, and a line-printer. You may consider any software which meets the needs of the administrative tasks and which is capable of being utilized within the scope of the hardware.

4. Please feel free to write any explanations or comments you may have in the margins and on the back of the questionnaire.

5. The information you supply as an individual will be held as confidential information. Information from individual questionnaires will be grouped and treated statistically so that the identity of individuals will remain anonymous.

6. If you desire a copy of the results of this study you may request a copy from the researcher.

7. Answer questions 1 through 72 by checking your answer which best fits the key:

Key

Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
5	4	3	2	1
[ ]	[ ]	[ ]	[ ]	[ ]

* *

	Strongly Agree 5	Agree 4	No Opinion 3	Disagree 2	Strongly Disagree 1
In my opinion, the implementation of a microcomputer based administration would likely succeed if a school board felt that:					
1. a computer could probably add to the quality of administration in the school district.	[ ]	[ ]	[ ]	[ ]	[ ]
2. computers should be used by school administrators more than they are now.	[ ]	[ ]	[ ]	[ ]	[ ]
3. the purchase of a microcomputer for administrative use should receive low budget priority.	[ ]	[ ]	[ ]	[ ]	[ ]
4. a microcomputer would be an unnecessary luxury for our school administration.	[ ]	[ ]	[ ]	[ ]	[ ]
5. school administrators should learn more about microcomputers and how to use them as problem-solving tools.	[ ]	[ ]	[ ]	[ ]	[ ]
In my opinion, a school board must be willing to provide the financial support for:					
6. the purchase of <u>at least one</u> 48-K microcomputer for administrative use.	[ ]	[ ]	[ ]	[ ]	[ ]
7. the purchase of a line-printer to produce hardcopy reports.	[ ]	[ ]	[ ]	[ ]	[ ]
8. the purchase of the management software programs which the superintendent feels would be most appropriate for administrative use in the school district.	[ ]	[ ]	[ ]	[ ]	[ ]
9. the training needed to teach the superintendent how to operate a microcomputer for management purposes.	[ ]	[ ]	[ ]	[ ]	[ ]
10. the annual costs for microcomputer maintenance and supplies.	[ ]	[ ]	[ ]	[ ]	[ ]
11. the in-service costs to keep the superintendent informed about the availability of management software and advancements in microcomputer technology.	[ ]	[ ]	[ ]	[ ]	[ ]
12. any miscellaneous costs related to the administrative use of a microcomputer which may occur throughout the year.	[ ]	[ ]	[ ]	[ ]	[ ]
In my opinion, an individual who uses a microcomputer as a management tool should:					
13. understand enough about microcomputer hardware to turn the microcomputer on, insert a disk into the disk drive, and load a program into the computer.	[ ]	[ ]	[ ]	[ ]	[ ]
14. understand enough about monitor commands to make the microcomputer hardware operational.	[ ]	[ ]	[ ]	[ ]	[ ]
15. understand enough about BASIC systems commands to allow him/her to make use of almost any management software program.	[ ]	[ ]	[ ]	[ ]	[ ]
16. have sufficient microcomputer skills to be able to "save" management programs or data on a disk for future use.	[ ]	[ ]	[ ]	[ ]	[ ]
17. understand enough about microcomputer error messages to know what course of action to take to correct most situations.	[ ]	[ ]	[ ]	[ ]	[ ]
18. understand enough about memory density to know when and how to use a data base concept or a data file concept.	[ ]	[ ]	[ ]	[ ]	[ ]

	Strongly Agree 5	Agree 4	No Opinion 3	Disagree 2	Strongly Disagree 1
19. be able to select the general purpose software which could best be used to meet the management needs of the school district.	[ ]	[ ]	[ ]	[ ]	[ ]
20. be able to select the specific application programs (i.e., payroll, financial accounting, etc.) which could best be used to meet the management needs of the school district.	[ ]	[ ]	[ ]	[ ]	[ ]
21. understand enough about BASIC programming language to write some simple microcomputer programs for school district administrative use.	[ ]	[ ]	[ ]	[ ]	[ ]
22. be well informed about the availability of software programs that could be used to help better manage school district affairs.	[ ]	[ ]	[ ]	[ ]	[ ]
23. be familiar with the role which a microcomputer plays in supporting management decisions in a school district.	[ ]	[ ]	[ ]	[ ]	[ ]
24. be aware of the advancements being made in computer technology and the potential impact of the microcomputer on educational administration.	[ ]	[ ]	[ ]	[ ]	[ ]

