ASSESSING THE USE OF MICROCOMPUTERS
BY ADMINISTRATORS IN HIGHER
EDUCATION IN OKLAHOMA

DISSERTATION

Presented to the Graduate Council of the
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By

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This study was conducted to examine the use of microcomputers and other computers by top administrators in the twenty-seven public colleges and universities in Oklahoma; to assess the impact that training and other factors have on the extent to which microcomputers are being used; and to identify trends in administrative computer usage.

The survey technique was utilized in collecting the data for this study. The survey instrument was developed for use in this study from a review of the literature, an evaluation by a panel of judges, and a pilot study. The survey instrument was sent to the administrators for business, academic, and student affairs via the president of each university in the 1986 spring and summer semesters. Seventy-four of the eighty-one or 91.4 percent of the administrators responded.

Following is a summary of the major findings of this study.

1. Fourteen of the seventy-four or 18.9 percent of the respondents personally use a microcomputer and 51.3 percent of the respondents have someone use a microcomputer on their behalf.
2. The most prevalent use of microcomputers is word processing; the most prevalent uses of mainframes are word processing and database management; and the majority of the respondents do not use a computer for spreadsheets, graphics, database management, telecommunications, and time management functions.

Computer functions rated highly important are word processing, spreadsheets, and database management.

3. Administrators feel they need more training in the use of computers.

4. Conditions affecting the use of microcomputers are an established process for evaluating software, funding for maintenance, and practice time.

5. Age is negatively correlated to the personal use of microcomputers.

6. Administrators believe that in the near future, the use of microcomputers will increase, the use of mainframes will remain about the same, and the number of jobs done without computers will decrease.
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CHAPTER I

INTRODUCTION

In a study sponsored by the National Institute of Education, Brown (4, p. 2) identified the functional areas of the administrative office tasks as decision support, communications, personal assistance, and task management. He contends that microcomputers can provide assistance as a tool in each of these areas.

Three types of decision support aids provided by microcomputers that have proved to be of most value to the novice and expert user are electronic worksheets for analyzing budgets and calculating "what if?" questions, graph and chart formatting aids for converting numerical data to a graphical representation, and database management systems for storage and recall of large quantities of information (1, 4, 7, 8, 10, 12). Microcomputer communication aids include electronic mail (telecommunications) and word processing for composing and editing reports and correspondence. The other administrative functional areas described by Brown (4, p. 4) where microcomputers can be used are personal assistance and task management aids for managing administrator's time, scheduling report preparation, tracking projects, and filing notes.
Bennett predicts that within the next few years most professionals in our colleges and universities will be using some sort of computer workstation (3, p. 2). Gantt believes that as administrators learn to use computers and do more of their own work, less clerical and support personnel will be required, saving time and personnel (6, pp. 6-7).

Oklahoma is currently experiencing a budget crisis. Now, and in the future, it is imperative that state tax revenues are spent wisely. It is equally important that equipment, including microcomputers, that has already been purchased be utilized effectively. A survey of the current uses of microcomputers, current level of computer training, and current adequacy of non-training conditions should provide information useful for assessing the utilization of microcomputers and aid in making planning and budget decisions.

Statement of the Problem

This study is concerned with the use of microcomputers by administrators in higher education in Oklahoma.

Purposes of the Study

The purposes of this study are as follows:

1. To identify the functions presently being performed with microcomputers by administrators in higher education.
2. To identify microcomputer functions not currently being performed but perceived to be important.

3. To rank the importance of microcomputer functions as perceived by administrators in higher education.

4. To assess the impact that training and other factors have on the extent to which microcomputers are being used by administrators in higher education.

5. To identify trends in administrative computer usage.

Research Questions

To achieve the purposes of this study, the following research questions are formulated.

1. To what extent do administrators personally use microcomputers or have someone in their immediate office use a microcomputer on their behalf?

2. What is the perceived importance of functions performed with computers by administrators and what type of computer is used to perform each of these functions?

3. Are there significant differences between the perceived level of computer training received by administrators and their opinions of the importance of this training?

4. Are there significant differences between the perceived adequacy of the following conditions affecting
5. Are the following factors related to the current use of computers by administrators?
   A. Age.
   B. Gender.
   C. Year in which last degree was granted.
   D. Years of experience.
   E. Administrative position.
   F. Enrollment and type of institution.
   G. Interest in learning more about microcomputers.

6. Is the use of microcomputers by administrators or by someone on their behalf replacing the use of mainframe computers for supplying administrative data?
Significance of the Study

Bender declares that "computers are no longer a luxury for a college of any size but rather a basic necessity—as basic a tool for college survival as the telephone" (2, p. 31). A study conducted by Booz, Allen, and Hamilton showed that 46 percent of top managers' time is spent communicating in meetings or over the phone and that a portion of the remaining 56 percent is spent creating or reading documents and seeking information (5, p. 3). If microcomputers were used exclusively for communication their use should improve productivity by saving time.

O'Daniel states that there is never enough time to accomplish all tasks that need to be done in the typical administrative office (10, p. 65). Since the microcomputer can "handle the routine, labor-intensive paper-handling tasks," more tasks can be accomplished during the work day than regular office staff can accomplish manually (10, p. 66). He also believes that the microcomputer will increase in importance as the demand for accumulating and reporting data increase (10, p. 66).

Palmer reports that most of the literature being written about the uses of microcomputers in education is targeted toward practitioners at the elementary and secondary levels (11, p. 109). A review of the literature produced few studies related to the use of microcomputers by administrators at four-year colleges and universities.
and none specifically related to institutions in Oklahoma. Therefore, the findings of this study should be of interest to administrators in higher education, regents of higher education, data processing support personnel, and legislators in Oklahoma. In addition, since the colleges and universities in Oklahoma are similar to those in the surrounding states this study may be of interest to the above groups in these states. At least this study could be replicated in other states to answer the same questions.

This study should provide the data needed to make more accurate policy and budget decisions by administrators, regents, and legislators. Without knowledge of current uses of computers, conditions affecting the use of computers, availability of computers, and current computer training levels in Oklahoma, decisions may be made arbitrarily. This study may also determine whether significant differences exist between the current level of computer related training and the importance of future computer training, and between the current adequacy of specified non-training conditions and the importance of those conditions.

In addition, administrators may be able to discover uses of computers previously unknown to them and may increase productivity. Data processing support personnel, computer dealers, and software developers may also be interested in the proposed uses of computers from a
training and marketing standpoint. Finally, educators may be able to use the data collected in this study in preparing curricula for prospective administrators.

Definition of Terms

The following terms are defined as follows:

1. **Microcomputer.**—A microcomputer is the smallest computer system with a microprocessor central processing unit that is designed for a single user (9, p. 293).

2. **Personal computer.**—This phrase is used interchangeably with microcomputer.

3. **Administrator.**—The three groups of administrators surveyed include general (business) administrators, academic administrators, and student service administrators.

4. **Use(s) or using.**—When used in reference to the use of a microcomputer, use(s) or using will refer to the administrator's personal use and someone using the microcomputer on the administrator's behalf unless otherwise stated.

Limitation

This study is confined to selected administrators in the twenty-seven public colleges and universities in the Oklahoma State System of Higher Education. Therefore, the findings of the study are limited to the responses of these
administrators collected in this survey during the spring and summer semesters in 1986.

Organization of the Study

Chapter I contains the introduction, statement of the problem, purposes of the study, research questions, significance of the study, definition of terms, limitations of the study, and basic assumptions. Chapter II provides a literature review of administrative computing in higher education, including use of microcomputers and factors affecting their use. Chapter III contains descriptions of the population, the development and administration of the instrument, and the methods used in collecting and analyzing the data.

Chapter IV presents the data findings from the research. Chapter V includes a summary, the findings, discussion of the findings, conclusions, and recommendations for further research.
CHAPTER BIBLIOGRAPHY


CHAPTER II

REVIEW OF THE LITERATURE

This chapter presents a review of the literature in administrative computing in higher education. The review is divided into three major areas: (1) administrative computing, (2) administrative use of microcomputers, and (3) summary.

Administrative Computing

"Most large colleges and school districts began to make use of computers for administrative purposes in the 1950s" (13, p. 42). Administrative data processing increased during the 1960s with improvements in technology and increased college enrollment (43, pp. 75-76). Thomas concluded from two national surveys, one in 1966-67 and the other in 1976-77, that in the ten years between the studies "the administrative use of the computer more than doubled, both in terms of the number of administrative areas served and the number of applications within those areas" (43, p. 77). The 1976 study identified the following administrative uses of the computer—admissions, records, financial management, planning, management, and institutional research (43, pp. 79-92). Later, in 1981, a national study found the administrative uses of the
computer were for student information, financial information, staff information, and physical facilities information (37, pp. 25-26).

The following is a general listing of administrative applications of the computer taken from Charp's *Layman's Guide to the Use of Computers in Education* (13, pp. 42-43).

**Student Applications**

1. Student Scheduling
2. Grade Reporting
3. Grade and Transcript Information
4. Daily and Summary Attendance Accounting
5. Student and Family Demographic Information
6. Health Records
7. Instructional Management
8. Test Scoring and Summary Information
9. Tuition and Fee Statements

**Personal Applications**

1. Payroll-checks and Deductions
2. Personnel Records
3. Staff Assignments
4. Certification Records
5. Health Records
6. Tax Information and W-2 Reports

**Financial Applications**

1. Budget/Accounting
2. Accounts Receivable/Payable
3. General Ledger
4. Purchase Order Generation
5. Salary Schedule Analysis and Forecasting

**Facilities/Equipment**

1. Room Locations/Capacities
2. Room Assignments/Utilization
3. Equipment Inventories
4. Maintenance Scheduling
5. Energy Utilization/Control
Research/Planning Applications

1. Budget Forecasting
2. Bus Routing
3. Statistical Analysis
4. Test Item Analysis
5. Project Planning/Evaluation (PERT/CPM)

Office Applications

1. Filing Systems
2. Word Processing
3. Mailing Lists and Labels

Library Applications

1. Bibliographic Information Retrieval
2. Circulation
3. Cataloging
4. Purchasing

The above listing is not intended to be exhaustive, but to be illustrative of the major and typical administrative uses of computers (13, p. 43). Suttle explains that these applications can be performed on a mainframe computer, a minicomputer, or a microcomputer equipped to emulate a terminal that is connected to a mainframe or minicomputer (42, p. 33). In addition, according to Spuck, microcomputer software is available for almost all of the above applications (41, p. 83).

Administrative Use of Microcomputers

History of Microcomputers

ENIAC (Electric Numerical Integrator and Calculator), designed in 1945, was one of the first electronic computers. It contained over 18,000 vacuum tubes, covered
1,500 square feet of floor space, contained 1,500 relays, used miles of wire, and weighed more than 30 tons (13, p. 2).

The following events made possible the microcomputer. The development of the transistor in 1947 by Bell Laboratories and, at about the same time, the stored program digital computer made computers more reliable, much smaller, required less power, and increased speed (11, p. 5; 13, p. 3). The development of the integrated circuit in 1959 by Texas Instruments led to the "microcomputer on a chip" in about 1975. The integrated circuit allowed for an enormous decrease in size, an increase in computer power, and a significant decrease in cost (11, p. 5; 13, p. 4). This reduction in cost and increase in power are contributing factors in the ability of academic administrators to acquire and use microcomputers.

Trends in Administrative Computer Use

The use of microcomputers by administrators has allowed a move from total dependence on a central computer system to distributed processing. In order for administrators to take full advantage of microcomputers, by personally using or having a staff member use one on their behalf, they must attain some level of computer literacy.

Decentralization.--O'Daniel, an administrator, states that "most administrators have a central data processing
office at their disposal, but they have found that computer printouts are often very complex and that at the same time they do not provide the information needed" (32, p. 61). Oftentimes the administrator must analyze the raw data provided by the computer center and then prepare a report of the summarized data (32, p. 61).

This does not mean that the information provided by the data processing department is useless. O'Daniel states that the information is necessary and it does simplify the administrative tasks, but the complexity of the information and the necessity to analyze and summarize the data produces a delay that has caused today's administrators to seek other tools (32, p. 61).

O'Daniel (32, p. 62) uses a microcomputer to prepare reports from the raw data provided by the data processing center. In this way, the microcomputer is used to complement the data processing center, not replace it.

Charp reports that the microcomputer allows the user to collect the data and generate reports independent of the central computer center, or the data can be collected through networking or linking of computers (13, p. 44). This application of a microcomputer allows generation of reports "more timely, more comprehensively, and less expensively than has been possible heretofore" (13, p. 44). Networking also allows the completed reports to be
transferred back to the central computer or to any other computer in the network (13, p. 44).

According to Bennett, it is a "clear fact of information systems life in higher education that the overall focus of attention is shifting from large, centrally oriented systems towards individuals and departments" (7, p. 2). The above statements support Bennett's belief that central computer systems and databases should not be abandoned, but that decentralized and connected departmental microcomputers will enable users to be linked electronically to the central system, other offices, and databases (7).

Computer Literacy for Administrators.—Computer literacy is defined by Haigh (19, p. 161) as "that compendium of knowledge and skill which ordinary, educated people need to have about computers in order to function effectively at work and in their private lives." Masat (26, p. 4) defines computer literacy as "understanding a computer and being able to use one." In a doctoral dissertation, Mims includes literacy among six computer competencies for public school administrators (30).