In my opinion, a 48-K microcomputer with two disk drives would probably be sufficient to perform the following administrative tasks in school districts where the student enrollment is 1000 or less:

25. maintain student records.	[ ]	[ ]	[ ]	[ ]	[ ]
26. process family census.	[ ]	[ ]	[ ]	[ ]	[ ]
27. calculate enrollment projections.	[ ]	[ ]	[ ]	[ ]	[ ]
28. keep student attendance records.	[ ]	[ ]	[ ]	[ ]	[ ]
29. maintain athletic eligibility lists.	[ ]	[ ]	[ ]	[ ]	[ ]
30. maintain student health records.	[ ]	[ ]	[ ]	[ ]	[ ]
31. compute and report student grades.	[ ]	[ ]	[ ]	[ ]	[ ]
32. schedule students into classes.	[ ]	[ ]	[ ]	[ ]	[ ]
33. compute transportation costs (route buses and/or activity buses).	[ ]	[ ]	[ ]	[ ]	[ ]
34. store guidance records.	[ ]	[ ]	[ ]	[ ]	[ ]
35. score and analyze tests.	[ ]	[ ]	[ ]	[ ]	[ ]
36. maintain staff personnel records (certification, seniority, etc.).	[ ]	[ ]	[ ]	[ ]	[ ]
37. project negotiations costs (salary simulation, etc.).	[ ]	[ ]	[ ]	[ ]	[ ]
38. process payroll related reports (sick leave, retirement, etc.).	[ ]	[ ]	[ ]	[ ]	[ ]
39. calculate payroll checks and process a payroll register.	[ ]	[ ]	[ ]	[ ]	[ ]
40. maintain facilities and equipment inventories.	[ ]	[ ]	[ ]	[ ]	[ ]
41. account for energy use.	[ ]	[ ]	[ ]	[ ]	[ ]
42. calculate percent of building utilization.	[ ]	[ ]	[ ]	[ ]	[ ]
43. process general accounting tasks (budgeting, receipts, expenditures).	[ ]	[ ]	[ ]	[ ]	[ ]
44. process accounts receivable/payable.	[ ]	[ ]	[ ]	[ ]	[ ]
45. forecast financial information.	[ ]	[ ]	[ ]	[ ]	[ ]

	Strongly Agree 5	Agree 4	No Opinion 3	Disagree 2	Strongly Disagree 1
46. process lunch program information (lunch counts, inventory, reports).	[ ]	[ ]	[ ]	[ ]	[ ]
47. process activity fund accounts.	[ ]	[ ]	[ ]	[ ]	[ ]
48. process certificates of deposit and investment information.	[ ]	[ ]	[ ]	[ ]	[ ]
49. process general ledger information.	[ ]	[ ]	[ ]	[ ]	[ ]
50. handle Special Education plans and budget accounting.	[ ]	[ ]	[ ]	[ ]	[ ]
51. perform statistical analysis (research activities).	[ ]	[ ]	[ ]	[ ]	[ ]
52. process library circulation tasks.	[ ]	[ ]	[ ]	[ ]	[ ]
53. reserve media (equipment, scheduling, inventory).	[ ]	[ ]	[ ]	[ ]	[ ]
54. plan projects and budgets (budget forecasting, etc.).	[ ]	[ ]	[ ]	[ ]	[ ]
55. process newsletters and other written correspondence (Word Processing).	[ ]	[ ]	[ ]	[ ]	[ ]
56. schedule activities (extra-curricular).	[ ]	[ ]	[ ]	[ ]	[ ]
57. process mailing lists/labels (students, staff, parents, etc.).	[ ]	[ ]	[ ]	[ ]	[ ]
58. store and retrieve information.	[ ]	[ ]	[ ]	[ ]	[ ]
59. gather data from larger data files (a mainframe computer)	[ ]	[ ]	[ ]	[ ]	[ ]
60. process data for the various financial reports required by the Nebraska Department of Education.	[ ]	[ ]	[ ]	[ ]	[ ]
61. process Special Education information such as test scores, IEP's, etc.	[ ]	[ ]	[ ]	[ ]	[ ]