Even though computer literacy has no clear definition, it is an important issue. Bender and Conrad (5, p. 31) believe that using computers effectively in the college and coping with computer literate students requires a computer
literate faculty, staff, and administration. Some of the microcomputer applications of which administrators may take advantage are discussed in depth in the microcomputer applications section.

**Personal Use.**—A microcomputer or a terminal connected to a computer in an administrator's office may be operated by the administrator or immediate staff member. According to Fersko-Weiss, over 11 percent of the corporate heads in the top 500 ranked companies in sales use a personal computer (17, p. 73). Administrative users in a study at the University of Kansas expressed strong interest in satisfying some of their computing needs themselves (34, p. 7).

O'Daniel (32, p. 65) saves time and money by using a word processor to write routine memorandums instead of having the secretary take dictation or transcribe a tape. Also, using the same word processing software, on the same or different computer, his secretary can prepare rough drafts of documents for his review. In his office, the person who uses the microcomputer is determined by whomever needs the information and how critical it is (32, p. 65).

Mathews (28, p. 35) cites the situation where the administrator uses a microcomputer to prepare initial drafts or to rearrange reports already stored on diskette.
He concurs with O'Daniel that administrators and secretaries can share the same microcomputer (28, p. 35).

**Microcomputer Applications**

Brown states that the primary benefit that businesses hope to gain from microcomputers is increased productivity from management and staff (9, p. 1). He also says that microcomputers "can contribute significantly to increasing administrators' productivity in" decision support, communications, personal assistance, and task management (9, p. 2). Although others may classify these administrative tasks differently, they are similar to Brown's (4, 7, 8, 22, 23, 38). Literature concerned with each of these functional areas and the associated microcomputer applications is reported in the following sections.

**Decision Support.**--Jamieson defines a decision support system as "a class of computerized aids that offer personalized facilities that can be used to help an executive or manager make decisions or process routine work" (22, p. 56). He states that numerous packages are available for microcomputers that address the decision support area (22, p. 56). According to Brown, three types of decision support aids provided by microcomputers that have proved to be of greatest value to the novice and expert user are electronic worksheets (spreadsheets), graph
and chart formatting aids, and database management systems (9, p. 2).

A spreadsheet is an "electronic sheet" that can be thought of as an array or table with rows and columns of cells (9, p. 2). Brown lists modeling and budget construction, analysis, and updating as the most promising administrative uses of electronic spreadsheets (9, p. 2). According to O'Daniel, modeling and simulation, such as calculating 'what if?' questions, can be achieved by changing the values in the cells to see their effect on the overall budget (32, p. 63). "Economist David Cherub has estimated that 90 percent of all companies can do 90 percent of their business simulations on a microcomputer, indicating some of the versatility of these machines . . ." (9, p. 2).

O'Daniel (32, pp. 63-64) uses the spreadsheet to design templates which can be saved on diskette and reused. These templates contain the formulas and labels that can be easily altered to fit new situations (32, p. 63). Grade sheets, team statistics, scheduling, instructional time on task, salary negotiations, budget projection, budgets for special programs, and valuing inventory are uses of microcomputer listed by Pogrow (35, p. 11). Brown adds that some spreadsheets have the capability of producing graphs which can aid in decision support and communication (9, p. 2).
Jamieson believes that the use of a spreadsheet does not require any computer programming skill (22, p. 57). It does, however, require understanding of the spreadsheet concept and some knowledge of the commands.

Graphics aids are available that will convert numerical data to a graphical representation such as line graphs, histograms, and pie charts. According to Brown, graphic aids can be used to summarize data in a manner that makes it easier to spot relationships that are not readily apparent in tabular form (9, p. 2). Bailey states that graphics aids facilitate decision making by permitting quick access to, manipulation, and comparison of data, thus improving productivity and performance (4, p. 20). Brown adds that graphic aids are also used for generating reports and presentations (9, p. 2).

Brown (9, p. 3) calls a database management system an "electronic filing system." Such a system can be used anywhere there are large amounts of related data which require quick recall, easy update capability, and generation of standard or specialized reports. Database management systems are used to organize, store, retrieve, update, generate, and print reports of numerous amounts of data. O'Daniel (32, p. 64) says that a typical community college administrative office can operate with an inexpensive database management system.
According to Brown and Bailey, database management systems can be used in conjunction with graphic aids systems to produce graphs and charts, and with word processors to produce customized reports and mailing lists (9, p. 2; 4). Other uses of database management systems reported by Brown (9, p. 2) are in fund raising to keep track of donor contributions and to target specific populations, the creation of targeted mailing lists, and the production of reports from the records kept on file. Other examples include (9, p. 2) reports on faculty records, scheduled maintenance for buildings on campus, and number of degree recipients per year. Inventory control reported by Huntington (21, p. 95), purchasing reported by O'Daniel (32, p. 62), and student demographic data, lists of purchase orders, student disciplinary referrals, student athletic eligibility, overdue library books, club participants, nurse treatment records, vendor files, and special student populations listed by Pogrow (35, p. 11) are additional uses of database management systems. Charp adds that equipped properly, the microcomputer can retrieve the needed data from a central computer and store it on a diskette in order to create customized databases (13, p. 44).

Communications.—Communications is another important administrative task. Electronic mail (telecommunications)
and word processing are uses of microcomputers that will aid in communications according to Brown (9, p. 3). Mann (25, p. 26) believes that the major impacts that communications technology will have on colleges and universities are the reduction of physical travel between geographic locations, improvement of the transfer of information, and reduction of the cost of information exchange. According to a study by Booz, Allen, and Hamilton, 46 percent of managers' time is spent communicating in meetings or over the telephone (15, p. 78). The time saved in communication by microcomputers alone should free up time for an administrator to do other tasks.

Brown, Huntington, and Schneider report that word processing systems can be used to compose, edit, and revise reports, correspondence, and other documents (9, p. 3; 21, p. 93; 38, p. 3). All corrections can be made before making a paper copy. Mann says that this eliminates having to retype drafts of letters, lengthy reports, or other documents, which means that only the errors are retyped and/or missing text is added (Mann, p. 32). O'Daniel and Pogrow report that another valuable feature of most word processors is the ability to generate individualized form letters, which adds a personal touch (32, p. 62; 35, p. 11). Huntington adds that some word processors or stand alone software will check spelling and grammar (21, p.
93). In addition, he considers a word processor an important part of time management which will aid in "paper shuffling," another aspect of the task of communication (21, p. 92).

Examples of uses of word processors, provided by Huntington, are writing letters to parents, staff members, general correspondence, staff bulletins, and reports (21, p. 92). Pogrow (35, p. 11) lists customized contracts and policy guides and Haigh (19, p. 33) lists writing speeches, papers, books, and policies.

Huntington suggests that word processing is a good way to get started in microcomputing (21, p. 92). Then the user can move on to an electronic spreadsheet and, finally, add a database management system.

Brown states that electronic mail can supplement conventional mail by allowing the administrator to communicate, almost instantly, with one person or many people simultaneously in many different locations (9, p. 4). According to Jamieson (22, p. 58), the major advantage of electronic mail is the ability to conduct asynchronous conversation, which eliminates the problem of "telephone tag." This means that messages can be sent without the receiver having to answer the phone and the receiver can read the mail at his leisure. Brown (9, p. 3) lists communication among administrators and staff as a use of electronic mail. The reduction in time between sending and
receiving a message, the reduction in paper, and the elimination of missed telephone connections are some of the advantages of electronic mail over traditional mail according to Brown (9, p. 3). The intended recipient must have access to the same electronic mail system and Mann adds that the users' systems must be compatible (25, p. 33) in order to utilize electronic mail.

According to Brown, a microcomputer that is equipped for electronic mail can also be used to access information services and computer networks, which may include the campus mainframe (9, p. 3). This capability can also be a valuable asset in obtaining information for decision making. Suttle (42, p. 33) states that microcomputers can be used to access the power of other computers, to the people who use those systems, and to the information stored in them. The systems may be located locally or across the country.

Brown adds that, properly equipped, a microcomputer can emulate a computer terminal which will allow access to the mainframe computer (9, p. 3). Thus the microcomputer can be used to operate another computer in performing all of the applications listed in the previous section.

Personal Assistance, Task Management, and Programming.—Examples of microcomputer use for personal assistance provided by Brown include managing the
administrator's time daily by keeping track of appointments and other tasks, sending and collecting messages, and keeping notes (9, p. 4). Scheduling the preparation of reports and functions that must be completed regularly or periodically and keeping track of employee's schedules especially when several are involved in a complex project so that deadlines can be met are additional examples of task management uses of microcomputers reported by Brown (9, p. 4).

Word processing, electronic spreadsheets, and database management systems are classified as general applications software. O'Daniel states that "most administrative tasks can be handled with one or more of these systems" (32, p. 62) as illustrated by the above examples. However, specialized applications may call for customized software. According to Brown, the availability of such software can be a problem since most of the available software is designed for small business use and may have to be tailored to satisfy the specific needs (9, p. 4). It should be understood that some software packages are very difficult, if not impossible, to alter.

Some administrators may have the expertise to write their own software and not be dependent on others. Since a wide variety of applications software is available, the need for knowing how to program is decreasing. However, Haigh reports that it is believed that programming helps
improve problem-solving skills (19, p. 165). If administrators have the time and desire to program, in general, microcomputers are adequate for development of complex software especially with current internal memory, high level languages, and storage devices.

**Surveys and Studies**

As previously stated, Palmer reports that most of the literature written about the use of microcomputers in education is targeted toward practitioners at the elementary and secondary levels (33, p. 109). Mays adds that the studies that are done about computer utilization in higher education deal with inventories of hardware and little about the use of the equipment (29, p. 106). A discussion of the surveys and studies closely related to this survey follows.

A recent study, 1985, made by Colley as her doctoral dissertation, surveyed the division chairs in the seven community colleges in the Dallas County Community College District (14). Word processing, database management, spreadsheet, telecommunications, programming, and time management applications were surveyed. Computer training and conditions impacting the use of microcomputers were also surveyed. The following is a brief summary of the findings of Colley's survey.
Word processing was the most prevalent use of the microcomputer (14, p. 98) with seventy-six percent of the respondents reporting moderate to high use of word processing to create and edit lengthy documents and reports. Sixty-three percent reported moderate to high use of word processing for creating and editing brief documents and fifty-four percent reported moderate to high use of word processing for mass mailings (14, p. 98). Approximately twenty-five percent of the respondents reported moderate to high use of database management for recording and tracking the status of divisional goals, for book orders, and class scheduling (14, p. 98). Twenty-four percent reported moderate to high use of spreadsheets for projecting enrollment while eighteen percent reported moderate to high use of spreadsheets for budgeting, fourteen percent reported moderate to high use of programming to develop applications software, and twelve percent reported moderate to high use of database management for equipment inventory (14, p. 98).

Colley's survey found no significant relationships between the division chair's self-ratings of current overall use and age, gender, degree level, years as division chair, or years with the district (14, p. 100).

However, Colley reported significant differences between the current use ratings and importance ratings for
thirteen microcomputer functions (14, p. 100). The functions were:

word processing for mass mailings, spreadsheets for projections, spreadsheets for budgeting, graphics for visual elements, database management for faculty records, database management for class scheduling, database management for book orders, database management for inventory, database management for recording and tracking division goals, telecommunications for electronic mail, telecommunications for access to the mainframe computer, telecommunications for access to remote databases, and programming for custom applications (14, p. 100).

The study showed no significant differences between the current use ratings and importance of use ratings for word processing for brief documents and for lengthy documents (14, p. 101).

The study also showed that there were significant differences between the current level of training and importance of training in computer orientation, word processing, database management, spreadsheet, graphics, programming, and how to evaluate instructional and administrative software (14, p. 101). Regarding conditions impacting the use of microcomputers, the study found significant differences between the adequacy of conditions affecting computer use and importance of the condition (14, p. 101). These conditions include: "environmental considerations, process for evaluating software, funding for computer supplies," "practice time, availability of applications software, availability of peripherals, technical support, and computer availability" (14, p. 101).
A study by Slovacek, 1985, that surveyed twenty-two California postsecondary institutions reported 1,029 administrative microcomputers in use and that 559 microcomputers were planned for purchase the next year (40, p. 5). Word processing was reported as the most popular use of microcomputers by 89.5 percent of the respondents (40, p. 6). The use of spreadsheets, database management, telecommunications, graphics, electronic mail, and integrated software followed word processing in popularity, in that order (40, p. 6). In addition, fourteen or 73.7 percent of the institutions reported that they provided a microcomputer training program to administrative personnel (40, p. 6). Slovacek observed that formal planning processes for implementation of computers were "more apt to cover large mainframe and minicomputer networks than to plan explicitly for the microcomputing environment" (40, p. 8).

Pogrow, 1985, surveyed vendors and users of administrative software (36, p. 72). The findings indicated that most users were happy with their systems. It was also found that "the quality of administrative programs has improved substantially over the years, but student management software is generally further ahead in providing needed features than financial management software" (36, p. 72). The survey also indicated that almost all of the administrative software available for microcomputers is
being developed for the IBM PC XT and AT (36, p. 73). In addition, major limitations with available systems related to microcomputers include the capability to exchange information across more than a single station and inadequate multi-tasking systems (36, p. 73).

Pogrow concluded from the survey that "continued improvement in software will depend on the two key factors of: a) Better hardware; and b) Increasing sophistication on the part of administrators" (36, p. 74). He believes that educational administrators have made great strides in adapting to the computer age and with increased sophistication of administrators in evaluating and applying computers will increase the quality of administrative software (36, p. 74).

Browne, 1984, distributed four questions to hundreds of presidents in higher education of which only seventy-five responded (10, p. 86). Question one asked "Are you personally interested in executive computing?" Sixty-nine of the seventy-five respondents answered "yes" (10, p. 87). Question two asked "if the president had ready access to a microcomputer." Sixty-five percent responded "yes" (10, p. 87). Question three asked "Do you operate your computer?" Fifty percent responded "yes" (10, p. 87). Browne noted that "administrators of senior public institutions were most likely to be operators, while those in two-year colleges were least likely" (10, p. 87). He
also found that the "business officer, registrar, admissions officer and librarian are more apt to use computers than the president, academic affairs, provost or student affairs officer" (10, p. 87). The fourth question asked about training. Approximately "half responded affirmatively, while the two-year college executives were more negative than positive" (10, p. 87).

Howard, 1984, studied causes and treatments for computer anxiety (20). His findings contradicted "the popular notions that managers are generally negative about the usefulness of microcomputers and that computer anxiety is an intense and widespread phenomenon" (20, p. 156). He found that most managers are positive about personally using microcomputers and the serious cases of computer anxiety are low with minimal intensity (20, p. 156). In addition, he believes that hands-on microcomputer training can greatly reduce most anxieties. Howard adds that the study showed "that this experience should be given over an extended period, and that a brief session will probably not succeed in significantly reducing computer anxiety" (20, p. 157). Therefore, "organizations that are trying to indoctrinate managers to microcomputing through short, intensive workshops may be disappointed at the results" (20, p. 157).

A national study by Bender and Conrad, 1983, found that over ninety-one percent of the 168 small two-year
colleges reported having one or more microcomputers on campus (6, p. 10). Also, the applications of microcomputers were reported as sixty-eight percent direct instruction, twenty percent instructional support, and 12 percent for administrative purposes (6, p. 11). These applications were performed with locally developed software and purchased software packages (6, p. 11). The study also reported "an absence of policies in the areas of microcomputer procurement, staffing, usage, and evaluation" (6, p. 17).

Bender and Conrad list numerous implications from the study related to policy planning, hardware, software, personnel, and costs/funding (6, pp. 19-21). One of the implications is that every "institution should follow a systematic approach to the development, introduction, operation, maintenance, and assessment of microcomputing" (6, p. 19). The report listed the need for established hardware and software acquisition, emphasizing that software is a very important issue since the lack of appropriate software makes a microcomputer of little value (6, pp. 19-20.) Another implication is the importance of the training of faculty, staff, and administrators in computer literacy and use of microcomputers in reducing the problems in introducing word processing and microcomputing (6, p. 20). The report also lists cost as a major deterrent to the use of microcomputers (6, p. 21).
Schultz, 1983, studied the classroom and administrative applications of microcomputers in the secondary schools in the Upper Peninsula of Michigan (39). The survey found that less than ten percent of the forty-nine schools used a microcomputer in the office for such things as attendance, student records, form letters, scheduling, and accounting (39, p. 55). Word processing, budget planning, and athletic scoring were reported just barely over ten percent (39, p. 55).

Dougherty, 1982, conducted a survey of university computing facilities asking about the use of terminals, microcomputers, mainframes, networks, and the effects of university enrollments and computer science curricula on the number of terminals and networks (16, p. 69). Sixty-one percent or 105 responded to the survey. "Only a few schools reported microcomputer use of more than twenty machines" (16, p. 77). Dougherty concluded that computer networks will be in use in universities before the end of the decade (16, p. 76). In addition, the DEC VAX 11/780 is likely to become the standard instructional computing system and very large mainframes will be confined to a few prestigious, research oriented institutions (16, p. 76).

Carl, 1983, surveyed Departments of Educational Administration within the Colleges of Education seeking information on what Departments of Educational Administration were doing to provide training and information
for school administrators (12, p. 61). Sixteen of the thirty-seven respondents offered at least one course in computers and education (12, p. 61-62). In addition, computer topics were included in other departmental courses such as "School Management Systems" (12, p. 62). Eight percent required computer-based education courses to be taken in other departments within the College of Education (12, p. 62).

Abernathy, 1982, conducted an analysis of microcomputer use and policies at New Mexico State University and other land grant universities (1). Research applications, teaching/service applications, and administrative applications were surveyed (1). Administrative applications of microcomputers reported were "word processing, data storage and retrieval, budget analysis, inventory control, scheduling, student records for the unit's use, and report generation" (1, p. 70). Abernathy reported that general registration, student records, personnel, and payroll are performed on the central computer (1, p. 70). Projected microcomputer use found in the survey include microcomputer networks for accessing office, university, state, and national networks (1, p. 75). Abernathy also reported that thirteen respondents thought increasing microcomputer use would generate mainframe use and some thought that mainframes might become more archival in nature (1, p. 78).
Regarding policies for administrative applications, Abernathy writes that many administrative units want to use microcomputers for increasing productivity (1, p. 158). She emphasizes that if microcomputers are to be used for this purpose, "coordination with other departments and colleges would be advantageous because training and equipment could be coordinated" (1, p. 158). Abernathy adds that interest in "some administrative uses may be temporary and may depend on the price of word processors, availability of useful information and software packages for administrative units on the central computer and availability of support staff" (1, p. 158).

Angel and McCusker, 1982, surveyed all two-year colleges in the United States in an effort to assess how community colleges were responding to the "Information Revolution" (3, p. 23). The questionnaire solicited information of the types of computer systems employed, the types of services provided, the types of administrative uses, and the types and levels of instructional use (3, p. 23). The survey did not differentiate between the type of computer. In the area of administrative usage, the questionnaire requested information on "budget, accounting, payroll, personnel, admissions, registration, attendance, grading, and transcripts" (3, p. 23). Angel found that only five percent of the respondents did not utilize computers in one or more of the above areas and that most
of the institutions were making heavy use of computers (3, p. 23). He also found that much of their processing activities had manual components.

Russell's doctoral research, 1981, on computer-based information systems obtained data on the use of administrative computing and information systems through a national survey of colleges and universities (37, p. 25). About forty-three percent of the 3,167 institutions surveyed responded to the questionnaire and 80 percent reported use of computers for administrative purposes (37, p. 25). The survey did not provide data on the use of microcomputers.

Factors Influencing the Personal Use of Computers

Factors impacting the successful introduction of technology include planning, money, time, knowledge or training, and a supportive environment (6, p. 22; 27, p. 38). Bender and Conrad state that the institutions that have been most successful with introducing new technology are those that have planned in advance (6, p. 22). They report that planning should include adopting policies regarding: (1) control of information, (2) hardware procurement, operations, location, and long term needs, (3) software development and vendors, and (4) personnel technical expertise and literacy (6, pp. 21-22).
Kliem (24, p. 52) states that a common error made by management is ordering hardware and software without first determining office requirements or ways to fulfill them. Instead, management should decide "who needs to do what, when, where and how in advance" (24, p. 52). Not involving the user in the planning is another frequent mistake (24, p. 52).

Masland believes that the availability of funds for purchasing hardware, software, and supplies, paying for special workshops and other types of training, and paying student assistants is obviously a factor in successful automation (27, p. 38). He also considers time as important as money (Masland, p. 38). In a survey reported by Masland, the lack of sufficient time for computing was mentioned by every faculty member surveyed (27, p. 38). Another mistake, related to time, made by managers is trying to automate too much, too rapidly (24, p. 52).

It is obvious that knowledge of how to operate a microcomputer is very important. Spuck and Atkinson (41, p. 89) suggest that training should be a part of the purchase of the microcomputer system. Huntington (21, p. 92) proposes starting with word processing and then moving to spreadsheets, while Needle states that "the quickest way to learn something with your computer is to have someone show you" (31, p. 103). The expert or the person that provides the information may be other administrators,
faculty members, students, or computer support personnel. The amount of time for mastery of a particular application will vary depending on the computer program itself, the users capacity and interest in learning, and documentation supplied with the program (31, p. 105).

Training courses and tutorial software are available for many software packages. A course's usefulness is determined by the course material, qualifications of the instructor, and the student's desire to learn, according to Needle (31, p. 105). An alternative to courses is tutorial software. Tutorials range from introductory programs to sophisticated applications such as Lotus's Symphony (31, p. 105). Some programs contain a "help" function that provides hints or instructions on demand. Regardless of how knowledge is attained, ideally, learning "should not be done haphazardly or under the pressure of an office setting where you can easily be distracted" (31, p. 103). Pasche states that the wide variety of backgrounds, experience, and need of assistance should be carefully considered in planning the training (34, p. 6).

Masland (27, p. 39) includes facilities, resource allocation, support personnel, computer literacy policy, and institutional characteristics as elements of a supportive environment. Ergonomics is an essential consideration in the successful automation of an office. According to Ganus, some of the elements of ergonomics of
concern are lighting, visual display terminals, furniture, ventilation and humidity control, and noise and interruption control (18). She also (18, p. 24) suggests that consideration should be given to the following needs: human, social, motivational, aesthetic, sensory, anthropometric, and ambient.

**Oklahoma Practices and Policies**

A letter was written to the Oklahoma State Regents for Higher Education asking for information on available surveys and studies related to the use of microcomputers in higher education in Oklahoma. The response from the regents stated that no studies, surveys, or research reports on the subject are available. The letter did, however, indicate that a survey conducted by the Office of State Finance was available concerning hardware and software purchased by each institution.

**Summary**

Chapter II reviews the literature in administrative computing in higher education. The review covers administrative computing in general, administrative use of microcomputers, including history of microcomputers, trends in administrative computer use, microcomputer applications, recent surveys and studies on computer use, and factors influencing the personal use of computers.
Greater availability of microcomputers and user-friendly software are allowing administrators access to a powerful tool. Computer software is available that will help in decision support, communications, personal assistance, and task management. Word processing seems to be the most popular use of microcomputers.

Most of the surveys and studies concerning computers address inventories of hardware and software or they are targeted toward the elementary and secondary level. However, studies do exist on the use of microcomputer by administrators such as Colley's survey of Dallas County Community College District and Slovacek's survey of post secondary institutions in California. A major concern of some of the studies is the need for policies regarding microcomputer procurement, staffing, usage, and evaluation.
CHAPTER BIBLIOGRAPHY


20. Howard, Geoffrey S., Computer Anxiety and Other Determinants of Managers' Attitudes Toward the Usefulness of Microcomputers in Management, unpublished doctoral dissertation, Graduate School of Management, Kent State University, Kent, Ohio, April, 1984.


CHAPTER III

RESEARCH METHODS AND PROCEDURES

This study of computer use by administrators in the public colleges and universities in the Oklahoma state system of higher education utilized the survey technique. This chapter contains a description of the research methods and procedures of the study. It is divided into five major areas: (1) the population, (2) development of the survey instrument, (3) administration of the final survey instrument, (4) treatment of the data, and (5) summary.

The Population

The subjects of this study were the administrator for academic affairs, administrator for business affairs, and administrator for student affairs at each of the twenty-seven public colleges and universities in Oklahoma. The president of each institution was asked to identify the appropriate administrators.

Description of the Survey Instrument

Preliminary Survey Instrument

The survey instrument was developed from questions on the survey used in a doctoral dissertation by Colley (1, pp. 113-115). Colley's questionnaire was designed
specifically for the administrators in the Dallas County Community College District. Additional questions were developed from a review of the literature and were approved by a panel of judges.

The preliminary survey instrument is divided into seven parts. Part I consists of three questions regarding the administrators' personal use of microcomputers.

Part II consists of sixteen computer functions and one space for the respondent to identify another function. Each function has two scales. The scale (Micro, Main, Other, None) is used to specify the type of computer(s) or that a computer is not used in performing that function. The scale one (low) to three (high) is used to rate the importance of the function.

Part III consists of eight training areas and one space for the respondent to identify another training area. Each training area has two scales from one (low) to three (high). The first scale is used to rate the administrator's current level of training. The second scale is used to rate the importance of future training.

Part IV consists of eight conditions affecting computer use and one space for the respondent to identify another condition. Each condition has two scales from one (low) to three (high). The first scale is used to rate the current adequacy of each condition. The second scale is used to rate the importance of the condition.
Part V consists of eight questions about the respondent: a self rating from one (low) to five (high) of the current microcomputer use, the respondent's age by group, the respondent's gender, year in which last degree was granted, years of administrative experience, administrative position, enrollment and type of institution, and interest in learning more about microcomputers.

Part VI consists of six questions that seek the administrator's opinion on the percentage of the use of each type of computer system for three years ago, currently, and in three to five years. Part VII solicits comments on the use of computers in higher education administration.

Panel of Judges

A panel of judges was selected to evaluate the preliminary survey instrument. The individuals were selected on the basis of extensive knowledge of administrative computing and/or administrative experience. The judges were: (1) the acting Dean of the College of Education at North Texas State University, Denton, Texas, (2) the Chairman of the Computer Science Department at Southeastern Oklahoma State University, Durant, Oklahoma, and (3) a recent recipient of the Doctor of Education in Higher Education from North Texas State University,
Denton, Texas whose dissertation involved research in administrative computer use.

The preliminary survey instrument (Appendix A) along with a copy of the research purposes of the study, a cover letter/rating sheet (Appendix B), and a stamped self-addressed envelope was mailed to the judges. The judges were asked to examine each question and rate it as acceptable for the study, unacceptable for the study, or unable to decide. In addition, the judges were asked if they agree, disagree, or are undecided about the statements: (1) the omission of a "Don't Know" response is acceptable, (2) at least one item is present for each measurable objective, (3) the language of each item marked acceptable is easily understood, and (4) the arrangement of the items on the questionnaire is acceptable. An item was retained with agreement from a majority of the judges. The judges were also asked to list any words that needed defining.