In my opinion, the use of a microcomputer as a management tool in school district administration would probably:

62. diminish certain personnel costs significantly.	[ ]	[ ]	[ ]	[ ]	[ ]
63. optimize inventory levels and control.	[ ]	[ ]	[ ]	[ ]	[ ]
64. help school superintendents to better meet deadlines.	[ ]	[ ]	[ ]	[ ]	[ ]
65. provide superintendents with more and better information for decision making and planning.	[ ]	[ ]	[ ]	[ ]	[ ]
66. improve accuracy in word processing and computational problems.	[ ]	[ ]	[ ]	[ ]	[ ]
67. save filing space.	[ ]	[ ]	[ ]	[ ]	[ ]
68. improve data communications.	[ ]	[ ]	[ ]	[ ]	[ ]
69. significantly diminish the time which a superintendent spends doing clerical tasks so that he may spend time on more productive tasks.	[ ]	[ ]	[ ]	[ ]	[ ]
70. improve the utilization of school district resources.	[ ]	[ ]	[ ]	[ ]	[ ]
71. provide school superintendents with more managerial control of the school district.	[ ]	[ ]	[ ]	[ ]	[ ]
72. centralize the organization of data in a school district.	[ ]	[ ]	[ ]	[ ]	[ ]

Please indicate your best estimate of what a school district with a student enrollment of 1000 or less would have to budget in order to:

73. purchase a microcomputer hardware system (microcomputer with 48-K memory, two disk drives, monitor, and line-printer) which would satisfactorily process most administrative tasks? .....$_____

74. purchase the management software programs which a superintendent will need to meet the four or five most important administrative needs of the school district?..$_____

75. pay for a consultant to come into the district to help a superintendent set up a microcomputer based administration?.....$_____

76. cover annual recurring costs such as supplies, depreciation, in-service training, telephone line service, etc.?.....$_____

Data Managers' Comments

Henry Brus

". . . . Computers can indeed help to reduce costs, but, more importantly, they can allow you to tackle problems that you wouldn't otherwise undertake . . . ."

Bobby Chandler

Related to items 25 through 61 regarding the use of a microcomputer to process selected administrative tasks. A 48-K microcomputer system has the capabilities to process these administrative tasks "assuming off-line storage of data."

Related to item 75 regarding the use of a consultant to help the superintendent set up a microcomputer-based administration. "I would suggest using a sales representative of the various manufacturers at little or no cost."

Chris Chaney

Related to items 25 through 61 regarding the use of a microcomputer to process selected administrative tasks. "Answers are greatly dependent upon which system is chosen, quality of software, etc. . . ."

J. J. Davis

Related to items 73 through 76 regarding the amount of money school boards will need to budget for certain costs. "These costs are very broad since they will vary with brand names, consultant fees, self pace use, instructor vs. instructor and training, travel, distance, etc."

Jerry Hiclen

Related to items 73 through 76 regarding the amount of money school boards will need to budget for certain costs. "Estimates impossible in a volatile industry as this."

Dennis Huber

"To do some of the projects you have outlined, the software will not run effectively on a 48-K machine."

"Some of your recordkeeping functions will require the use of disk capacities above the base line offerings."

Dennis Huber (continued)

"In a remote location, a system failure could come at an inconvenient time and repairs may not be speedy."

Richard D. Hileman

Regarding items 26 through 61 related to selected administrative tasks. "The above checked 'agree' represents what I feel would be supported on a 48-K system with 2 disk drives. More information would be necessary about record sizes, program sizes, etc., to make good estimates."