**Construction of the Final Survey Instrument**

The responses of the judges and a pilot study were used to construct the final survey instrument. All questions on the preliminary survey instrument were retained. Only minor changes were made in one question and the directions in Part II. Question three was changed from "Are you using the microcomputer to do jobs presently done
with a mainframe computer?" to "Are you or someone in your office using the microcomputer to do jobs presently done with a mainframe?" The keys to the abbreviations for question one in the directions to Part II were rearranged to be consistent with the scale. In addition, minicomputer was added to the abbreviation "Main."

A pilot study was performed before the questionnaire was finalized. It was sent to the administrator for academic affairs, administrator for business affairs, and the administrator for student affairs at Southeastern Oklahoma State University, Durant, Oklahoma. All questionnaires were returned.

The pilot study identified a potential problem in the directions for the second question in Part II. The sentence "Please respond to the importance column even if you are not currently using a computer" was added in an effort to get non-users of microcomputers to answer the computer system and the importance questions.

Administration of the Final Survey Instrument

The survey instrument (Appendix C) was administered to the administrator for academic affairs, the administrator for business affairs, and the administrator for student affairs at each of the twenty-seven public colleges and universities in Oklahoma except Southeastern Oklahoma State University. SOSU was not included because of its
participation in the pilot study. Each president of the institution was mailed a packet that contained a personal letter from the President of Southeastern Oklahoma State University (Appendix D) and three envelopes. The letter asked the president to attach a note to each envelope requesting participation in the study and to forward them to the appropriate people. One envelope was addressed to the administrator of academic affairs, one to the administrator for business affairs, and the other to the administrator for student affairs. The letter also promised the presidents a summary of the findings.

Each envelope contained a questionnaire (Appendix C), a cover letter (Appendix E), and a stamped self-addressed envelope. Approximately thirty days after the first mailing, a follow-up questionnaire with a cover letter (Appendix F) and another stamped self-addressed envelope were sent to non-respondents in care of the president of the institution (cover letter in Appendix H).

Treatment of the Data

After collection and inspection of the questionnaires, LOTUS 1-2-3 (2) and STATS-2 (3) were used to analyze the data. The major findings are presented and displayed in tabular form in Chapter IV. Frequencies, modes, and percentages are reported for the data collected on computer use, computer functions, computer training, conditions
affecting computer use, respondent information, and trends in administrative computer usage. The computer functions are listed in decreasing order of importance.

Chi square analysis was used as a test of statistical significance to determine whether significant differences existed between the perceived current level of computer training received by administrators and their opinions of the importance of future training, and between the perceived current adequacy of conditions affecting computer use by administrators and their opinions of the importance of these conditions. The chi square values are reported with those at the .05 or less level of probability reported as significant.

Correlation coefficients were calculated and tabulated to establish the strength of the relationship between how the respondents rate their overall use of the microcomputer and age, graduation date, administrative experience, and size of enrollment. The chi square test of independence was used to test the relationship between the self-rated overall use of the microcomputer, personal use, importance of computer function, and type of computer system and age, administrative position, enrollment, and type of institution.

A weighted discrepancy index was calculated to establish a discrepancy ranking for future computer training and conditions affecting computer use. The
formula (1, p. 58), Discrepancy index = (Importance mean - "Current training mean") \times Importance mean, was used to rank the future computer training areas. The formula was converted to calculate the discrepancy indices to rank the conditions affecting computer use by replacing "Current training mean" with "Current adequacy mean."

Comments solicited concerning the future use or current use of computers in higher education and/or campus data processing centers are listed. A few unsolicited comments were also noted.

Summary

The main purpose for the data collected in this survey was to analyze the use of computers, especially microcomputers, by high level administrators in the twenty seven public colleges and universities in the state of Oklahoma. Questionnaires were distributed to the administrator for academic affairs, administrator for business affairs, and administrator for student affairs at each institution. The survey instrument was developed by the researcher from questions on the questionnaire used in a dissertation that surveyed the use of microcomputers by division chairs in the Dallas County Community College District. In addition, a review of the literature, an evaluation by a panel of judges, and a pilot study contributed to the construction of the final version of the survey instrument. This
chapter also describes the procedures used in collecting and analyzing the data.


CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

This chapter presents, analyzes, and discusses the findings of this study. The data are examined as they relate to the six research questions in numerical order. Respondent comments and a summary are provided at the end of the chapter.

Analysis of Data

The survey instrument (Appendix C) was mailed to eighty-one administrators which included the administrator for student affairs, the administrator for business affairs, and the administrator for academic affairs at the twenty-seven public colleges and universities in the state of Oklahoma. The initial mailing and a follow-up mailing produced a 91.4 percent return; that is, seventy-four of the eighty-one administrators responded to the questionnaire. Virtually equal numbers of administrators from each group responded to the questionnaire. The seventy-four returned questionnaires included twenty-six or 35 percent of the total from the administrators for student affairs, twenty-three or 31 percent of the total from the administrators for business affairs, and twenty-five or 34
### TABLE I

**NAMES, LOCATIONS, AND ENROLLMENTS* OF THE PUBLIC COLLEGES AND UNIVERSITIES IN OKLAHOMA**

<table>
<thead>
<tr>
<th>Comprehensive Universities</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Oklahoma, Norman</td>
<td>19,668</td>
</tr>
<tr>
<td>Oklahoma State University, Stillwater</td>
<td>19,480</td>
</tr>
<tr>
<td>Regional Universities</td>
<td></td>
</tr>
<tr>
<td>Central State University, Edmond</td>
<td>12,176</td>
</tr>
<tr>
<td>East Central University, Ada</td>
<td>3,952</td>
</tr>
<tr>
<td>Northeastern State University, Tahlequah</td>
<td>7,826</td>
</tr>
<tr>
<td>Northwestern Oklahoma State University, Alva</td>
<td>1,642</td>
</tr>
<tr>
<td>Southeastern Oklahoma State University, Durant</td>
<td>4,057</td>
</tr>
<tr>
<td>Southwestern Oklahoma State University, Weatherford</td>
<td>4,789</td>
</tr>
<tr>
<td>Cameron University, Lawton</td>
<td>4,799</td>
</tr>
<tr>
<td>Langston University, Langston</td>
<td>1,937</td>
</tr>
<tr>
<td>Oklahoma Panhandle State University, Goodwell</td>
<td>1,193</td>
</tr>
<tr>
<td>University of Science and Arts of Oklahoma, Chickasha</td>
<td>1,179</td>
</tr>
<tr>
<td>Medical School</td>
<td></td>
</tr>
<tr>
<td>The Oklahoma College of Osteopathic Medicine and Surgery, Tulsa</td>
<td>326</td>
</tr>
<tr>
<td>Junior and Community Colleges</td>
<td></td>
</tr>
<tr>
<td>Carl Albert Junior College, Poteau</td>
<td>2,066</td>
</tr>
<tr>
<td>Connors State College, Warner</td>
<td>1,475</td>
</tr>
<tr>
<td>Eastern Oklahoma State College, Wilburton</td>
<td>2,153</td>
</tr>
<tr>
<td>El Reno Junior College, El Reno</td>
<td>1,514</td>
</tr>
<tr>
<td>Murray State College, Tishomingo</td>
<td>1,301</td>
</tr>
<tr>
<td>Northeastern Oklahoma A&amp;M College, Miami</td>
<td>2,415</td>
</tr>
<tr>
<td>Northern Oklahoma College, Tonkawa</td>
<td>1,766</td>
</tr>
<tr>
<td>Oklahoma City Community College, Oklahoma City</td>
<td>8,158</td>
</tr>
<tr>
<td>Rogers State College, Claremore</td>
<td>2,804</td>
</tr>
<tr>
<td>Rose State College, Midwest City</td>
<td>10,084</td>
</tr>
<tr>
<td>Seminole Junior College, Seminole</td>
<td>1,283</td>
</tr>
<tr>
<td>Tulsa Junior College, Tulsa</td>
<td>14,964</td>
</tr>
<tr>
<td>Western Oklahoma State College, Altus</td>
<td>2,036</td>
</tr>
<tr>
<td>Sayre Junior College, Sayre</td>
<td>421</td>
</tr>
</tbody>
</table>

*Spring 1986 enrollment figures from the Regents for Higher Education Report.*
percent of the total from the administrators for academic affairs.

Table I provides the names, enrollments, type, and location of the colleges and universities whose administrators were surveyed. The data in this table are also used in responding to research question five.

Research Question One

Research question one asks, "To what extent do administrators personally use microcomputers or have someone in their immediate office use a microcomputer on their behalf?" Part I of the questionnaire elicited this information. Table II presents these data.

TABLE II
MICROCOMPUTER USE

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>%</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do you personally use a microcomputer in conducting the duties of your office?</td>
<td>14</td>
<td>18.9</td>
<td>60</td>
<td>81.1</td>
</tr>
<tr>
<td>2. Does someone in your office use a microcomputer in conducting your business?</td>
<td>38</td>
<td>51.3</td>
<td>36</td>
<td>48.7</td>
</tr>
<tr>
<td>3. Are you or someone in your office using a microcomputer to do jobs previously done with a mainframe computer?</td>
<td>16</td>
<td>51.6</td>
<td>15</td>
<td>48.4</td>
</tr>
</tbody>
</table>
Responses to question one in Table II show that fourteen of the seventy-four or 18.9 percent of the respondents personally use a microcomputer, while answers to question two show that 51.3 percent of the administrators have someone use a microcomputer on their behalf. Also note that twenty-four or 40 percent of the administrators who do not personally use a microcomputer have someone in their immediate office use one on their behalf.

Responses to question three show that approximately half, 51.6 percent, of the administrators are using a microcomputer to do jobs previously done with a mainframe computer. However, nine of the forty administrators who were supposed to answer question three did not respond.

Discussion.—No studies were located for comparison to equivalent populations for questions one through three. However, Fersko-Weiss found that over 11 percent of corporate heads in the top 500 ranked companies use a personal computer (5, p. 73).

Colley's study differed, in part, from this study in that microcomputers were assigned to the administrators and different levels of administrators were surveyed. In addition, questions specifically on the personal use of microcomputers and use of microcomputers by someone on the administrator's behalf were not posed (4).
Examples of the personal use of microcomputers by administrators and the use of computers by someone on behalf of administrators were plentiful, while statistics were not. According to the literature, some administrators do not want to enter the data, but elect to have their assistants and/or secretaries do so. A study at the University of Kansas, mentioned previously, found that some administrators want to satisfy some of their own computing needs (9, p. 7). O'Daniel (8, p. 65) and Mathews (7, p. 35), both junior college administrators, personally use a microcomputer for writing memos and composing documents and have their secretaries add the finishing touches. As this study found, some administrators personally use the microcomputer, some have assistants use one on their behalf, some do both, and some neither probably according to their abilities and/or personal preference.

Responses to question three agree with the trend toward decentralization of campus data processing and also shows that administrators are taking advantage of another tool. An interesting question to have included in part one of the questionnaire might have been "Are you using a microcomputer to do jobs that you could not get done without a microcomputer or at the campus computer center?"
Research Question Two

Research question two asks, "What is the perceived importance of functions performed with computers by administrators and what type of computer is used to perform each of these functions?" Part II of the questionnaire elicited this information. Tables III through V present the data.

Table III shows the frequencies and percentages of responses from the administrators regarding the type of computer system used in conducting the sixteen specified administrative functions. The frequencies for the use of microcomputers range from three to twenty-seven. The modes for microcomputer use are word processing for brief and lengthy documents. The range of frequencies for mainframes is from four to thirty-five. Modes for this category include word processing for lengthy documents (this use is bimodal), word processing for mass mailings, database management for class scheduling, and database management for equipment inventory. Functions reporting modes in the category where a computer is not used are spreadsheets for projections and budgeting; graphics for generating graphic elements; database management for recording and tracking goals and objectives; telecommunications to access the mainframe, remote databases, and electronic mail; programming for developing applications software; and time management for appointments and task scheduling. The
### TABLE III

Frequencies and Percentages of Computer Systems Used in Performing Selected Functions

<table>
<thead>
<tr>
<th>Computer Function</th>
<th>Micro</th>
<th>Main</th>
<th>Other</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>1. Word processing/brief documents</td>
<td>27*</td>
<td>39.1</td>
<td>20</td>
<td>29.0</td>
</tr>
<tr>
<td>2. Word processing/lengthy documents</td>
<td>23*</td>
<td>33.3</td>
<td>23*</td>
<td>33.3</td>
</tr>
<tr>
<td>3. Word processing/mass mailings</td>
<td>17</td>
<td>25.8</td>
<td>25*</td>
<td>37.9</td>
</tr>
<tr>
<td>4. Spreadsheet/projections</td>
<td>16</td>
<td>23.5</td>
<td>17</td>
<td>25.0</td>
</tr>
<tr>
<td>5. Spreadsheet/budgeting</td>
<td>20</td>
<td>29.4</td>
<td>19</td>
<td>27.9</td>
</tr>
<tr>
<td>6. Graphics/visual elements</td>
<td>16</td>
<td>25.0</td>
<td>10</td>
<td>15.6</td>
</tr>
<tr>
<td>7. Database management/faculty records</td>
<td>10</td>
<td>14.3</td>
<td>26</td>
<td>37.1</td>
</tr>
<tr>
<td>8. Database management/class schedules</td>
<td>6</td>
<td>9.4</td>
<td>33*</td>
<td>51.6</td>
</tr>
<tr>
<td>9. Database management/inventory</td>
<td>4</td>
<td>6.4</td>
<td>35*</td>
<td>55.6</td>
</tr>
<tr>
<td>10. Database management/goals</td>
<td>9</td>
<td>14.1</td>
<td>12</td>
<td>18.8</td>
</tr>
<tr>
<td>11. Telecommunications/mainframe</td>
<td>6</td>
<td>9.4</td>
<td>20</td>
<td>31.3</td>
</tr>
<tr>
<td>12. Telecommunications/remote databases</td>
<td>3</td>
<td>4.9</td>
<td>14</td>
<td>23.0</td>
</tr>
<tr>
<td>13. Telecommunications/electronic mail</td>
<td>3</td>
<td>4.9</td>
<td>14</td>
<td>23.0</td>
</tr>
<tr>
<td>14. Programming/custom applications</td>
<td>14</td>
<td>21.2</td>
<td>21</td>
<td>31.8</td>
</tr>
<tr>
<td>15. Time management/appointments</td>
<td>7</td>
<td>11.1</td>
<td>5</td>
<td>7.9</td>
</tr>
<tr>
<td>16. Time management/task scheduling</td>
<td>10</td>
<td>16.1</td>
<td>4</td>
<td>6.5</td>
</tr>
<tr>
<td>17. Other. Please specify.</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

*Mode.*

***"Micro"—microcomputer, "Main"—mainframe or minicomputer, "Other"—computer system other than Micro or Main, "None"—computer is not used."
category for specifying that a computer is not used contains eleven modes, the greatest number of modes for any category. Frequencies range from fifteen to fifty in this category. The frequencies for the "Other" category range from one to seven and contains no modes.

The administrative functions showing that a computer of some type is used by at least 50 percent of the administrators include word processing for brief documents, lengthy documents, and mass mailings; spreadsheets for projections and budgeting; database management for faculty records, class schedules, and equipment inventory; and programming for custom applications. A computer is not used by over half of the administrators on the remaining functions. Over 70 percent of the administrators do not use a computer for telecommunications and time management functions.

Nineteen responses were dual responses; that is, both a microcomputer and a mainframe were used to perform an individual computer function. These functions include word processing for creating and editing brief and lengthy reports and documents; spreadsheets for simulation and modeling; database management faculty records; telecommunications to access central mainframe computers; and programming to develop applications.

Respondents to question 17, regarding functions that were not listed on the questionnaire, wrote in student
research and statistics but did not specify a computer system; spreadsheets for generating reports and production of transparencies using a microcomputer; and recording transcripts using a mainframe. All of these applications were rated high in importance.

Table IV shows the frequencies, percentages, and means of responses for importance of computer function. The scale for rating the importance used digits from 1 (low) to 3 (high).

The frequencies for a low rating range from eleven to forty-one, for a medium rating range from seven to twenty-three, and for a high rating range from four to forty-nine. Computer functions showing modes for high importance are the word processing functions, the spreadsheet functions, and database management for class schedules and equipment inventory. In this group, only the use of spreadsheets for simulations and modeling is rated high by less than 50 percent of the administrators.

The remainder of the functions show a mode in the low importance rating. Functions showing a low rating by over 50 percent of the administrators are database management for tracking goals and objectives, telecommunications to access remote databases and electronic mail, and time management systems for scheduling appointments and task scheduling.
TABLE IV
FREQUENCIES, PERCENTAGES, AND MEANS FOR IMPORTANCE OF COMPUTER FUNCTIONS

<table>
<thead>
<tr>
<th>Computer Function</th>
<th>Importance</th>
<th></th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>low 1 F</td>
<td>%</td>
<td>2 F</td>
</tr>
<tr>
<td>1. Word processing/brief documents</td>
<td>12 17.1</td>
<td>19 27.1</td>
<td>39* 55.1</td>
</tr>
<tr>
<td>2. Word processing/lengthy documents</td>
<td>11  5.7</td>
<td>10 14.3</td>
<td>49* 70.0</td>
</tr>
<tr>
<td>3. Word processing/mass mailings</td>
<td>16 23.5</td>
<td>7   10.3</td>
<td>45* 66.2</td>
</tr>
<tr>
<td>4. Spreadsheet/projections</td>
<td>20 31.3</td>
<td>19 29.7</td>
<td>25* 39.1</td>
</tr>
<tr>
<td>5. Spreadsheet/budgeting</td>
<td>15  22.4</td>
<td>17 25.4</td>
<td>35* 52.2</td>
</tr>
<tr>
<td>6. Graphics/visual elements</td>
<td>33* 50.0</td>
<td>20 30.3</td>
<td>13 19.7</td>
</tr>
<tr>
<td>7. Database management/faculty records</td>
<td>25* 39.1</td>
<td>15 23.4</td>
<td>24 37.5</td>
</tr>
<tr>
<td>8. Database management/class schedules</td>
<td>15 23.1</td>
<td>11 16.9</td>
<td>39* 60.0</td>
</tr>
<tr>
<td>9. Database management/inventory</td>
<td>16 25.4</td>
<td>15 23.8</td>
<td>32* 50.8</td>
</tr>
<tr>
<td>10. Database management/goals</td>
<td>32* 54.2</td>
<td>16 27.1</td>
<td>11 18.6</td>
</tr>
<tr>
<td>11. Telecommunications/mainframe</td>
<td>24* 42.1</td>
<td>21 36.8</td>
<td>12 21.1</td>
</tr>
<tr>
<td>12. Telecommunications/remote databases</td>
<td>33* 57.9</td>
<td>16 28.1</td>
<td>8 14.0</td>
</tr>
<tr>
<td>13. Telecommunications/electronic mail</td>
<td>36* 64.3</td>
<td>12 21.4</td>
<td>8 14.3</td>
</tr>
<tr>
<td>14. Programming/custom applications</td>
<td>25* 39.0</td>
<td>23 35.9</td>
<td>16 25.0</td>
</tr>
<tr>
<td>15. Time management/appointments</td>
<td>41* 77.4</td>
<td>8   15.1</td>
<td>4  7.6</td>
</tr>
<tr>
<td>16. Time management/task scheduling</td>
<td>32* 58.2</td>
<td>16 29.1</td>
<td>7  12.7</td>
</tr>
<tr>
<td>17. Other. Please specify.</td>
<td>-- --</td>
<td>-- --</td>
<td>-- --</td>
</tr>
</tbody>
</table>

*Mode
TABLE V  
RANKING OF COMPUTER FUNCTIONS  
BY IMPORTANCE MEANS  

<table>
<thead>
<tr>
<th>Computer Function</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Word processing/lengthy documents</td>
<td>2.5</td>
</tr>
<tr>
<td>2. Word processing/mass mailings</td>
<td>2.4</td>
</tr>
<tr>
<td>3. Word processing/brief documents</td>
<td>2.4</td>
</tr>
<tr>
<td>4. Database management/class schedules</td>
<td>2.4</td>
</tr>
<tr>
<td>5. Spreadsheet/budgeting</td>
<td>2.3</td>
</tr>
<tr>
<td>6. Database management/inventory</td>
<td>2.3</td>
</tr>
<tr>
<td>7. Spreadsheet/projections</td>
<td>2.1</td>
</tr>
<tr>
<td>8. Database management/faculty records</td>
<td>2.0</td>
</tr>
<tr>
<td>9. Programming/custom applications</td>
<td>1.9</td>
</tr>
<tr>
<td>10. Telecommunications/mainframe</td>
<td>1.8</td>
</tr>
<tr>
<td>11. Graphics/visual elements</td>
<td>1.7</td>
</tr>
<tr>
<td>12. Database management/goals</td>
<td>1.6</td>
</tr>
<tr>
<td>13. Telecommunications/remote databases</td>
<td>1.6</td>
</tr>
<tr>
<td>14. Time management/task scheduling</td>
<td>1.6</td>
</tr>
<tr>
<td>15. Telecommunications/electronic mail</td>
<td>1.5</td>
</tr>
<tr>
<td>16. Time management/appointments</td>
<td>1.3</td>
</tr>
<tr>
<td>17. Other. Please specify</td>
<td>--</td>
</tr>
</tbody>
</table>

Table V presents the computer functions ranked in descending order by the importance means. The means range from 1.3 to 2.5. All word processing functions, database management for class scheduling and equipment inventory, and spreadsheet for budgeting exhibit means above 2.2.
Word processing for creating and editing lengthy documents has the highest mean of 2.5. The lowest mean of 1.3 is for time management for scheduling appointments. Eight functions have means of 2.0 or above and eight have means below 2.0.

Discussion.—A noteworthy finding regarding the types of computer systems used in conducting the sixteen specified functions is that no computer of any type is used by a majority of the respondents for eleven of the sixteen functions. Nine of these functions—graphics, database management for faculty records and tracking goals, telecommunications, programming, and time management—are rated low in importance which is probably one of the reasons that computers are not used for these functions.

Microcomputers, mainframe computers, and minicomputers are used about equally for word processing. Since all of these types of computer systems can perform this function, the use of a particular system is probably due to the availability or personal preference.

The larger systems are used by more administrators for mass mailings probably due to the size of the lists or because the lists have not been transferred from the campus mainframe to microcomputers. This may change as administrators begin downloading mailing lists from mainframes to microcomputers. Also, mainframes and minicomputers
are used most often for class schedules and inventories probably because this is the traditional data storage system.

As in this study, Colley (4, p. 98) and Bender and Conrad (1, p. 8) found that word processing was the prevalent function performed with microcomputers. Keep in mind that the other studies dealt with junior colleges only and included faculty, staff, and other levels of administrators. In addition, Colley's study (4, p. 64) concurs with this study on the high importance placed on word processing, spreadsheet, and database management functions by administrators. The two studies differ somewhat on the importance given to telecommunications, programming, and time management functions. The administrators in this study rated the importance of these functions, on the whole, lower than the administrators in Colley's study (4, p. 64).

**Research Question Three**

Research question three asks, "Are there significant differences between the perceived level of computer training received by administrators and their opinions of the importance of this training?" Part III of the questionnaire elicited this information. Tables VI and VII present these data.
<table>
<thead>
<tr>
<th>Computer Function</th>
<th>Current Level of Training</th>
<th>Importance of Future Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>low 1</td>
<td>2</td>
</tr>
<tr>
<td>1. Computer orientation</td>
<td>38*</td>
<td>51.4</td>
</tr>
<tr>
<td>2. Database management</td>
<td>55*</td>
<td>74.3</td>
</tr>
<tr>
<td>3. Word processing</td>
<td>52*</td>
<td>70.3</td>
</tr>
<tr>
<td>4. Spreadsheet</td>
<td>54*</td>
<td>73.0</td>
</tr>
<tr>
<td>5. Graphics</td>
<td>61*</td>
<td>83.6</td>
</tr>
<tr>
<td>6. Telecommunications</td>
<td>67*</td>
<td>90.5</td>
</tr>
<tr>
<td>7. Programming</td>
<td>61*</td>
<td>82.4</td>
</tr>
<tr>
<td>8. How to evaluate software</td>
<td>55*</td>
<td>75.3</td>
</tr>
<tr>
<td>9. Other? Please specify.</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

*Mode
Table VI presents the frequencies and percentages of responses from administrators on the current level of computer training and their opinions on the importance of future training in eight training areas. The modes for current level of training received a low rating for all computer functions. The largest frequency, sixty-seven, as well as highest percentage, 90.5 percent, for a low rating is for training in telecommunications. The current level of training for all functions is rated low by over 70 percent of the administrators except for computer orientation which is rated low by 51.4 percent of the administrators. Eight administrators rated computer orientation high, eight rated word processing high, seven administrators rated spreadsheet high, and six administrators rated database management high on current level of training.

For importance of future training, modes in the low rating are for word processing, graphics, and programming. Computer functions whose importance ratings are two are computer orientation, database management, spreadsheet, telecommunications, and how to evaluate software. No modes occur in the high importance level. The only computer function receiving a response rate above 50 percent is the low level of importance for programming by 59.2 percent of the administrators. The importance of future training mean
for each function is higher than the corresponding current level of training mean.

**Difference Ranking.**—A weighted discrepancy index was used to compare the differences between the current level of training means and the importance of future training means. The data collected by Part III of the questionnaire were used to compute these means. The means were then used to calculate a weighted discrepancy index (4, p. 58) using the formula: $$\text{Discrepancy index} = (\text{Importance mean} - \text{Current training mean}) \times \text{Importance mean}.$$ Table VII presents the means and the training areas ranked in decreasing order by the weighted discrepancy index.

**TABLE VII**

RANKING OF COMPUTER TRAINING ACCORDING TO THE WEIGHTED DISCREPANCY INDEX USED TO COMPARE CURRENT TRAINING LEVEL MEANS AND IMPORTANCE OF FUTURE TRAINING MEANS

<table>
<thead>
<tr>
<th>Computer Training</th>
<th>Current Training Mean</th>
<th>Importance Mean</th>
<th>Weighted Discrepancy Index*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Database management</td>
<td>1.34</td>
<td>2.14</td>
<td>1.71</td>
</tr>
<tr>
<td>2. Telecommunications</td>
<td>1.11</td>
<td>1.94</td>
<td>1.61</td>
</tr>
<tr>
<td>3. Software evaluation</td>
<td>1.30</td>
<td>2.01</td>
<td>1.43</td>
</tr>
<tr>
<td>4. Spreadsheet</td>
<td>1.36</td>
<td>1.99</td>
<td>1.25</td>
</tr>
<tr>
<td>5. Computer orientation</td>
<td>1.59</td>
<td>2.06</td>
<td>.97</td>
</tr>
<tr>
<td>6. Graphics</td>
<td>1.18</td>
<td>1.68</td>
<td>.84</td>
</tr>
<tr>
<td>7. Word processing</td>
<td>1.41</td>
<td>1.85</td>
<td>.81</td>
</tr>
<tr>
<td>8. Programming</td>
<td>1.24</td>
<td>1.54</td>
<td>.46</td>
</tr>
<tr>
<td>9. Other. Please specify.</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

*Discrepancy Index = (Importance Mean - Current Training Mean) \times \text{Importance Mean. All numbers on this table have been rounded to two decimal places.*}
The training area with the greatest weighted discrepancy index is database management and the training area with the least discrepancy index is programming. In all cases, the discrepancy index is positive because all of the importance means are greater than the corresponding current training means.

**Hypothesis.**—To respond to research question three, the null hypothesis "No significant difference exists between the perceived level of computer training received by administrators and their opinions of the importance of future training" was formulated. The data from Part III of the questionnaire were subjected to chi square test for goodness of fit. Table VIII shows the results of the analysis.

**TABLE VIII**

<table>
<thead>
<tr>
<th>Computer Training</th>
<th>Chi Square Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Computer orientation</td>
<td>14.40*</td>
</tr>
<tr>
<td>2. Database management</td>
<td>38.89*</td>
</tr>
<tr>
<td>3. Word processing</td>
<td>14.54*</td>
</tr>
<tr>
<td>4. Spreadsheet</td>
<td>24.52*</td>
</tr>
<tr>
<td>5. Graphics</td>
<td>24.22*</td>
</tr>
<tr>
<td>6. Telecommunications</td>
<td>49.94*</td>
</tr>
<tr>
<td>7. Programming</td>
<td>9.73*</td>
</tr>
<tr>
<td>8. How to evaluate software.</td>
<td>31.75*</td>
</tr>
<tr>
<td>9. Other. Please specify.</td>
<td>--</td>
</tr>
</tbody>
</table>

*Significant ($p < .01$)
The chi square values range from 9.73 to 49.94. The ratings for current level of training and importance of future training are significantly different for all training areas at the .01 level of significance. Therefore, the null hypothesis is rejected for all training areas.

Discussion.—While other studies and articles discuss the importance of training, Colley's dissertation was the only one that solicited administrators' opinions on the perceived current level of training and the importance of future training (4). Again, keep in mind that the population in this study and Colley's study are different. With one exception, computer orientation, the administrators in both studies rated their current level of training low in all categories. Computer orientation was rated at the midpoint in Colley's study and low in this study. It should also be noted that training in telecommunications was not surveyed in Colley's study.

In the area of importance of future training, the administrators in Colley's study rated computer orientation, database management, word processing, spreadsheet, and graphics higher than the administrators in this study (4, p. 70). Training in programming and software evaluation were rated about the same in both studies.
The null hypothesis "No significant difference exists between the perceived level of computer training received by administrators and their opinions of the importance of future training" was rejected in this study and in Colley's study. In both studies there was not only a significant difference, but the importance level ratings were higher than the current level ratings. This indicates that administrators believe that they need, or at least want, training in all of these areas in the future.

The ranking of computer training according to a weighted discrepancy index listed database management with the highest discrepancy index in this and in Colley's study (4, p. 70). Programming training was ranked low in both studies. The rankings of the other training areas were similar.

**Research Question Four**

Research question four asks, "Are there significant differences between the perceived adequacy of the following conditions affecting computer use by administrators and their opinions of the importance of these conditions?" The conditions include: computer availability, environmental considerations, established process for evaluating software, availability of peripherals, funding for maintenance, technical support, and practice time. Part IV
<table>
<thead>
<tr>
<th>Conditions Affecting Computer Use</th>
<th>Current Adequacy</th>
<th>Importance of Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>low 1 F %</td>
<td>high 3 F %</td>
</tr>
<tr>
<td>1. Computer availability</td>
<td>6 8.2 16 21.9 51* 69.9</td>
<td>9 12.2 16 21.6 49* 66.2</td>
</tr>
<tr>
<td>2. Environmental consider</td>
<td>6 8.2 27 37.0 40 54.8</td>
<td>8 10.8 23 31.1 43* 58.1</td>
</tr>
<tr>
<td>3. Process for eval. sof.</td>
<td>36* 50.1 27 38.0 8 11.3</td>
<td>16 22.2 31* 43.1 25 34.7</td>
</tr>
<tr>
<td>4. Avail. of software</td>
<td>17 23.6 34* 47.2 21 29.2</td>
<td>11 15.3 28 38.9 33* 45.8</td>
</tr>
<tr>
<td>5. Avail. of peripherals</td>
<td>16 22.2 38* 52.8 18 25.0</td>
<td>13 17.8 39* 53.4 21 28.8</td>
</tr>
<tr>
<td>6. Funding for maintenance</td>
<td>18 25.4 30* 42.8 23 32.4</td>
<td>6 8.3 23 31.9 43* 59.7</td>
</tr>
<tr>
<td>7. Technical support</td>
<td>15 21.1 28* 39.4 28* 39.4</td>
<td>7 9.6 26 35.6 40* 54.8</td>
</tr>
<tr>
<td>8. Practice time</td>
<td>33* 47.1 20 28.6 17 24.3</td>
<td>19 26.8 27* 38.0 25 35.2</td>
</tr>
<tr>
<td>9. Other? Please specify.</td>
<td>-- -- -- -- -- --</td>
<td>-- -- -- -- -- --</td>
</tr>
</tbody>
</table>

*Mode
of the questionnaire elicited these data. Tables IX and X present these data.

Table IX presents the frequencies and percentages of the administrators' responses for the current adequacy of condition and importance of the condition. Approximately 70 percent of the administrators rate the current adequacy of computer availability high. Environmental considerations are rated high by about 55 percent of the administrators. These conditions and technical support represent the modes in the high level ratings. The modes for availability of software, availability of peripherals, funding for maintenance, and technical support are in the middle level. Practice time and an established process for evaluating software have modes in the low level. An established process for evaluation of software is rated low by 50 percent of the administrators and is the only mode in the low level.

On the importance of condition, the modes in the high level are for computer availability, environmental considerations, availability of software, funding for maintenance, and technical support. Again computer availability is rated high by the largest percentage, 66.2 percent, of administrators. Next are environmental considerations and funding for maintenance with forty-three high ratings each and percentages above fifty-eight.
TABLE X

RANKING OF CONDITIONS AFFECTING COMPUTER USE ACCORDING TO THE WEIGHTED DISCREPANCY INDEX USED TO COMPARE CURRENT ADEQUACY MEANS AND IMPORTANCE OF CONDITION MEANS

<table>
<thead>
<tr>
<th>Conditions Affecting Use</th>
<th>Current Adequacy Mean</th>
<th>Importance Mean</th>
<th>Weighted Discrepancy Index*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Funding for maintenance</td>
<td>2.07</td>
<td>2.51</td>
<td>1.10</td>
</tr>
<tr>
<td>2. Process for eval. soft.</td>
<td>1.61</td>
<td>2.12</td>
<td>1.08</td>
</tr>
<tr>
<td>3. Technical support</td>
<td>2.18</td>
<td>2.45</td>
<td>.66</td>
</tr>
<tr>
<td>4. Practice time</td>
<td>1.77</td>
<td>2.08</td>
<td>.64</td>
</tr>
<tr>
<td>5. Avail. of software</td>
<td>2.06</td>
<td>2.31</td>
<td>.58</td>
</tr>
<tr>
<td>6. Avail. of peripherals</td>
<td>2.03</td>
<td>2.11</td>
<td>.17</td>
</tr>
<tr>
<td>7. Environmental consider.</td>
<td>2.47</td>
<td>2.47</td>
<td>.00</td>
</tr>
<tr>
<td>8. Computer availability</td>
<td>2.62</td>
<td>2.54</td>
<td>-.20</td>
</tr>
<tr>
<td>9. Other. Please specify.</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

*Discrepancy Index = (Importance Mean - Current Adequacy Mean) X Importance Mean. All numbers on this table have been rounded to two decimal places.

Modes in the middle level were reported for an established process for evaluating software, availability of peripherals, and practice time. No modes appear in the low level for any condition. All conditions are rated in the middle or high levels by over 70 percent of the administrators.
**Difference Ranking.**—A weighted discrepancy index was used to compare the differences between the adequacy of conditions affecting the use of computer means and the importance of condition means. The formula—Discrepancy index = (Importance mean - Current adequacy mean) X Importance mean—was used to compute the discrepancy index. Table X presents the conditions affecting the use of computers in decreasing order by weighted discrepancy index. Funding for maintenance and process for evaluating software have the largest discrepancy index values. There is no difference between the means for environmental considerations. A negative discrepancy index for item eight is feasible because the current adequacy mean is larger than the importance mean.

**Hypothesis.**—To respond to research question four, the null hypothesis "No significant difference exists between the perceived adequacy of conditions affecting computer use by administrators and their opinions of the importance of these conditions" was formulated. The data from Part IV of the questionnaire were subjected to chi square test for goodness of fit. Table XI shows the results of the analysis.

With chi square values ranging from .55 to 5.07, the current adequacy and importance ratings are not significantly different for the conditions: computer
TABLE XI

CHI SQUARE VALUES COMPARING FREQUENCY OF RESPONSE IN CURRENT ADEQUACY OF CONDITION AND IMPORTANCE OF CONDITION

<table>
<thead>
<tr>
<th>Condition</th>
<th>Chi Square Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Computer availability</td>
<td>0.63</td>
</tr>
<tr>
<td>2. Environmental considerations</td>
<td>0.71</td>
</tr>
<tr>
<td>3. Process for evaluating software</td>
<td>16.72**</td>
</tr>
<tr>
<td>4. Availability of software</td>
<td>4.53</td>
</tr>
<tr>
<td>5. Availability of peripherals</td>
<td>0.55</td>
</tr>
<tr>
<td>6. Funding for maintenance</td>
<td>12.98**</td>
</tr>
<tr>
<td>7. Technical support</td>
<td>5.07</td>
</tr>
<tr>
<td>8. Practice time</td>
<td>6.33*</td>
</tr>
<tr>
<td>9. Other. Please specify.</td>
<td>--</td>
</tr>
</tbody>
</table>

*Significant $(p \leq .05)$

**Significant $(p \leq .01)$

availability, environmental considerations, funding for maintenance, availability of peripherals, availability of software, and technical support. The null hypothesis is accepted for these conditions.

The current adequacy and importance ratings for practice time is significantly different at the .05 level. With chi square value of 16.72 for process for evaluating software and chi square value of 12.98 for funding for maintenance, the current adequacy and importance are significantly different at the .01 level of significance.
Therefore, the null hypothesis is rejected for the remaining items numbered three, six, and eight.

Discussion.—Approximately 70 percent of the respondents rated the availability of computers highly adequate and approximately 55 percent rated their environmental conditions adequate. These figures seem reasonable for the level of administrators in this study. Practice time seems to be a problem which is understandable for busy administrators.

In comparison to Colley's study of the administrators at the DCCCD, computer availability, process for evaluating software, availability of software, technical support, and practice time ratings are about the same as those in this study (4, p. 78). However, the current adequacy levels for environmental considerations and availability of peripherals are somewhat higher in this study than in Colley's (4, p. 78). Funding for maintenance cannot be compared to Colley's study since it was not measured in that study. The importance of condition ratings were about the same for this study and Colley's study.

The null hypothesis "No significant difference exists between the perceived adequacy of conditions affecting computer use by administrators and their opinions of the importance of these conditions" was rejected in this study and in Colley's study (4, p. 86) for the conditions:
process for evaluating software and practice time. Colley's study rejected the null hypothesis for all conditions (4, p. 86), while this study failed to reject the null hypothesis for the remaining conditions—computer availability, environmental considerations, technical support, availability of software, and availability of peripherals.

In this study, the condition affecting computer use with the greatest discrepancy between the current adequacy and importance weighted by its importance mean is funding for maintenance. Remembering that funding for maintenance was not questioned, practice time had the highest discrepancy index in Colley's study (4, p. 92). Computer availability has the smallest discrepancy index of the conditions affecting computer use in both studies (4, p. 92). This indicates that the availability of computers, availability of software, and the environment are not major problems for administrators at this level.

Research Question Five

Research question five asks, "Are the following factors related to the current use of computers and importance of uses of computers by administrators?" The factors are age, gender, year in which last degree was granted, years of experience, administrative position, enrollment and type of institution, and interest in
learning more about microcomputers. Parts I, II, and V of the questionnaire elicited this information. The general demographics are provided first.

Respondent Information.—Thirty-six or 48.7 percent of the administrators rate their overall use of the microcomputer one (low) on a scale from one (low) to five (high). Twelve or 16.2 percent rate two, twelve or 16.2 percent rate three, nine or 12.1 percent rate themselves four, and five or 6.8 percent of the administrators rate themselves as high (5) users of microcomputers. The overall use mean is 2.12.

Approximately 53 percent or thirty-nine of the administrators are in the fifty years-of-age or older category. Nineteen or 25.7 percent of the administrators are in the 45 to 49 years-old group, nine or 12.2 percent of the administrators are in the 40 to 44 years-old group, six or 8.1 percent are in the 35 to 39 years-old group, and one administrator is in the 30 to 34 years-old age group. No administrators are in the twenty-nine or younger age group. Sixty-eight or 91.9 percent of the administrators are male and six are female.

Over 70 percent or fifty of the administrators graduated in the years from 1962 to 1976. Twelve graduated before 1962 and nine graduated after 1976. The greatest number of graduates for one year is eight in 1971.
The mean number of years of experience as an administrator is 17.0. The majority of the administrators, thirty-nine or 53.4 percent, report from ten to twenty-four years of experience. Sixteen administrators report zero to nine years experience while eighteen administrators report from twenty-five to thirty-four years of experience. Of the seventy-four administrators responding to this survey, twenty-six or 35.1 percent are administrators for student affairs, twenty-three or 31.1 percent are administrators for business affairs, and twenty-five or 33.8 percent are administrators for academic affairs.

The types of institutions and their enrollments are presented in Table I. There are four comprehensive universities, ten regional universities, one medical school, and fourteen junior and community colleges. Four administrators responded from the comprehensive universities, twenty-eight administrators from the regional colleges and universities responded, all three administrators from the medical college responded, and thirty-nine of the administrators at the junior colleges responded. Enrollments at the institutions ranged from 325 to 19,668.

Sixty-seven administrators responded to the question concerning interest in learning more about microcomputers. Fifty-five or 82.1 percent of the respondents checked that
they are interested in learning more while twelve or 17.9 percent checked "No."

Relationships.—Correlation coefficients were calculated to establish the strength of relation between how the respondents rate their overall use of the microcomputer and some of their respective demographic characteristics. Correlation coefficients of -.25 for age, .00 for graduation date, -.08 for years of administrative experience, and -.06 for size of enrollment were computed. Ferguson (5, p. 523) identifies coefficients of .232 or larger as significant at the .05 level of significance for populations of seventy or greater. Therefore, age is significantly correlated to the respondent's overall use of the microcomputer.

The chi square test of independence was used to test the relationship between the respondents self-rated overall use of microcomputers and gender, administrative position, type of institution, and interest in learning more about microcomputers. All were independent of the overall use of microcomputers.

The chi square test of independence was also used to test the relationship between the personal use of microcomputers and the respondents demographics. Age group was the only characteristic that was significantly
dependent at the .05 level on the personal use of a microcomputer.

The chi square test of independence was used to test the dependence between the importance of each group of computer functions and the demographics provided by the administrators. The five demographics were age, years of experience, administrative position, type of institution, and size of enrollment. Word processing is dependent at the .05 level of significance on the number of years of experience, administrative position, and size of enrollment. Graphics, database management, and telecommunications are dependent on the administrative position at the .05 level of significance. Telecommunications was also dependent on the size of enrollment at the .05 level of significance.

The chi square test of independence was used to test the independence between the type of computer system, which included a category for specifying that a computer is not used, and selected demographics, specifically age group, years of experience, administrative position, type of institution, and enrollment. The use of word processing is dependent at the .05 level on the administrative position, type of institution, and size of enrollment. The use of graphics is dependent at the .05 level of significance on the administrative position. The use of database management is dependent at the .05 level of significance on
the number of years of experience, administrative position, and size of enrollment. In addition, the use of time management software is dependent on the years of experience.

Discussion.—This study found significant relationships between the respondents' personal use, overall use, type of computer system, importance of computer functions, and demographics. Colley's study calculated correlation coefficients for the self-rating of overall use of microcomputers and selected characteristics. Positive and negative coefficients were produced, but none were significant at the .05 level (4, p. 81). One reason for significance in this study and not in Colley's study is probably due to sample size.

The mode of the self-rating of overall use of microcomputers is thirty-six or 48.7 percent in the low category. The administrators in Colley's study produced a mode in the middle category of twelve or 35.3 percent (4, p. 81). In general, the administrators in Colley's study rated their overall use higher than the administrators in this study. The discrepancy might be due to a difference in experience, actual fact, or varying opinions of their own use of microcomputers.
**Research Question Six**

Research question six asks, "Is the use of microcomputers by administrators or by someone on their behalf replacing the use of mainframe computers for supplying administrative data?" Parts I, VI, and VII elicits this information. Table XII presents the data.

Question three of Part I asked, "Are you or someone in your office using the microcomputer to do jobs previously done with a mainframe computer?" Only microcomputer users or administrators who have someone use a microcomputer on their behalf were asked to respond to this question. Forty administrators were required to answer, but only thirty-one or 77.5 percent responded. Of these, thirty-one or 51.6 percent answered "Yes" while 48.4 percent answered "No."

**TABLE XII**

MEANS OF ESTIMATIONS OF COMPUTER USE THREE YEARS AGO, CURRENT, AND IN THREE TO FIVE YEARS

<table>
<thead>
<tr>
<th>Administrative Function</th>
<th>Percentage</th>
<th>3 years ago</th>
<th>Currently</th>
<th>In 3-5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Use of microcomputers.</td>
<td></td>
<td>4.5</td>
<td>20.3</td>
<td>32.5</td>
</tr>
<tr>
<td>2. Use of mainframes.</td>
<td>47.2</td>
<td>43.9</td>
<td>43.8</td>
<td></td>
</tr>
<tr>
<td>3. Use of other computers.</td>
<td>7.7</td>
<td>6.7</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td>4. Computer is not used.</td>
<td>40.6</td>
<td>29.2</td>
<td>18.9</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.1</td>
<td>100.3</td>
<td></td>
</tr>
</tbody>
</table>
Table XII presents the means of the questions concerning the percentage of jobs done by various systems three years ago, currently, and three to five years from now. The sum of each column was required to be 100 percent. Fifty-seven administrators answered according to the directions.

The means show an expected increase in the use of microcomputers in three to five years, while the use of mainframes are expected to remain the same. Other computer systems are expected to be used about the same also. Item four indicates that computers of some type will be used more since the percentage of jobs that are currently being done without computers is expected to decrease.

Question five in Part VI, asked administrators their opinion on whether they expect the use of microcomputers by administrators to increase and the use of mainframes to decrease. Sixty-nine administrators responded. Forty-six or 66.7 percent answered "Yes" while twenty-three or 33.3 percent answered "No." Administrators answering "Yes" to question five were also asked, "What percent of administrative jobs currently being done with mainframe computers will be done with microcomputers five years from now?" Answers range from 0 percent to 80 percent. The mode of the estimates is 50 percent and the mean is 40 percent.
Discussion.—The finding that administrators believe that the use of microcomputers will increase and the use of mainframe computers will remain about the same is in agreement with the literature (2, 3, 8). If the demand for access to information from mainframe computers increases as it probably will with the increase of microcomputers, the demand for mainframe computers will necessarily have to increase to handle the extra load. This increase will be dependent on the power of future computers of all types.

Comments From Respondents

Part VII of the questionnaire asked for comments about future use and current use of computers in higher education administration and/or campus data processing centers. The comments from the administrators are listed below. The names of the respondents are not provided to assure anonymity.

Comments from administrators for business affairs include:

... the use of micros will increase because it is easier to do the smaller jobs on the micros rather than use the mainframe.

I expect mainframe computers to be used more by major administrators. This means that less emphasis will be on microcomputers by individuals since the users will become less and less enthusiastic about experimenting with what they can or cannot do. Major administrators are going to come to the conclusion that they must be administrators and not programmers—they must have available a programmer that can produce the information needed by the administrator. In the future, it is essential that programmers have a
workable understanding of accounting. Such knowledge is essential in a programmer.

I answered the questions from a personal viewpoint. Micros could play a greater role in the business office but not necessarily for the chief business officer. Time constraints prohibit too much direct involvement in computer use. Most of our operations require more capacity than a personal computer could give us.

I expect increases in both mainframes and microcomputers.

Comments from administrators for student affairs include:

My training has not included statistics coursework nor that of behaviorism. Instead, it is in history. That limits my perspective in these very important areas. As an administrator, statistics would particularly have helped my receptivity to this area. I used the main frame computer on campus to retrieve information but we do not program through this office. We do entry however.

We will use microcomputers more in conjunction with mainframe—therefore, micros will also increase our use of mainframe.

I can see every administrative office equipped with a microcomputer terminal and selected offices with word processor printers.

In the student services center at ... we plan to utilize the mainframe computer beginning in the 1986 fall semester.

Comments from administrators for academic affairs include:

It is good that computer literacy comes gradually even to those who are "too busy" to stop for training. I am such a "people person" that "tools" are not really essential to my style of operation. For example I rarely use a typewriter even though I do type.

My answers [referring to the questionnaire] may indicate that I make little use of the computer.
Actually I am a heavy user of its services, but I do none of the programming or retrieval of data! The use of computers will increase and more administrators will rely on them to improve efficiency.

Micro use will increase. Mainframe will at least stay the same but probably increase.

Use of any computer should make management decisions more effective due to greater accuracy of data and the various methods of interpretation which computer programs provide.

My principal concern is that academic/administrative support personnel not interfere with the development and scheduling of curriculum and courses. There is the tendency for computer "czars" to interfere in areas for which they are not directly responsible.

Unsolicited comments regarding an administrator's anticipated retirement were also written on the questionnaire near the respondent information section.

Summary

Following is a summary of the major findings from this study.

1. Fourteen of the seventy-four or 18.9 percent of the respondents personally use a microcomputer and thirty-eight of the seventy-four or 51.3 percent have someone use a microcomputer on their behalf.

2. The most prevalent use of microcomputers is word processing for brief and lengthy documents. Mainframe computers are used mostly for word processing for creating and editing lengthy documents and for database management for class schedules and equipment inventory. The majority of the administrators reported that a computer is not used
for spreadsheets for projections; graphics for creating visual elements; database management for tracking goals; telecommunications to mainframe, remote databases, or electronic mail; and time management for appointments and task scheduling.

Computer functions rated high in importance by a majority of the administrators are word processing for brief documents, lengthy documents, and mass mailings; spreadsheet for projections and budgeting; and database management for class scheduling and equipment inventory. Computer functions rated low in importance by a majority of the administrators are database management for tracking goals; telecommunications for accessing remote databases and electronic mail; and time management for appointments and task scheduling.

3. The differences between the perceived level of computer training in computer orientation, database management, word processing, spreadsheets, graphics, telecommunications, programming, and software evaluation received by administrators and their opinions of the importance of this training are significant at the .01 level. Furthermore, the importance means are higher than the current training means in all training areas.

4. The differences between the perceived adequacy of condition and importance of condition regarding an established process for evaluating software, funding for
maintenance, and practice time are significantly different at the .05 level. No significant difference exists between the perceived adequacy of condition and importance of condition regarding computer availability, availability of software, environmental considerations, availability of peripherals, and technical support. The importance means are somewhat higher than the current adequacy means for all conditions except environmental considerations and computer availability.

5. The mean of the self-rated overall use of microcomputers is 2.12 on a scale from one to five. The overall use is significantly correlated to age (−.25), while not significantly correlated to graduation date, administrative experience, or size of enrollment. The chi square test of independence showed that the self-rated overall use of microcomputers is independent of gender, administrative position, type of institution, and interest in learning more about microcomputers.

6. Approximately half, 51.6 percent of the respondents who personally use a microcomputer or have someone use one on their behalf are using a microcomputer to do jobs previously done on a mainframe. When asked to estimate the use of computers by type—for three years ago, now, and in three to five years—respondents' answers seemed to show that microcomputer use will increase, mainframe use will remain about the same, the use of other
types of computers will remain about the same, and jobs
done without computer will decrease.
CHAPTER BIBLIOGRAPHY


CHAPTER V

SUMMARY, FINDINGS, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study was conducted to examine the use of microcomputers, as well as other computers, by top administrators in the twenty-seven public colleges and universities in the state of Oklahoma; to determine whether there are significant differences between administrators' perceived level of computer training and their opinions of the importance of this training; to determine whether there are significant differences between administrators' perceived adequacy of non-training conditions affecting computer use and their opinions of the importance of these conditions; to identify characteristics of administrators who use computers more than other administrators; and to identify trends in administrative computer usage.

The survey technique was utilized in collecting the data for this study. The survey instrument was developed by the researcher from questions on the questionnaire used in a dissertation that surveyed the use of microcomputers by division chairs in the Dallas County Community College District, a review of the literature, an evaluation by a panel of judges, and a pilot study. The survey instrument
was sent to the administrator for student affairs, administrator for business affairs, and administrator for academic affairs at each of the public twenty-seven colleges and universities in the state of Oklahoma in the 1986 spring and fall semesters. Seventy-four of the eighty-one administrators or 91.4 percent responded.

After collection and inspection of the questionnaires, a statistics software package was used to analyze the data. The data were analyzed and reported as appropriate for the various types of data collected by the questionnaire. In addition, a weighted discrepancy formula was used to rank the current level of training and importance of future training, and the current adequacy of condition and importance of conditions according to the variation between the means, weighted by the importance means.

Findings

Following is a summary of the major findings from this study.

1. Fourteen of the seventy-four or 18.9 percent of the respondents personally use a microcomputer and thirty-eight of the seventy-four or 51.3 percent have someone use a microcomputer on their behalf.

2. The most prevalent use of microcomputers is word processing for brief and lengthy documents. Mainframe computers are used mostly for word processing for creating
and editing lengthy documents and for database management for class schedules and equipment inventory. The majority of the administrators reported that a computer is not used for spreadsheets for projections; graphics for creating visual elements; database management for tracking goals; telecommunications to mainframe, remote databases, or electronic mail; or time management for appointments and task scheduling.

Computer functions rated high in importance by a majority of the administrators are word processing for brief documents, lengthy documents, and mass mailings; spreadsheet for projections and budgeting; and database management for class scheduling and equipment inventory. Computer functions rated low in importance by a majority of the administrators are database management for tracking goals; telecommunications for accessing remote databases and electronic mail; and time management for appointments and task scheduling.

3. The differences between the perceived level of computer training in computer orientation, database management, word processing, spreadsheets, graphics, telecommunications, programming, and software evaluation received by administrators and their opinions of the importance of this training are significant at the .01 level. Furthermore, the importance means are higher than the current training means in all training areas.
4. The differences between the perceived adequacy of condition and importance of condition regarding an established process for evaluating software, funding for maintenance, and practice time are significantly different at the .05 level. No significant difference exists between the perceived adequacy of condition and importance of condition regarding computer availability, availability of software, environmental considerations, availability of peripherals, and technical support. The importance means are somewhat higher than the current adequacy means for all conditions except environmental considerations and computer availability.

5. The mean of the self-rated overall use of microcomputers is 2.12 on a scale from one to five. The overall use is significantly correlated to age (−.25), while not significantly correlated to graduation date, administrative experience, or size of enrollment. The chi square test of independence showed that the self-rated overall use of microcomputers is independent of gender, administrative position, type of institution, and interest in learning more about microcomputers.

6. Approximately half, 51.6 percent of the respondents who personally use a microcomputer or have someone use one on their behalf are using a microcomputer to do jobs previously done on a mainframe. When asked to estimate the use of computers by type—for three years ago,
now, and in three to five years—respondents answers seemed to show that microcomputer use will increase, mainframe use will remain about the same, the use of other types of computers will remain about the same, and jobs done without computers will decrease.

Discussion

Following is a summary of the discussion of the findings from this study.

1. This study's findings regarding the personal use of microcomputers is in agreement with the literature that some administrators personally use the microcomputer, some have assistants use one on their behalf, some do both, and some do neither. Comments from a few of the respondents seemed to indicate that they were not interested in computers because they were close to retirement.

2. This study, Colley's study, and the study made by Bender and Conrad found that word processing was the prevalent function performed with microcomputers. Colley's study concurs with this study on the high importance placed on word processing, spreadsheet, and database management functions by administrators.

No computer of any type is used by a majority of the respondents for eleven of the sixteen functions listed on the questionnaire. Nine of the functions in the categories of graphics, database management, telecommunications,
programming, and time management were rated low in importance which is probably one of the reasons that a computer is not used.

3. The null hypothesis was rejected for all training categories in this study and in Colley's study. This fact and the ratings indicate that training is needed or at least wanted in computer orientation, database management, word processing, spreadsheets, graphics, telecommunications, programming, and software evaluation. Database management seems to be the greatest need while programming is in lowest demand. Keep in mind that the populations were different for these studies and that telecommunications was not a training category in Colley's study.

4. The availability of computers, availability of peripherals, availability of software, technical support, and environmental considerations are not major problems for the respondents in this study. This seems reasonable for this level of administrator. The rejection of the null hypothesis along with the ratings indicate that a process for evaluating software, practice time, and funding for maintenance, which is the greatest, are problems or at least inadequate for the respondents.

The null hypothesis was rejected for all of the conditions affecting computer use in Colley's study. The discrepancy in the findings of these studies could be attributed to the difference in the administrative levels
of the respondents and other factors related to self-rating questions. Since funding for maintenance was not questioned in Colley's study, a comparison of the studies on this topic cannot be made.

5. The self-ratings of overall use of microcomputers in this study were lower than the self-ratings of the administrators in Colley's study. This difference could be due to factors such as the difference in populations, difference in experience, and differing opinions of actual use of microcomputers.

The significant negative correlation between age and overall use might be tied to the comments by some of the administrators regarding their closeness to retirement.

6. The finding of this study that administrators believe that the use of microcomputers will increase and the use of mainframe computers will remain about the same is in agreement with the literature. The power and ease of use of hardware and software of future computer systems will have an affect on the use and popularity of computers in the future.

Conclusions

Based on the findings of this study, the following conclusions appear to be warranted.

1. Oklahoma administrators are benefiting from the use of microcomputers through someone in their offices.
2. Computers are considered important to Oklahoma administrators in carrying out their responsibilities.

3. Oklahoma administrators believe they need additional training in computer use.

4. Oklahoma administrators believe that the availability of computers and use are not closely related.

5. Oklahoma administrators seem committed to increased microcomputer use but may not be equally committed to increasing mainframe use.

Recommendations

Based on the findings of this study, the following recommendations are made.

1. A follow-up study of the uses of microcomputers by the top administrators in the public colleges and universities in Oklahoma is warranted in the future.

2. Similar studies of other administrators within the public colleges and universities in Oklahoma should be performed in order to evaluate the utilization of microcomputers.

3. Studies are warranted that assess the value of microcomputer software developed specifically for administrative purposes.

4. Studies are warranted that survey the policies adopted by colleges and universities in Oklahoma and other states regarding the development, introduction, operation, maintenance, training, and assessment of microcomputers.
5. Studies are warranted that access the use of computer networks by administrators in the colleges and universities in Oklahoma and other states.

6. Studies are warranted that address the problems related to purchasing and implementing microcomputer systems, including software and hardware, used by administrators.
APPENDICES
APPENDIX A

Preliminary Survey Instrument

QUESTIONNAIRE

Name ________________________________

I. Computer Use

DIRECTIONS: Please circle your response.
Yes No 1. Do you personally use a microcomputer (personal computer) in conducting the
duties of your office?

Yes No 2. Does someone in your office use a microcomputer in conducting your
business?

If you answered "No" to questions 1 & 2, skip to part II.

Yes No 3. Are you or someone in your office using the microcomputer to do jobs
previously done with a mainframe computer?

II. Computer Functions

DIRECTIONS: Please circle the response that best answers the following questions:
* First, what type of computer system is used by you or someone in your office to perform
the functions identified below?
  Micro—Microcomputer Main—Mainframe None—Computer is not used
  Other—Computer system other than a microcomputer or mainframe

* Second, how important are these functions in conducting the duties of your office?

<table>
<thead>
<tr>
<th>Function</th>
<th>Computer System</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word processing for creating and editing memos and other brief documents</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Word processing for creating and editing reports and lengthy documents</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Word processing for mass mailings, such as student advisement and</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>recruitment letters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spreadsheet for models and simulations, such as enrollment projections</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Spreadsheet for budgeting</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Graphics for generating graphic elements, such as bar graphs that</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>compare program enrollments by semester</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Database management for faculty records, such as maintaining faculty</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>evaluations and tracking part-time instructors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Database management for class scheduling</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Database management for equipment inventory</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Database management for recording and tracking the status of goals and</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>objectives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telecommunications to access central mainframe computer(s)</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Telecommunications to access remote databases and information services</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Telecommunications for electronic mail</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Programming to develop your own applications</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Time management system for scheduling appointments</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Time management system for report deadlines or task scheduling</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Other? Please specify.</td>
<td>Micro Main Other None</td>
<td>1 2 3</td>
</tr>
</tbody>
</table>
III. Computer Training

DIRECTIONS: Please circle the appropriate number to rate each of the following training areas according to the criteria:
* First, to what extent have you (personally) been trained (through any source) in that area?
* Second, how important is it that training be provided to you (personally) in that area in the future?

<table>
<thead>
<tr>
<th>Current Level of Training</th>
<th>Importance of Future Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

1. Computer orientation, including terminology, set-up, and using the hardware and operating system.
2. Training in using data base management software.
3. Training in using word processing software.
4. Training in using spreadsheet software.
5. Training in using graphics software.
6. Training in using telecommunications.
7. Programming training.
8. How to evaluate administrative software.
9. Other? Please specify.

IV. Conditions Affecting Computer Use

DIRECTIONS: Please circle the appropriate number to rate each of the following conditions according to the criteria:
* First, how adequate is the condition currently for your personal use of the computer?
* Second, how important is the condition to your personal use of the computer?

<table>
<thead>
<tr>
<th>Current Adequacy</th>
<th>Importance of Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

2. Environmental considerations, such as space, furniture, lighting, and noise.
3. Established process for evaluating administrative software.
4. Availability of applications software.
5. The availability of add-on equipment (peripherals).
6. Funding for computer maintenance.
7. Technical personnel and/or "hot-line" support.
8. Practice time.
9. Other? Please specify.
V. Respondent Information

DIRECTIONS: Please provide the following information about yourself.

1. Circle the number that you believe best reflects your current overall use of the microcomputer.
   Low  1  2  3  4  5  High

2. Your age? Check the appropriate box.
   • 29 years or less  • 30 to 34 years
   • 35 to 39 years  • 40 to 44 years
   • 45 to 49 years  • 50 years or older

3. Your sex? Check the appropriate box.
   • Male  • Female

4. Year in which last degree was granted: ______

5. Number of years experience as an administrator: ______

6. Administrative position: ________________________________

7. Enrollment and type of institution: ________________________

   □ Yes □ No  B. Please check. Are you interested in learning more about microcomputers and their use as an administrative tool?

VI. Trends in Administrative Computer Usage

DIRECTIONS: Please estimate your use of microcomputers, mainframes, and other systems for three years ago, currently, and five years in the future. The total for each column should be 100 percent.

3 years ago  currently  in 3-5 years

1. Use of microcomputers. 1 %  ___%  ___%  ___%
2. Use of mainframes. ___%  ___%  ___%
3. Use of other computer systems. ___%  ___%  ___%
4. Computer is not used. ___%  ___%  ___%

Total of above. 100 % 100 % 100 %

DIRECTIONS: Please circle your response.

Yes  No  5. Do you expect the use of microcomputers by administrators to increase and the use of mainframe computers to decrease?

If you answered "No" to question 4, skip to part VII.

_____ %  6. What percent of administrative jobs currently being done with mainframe computers will be done with microcomputers five years from now?

VII. Comments

DIRECTIONS: Please make comments you wish about future use, current use, etc., of computers in higher education administration and/or campus data processing centers. Use the back if more space is needed.
APPENDIX B

Cover Letter/Rating Sheet

QUESTIONNAIRE RATING SHEET

Name ____________________________ Date __________

Your help is needed in order to establish the content validity of the attached questionnaire. Please use the Purposes of the Study sheet to assist you in determining if an item is acceptable or unacceptable for this study. It would be very helpful if you would include a comment on the back for any item that you rate unacceptable. Please feel free to suggest additional questions.

<table>
<thead>
<tr>
<th>Item</th>
<th>Acceptable</th>
<th>Unacceptable</th>
<th>Don't Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part I.</td>
<td></td>
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<td>1.</td>
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<td>2.</td>
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<tr>
<td>3.</td>
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<tr>
<td>Part II.</td>
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<tr>
<td>1.</td>
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<td>2.</td>
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<td>3.</td>
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<td>4.</td>
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<td>5.</td>
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<td>6.</td>
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<td>7.</td>
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<td>8.</td>
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<td>9.</td>
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<tr>
<td>Part III.</td>
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<tr>
<td>1.</td>
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<td>2.</td>
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<tr>
<td>3.</td>
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<tr>
<td>4.</td>
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<td>5.</td>
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<td>6.</td>
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<td>7.</td>
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<td>8.</td>
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<tr>
<td>9.</td>
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<tr>
<td>Part IV.</td>
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<td>1.</td>
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<tr>
<td>2.</td>
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<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A. As presently constructed, this questionnaire does not offer a "Don't Know" response option. Omission of a "Don't Know" response option is acceptable.

B. At least one item is present for each measurable objective.

C. The language of each item (marked acceptable) is easily understood.

D. The arrangement of the items on the questionnaire is acceptable.

E. List the words that need to be defined.

Please check appropriately that you agree, disagree, or are undecided for each of the following statements. It would be helpful if you would include a comment on the back for any statement with which you disagree.
APPENDIX C

Survey Instrument

QUESTIONNAIRE

I. Computer Use

Name ___________________________ Date / /86

DIRECTIONS: Please circle your response.

Yes No 1. Do you personally use a microcomputer (personal computer) in conducting the duties of your office?

Yes No 2. Does someone in your office use a microcomputer in conducting your business?

If you answered "No" to questions 1 & 2, skip to part II.

Yes No 3. Are you or someone in your office using the microcomputer to do jobs previously done with a mainframe computer?

II. Computer Functions

DIRECTIONS: Please circle the response that best answers the following questions:
* First, what type of computer system is used by you or someone in your office to perform the functions identified below?
  Micro—Microcomputer (Personal Computer)  Main—Mainframe or Minicomputer
  Other—Computer system other than Micro or Main
  None—Computer is not used

* Second, how important are these functions in conducting the duties of your office?
  Please respond to the Importance column even if you are not currently using a computer.

<table>
<thead>
<tr>
<th>Computer System</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro</td>
<td>Main</td>
</tr>
</tbody>
</table>

1. Word processing for creating and editing memos and other brief documents.
2. Word processing for creating and editing reports and lengthy documents.
3. Word processing for mass mailings, such as student advisement and recruitment letters.
4. Spreadsheet for models and simulations, such as enrollment projections.
5. Spreadsheet for budgeting.
6. Graphics for generating graphic elements, such as bar graphs that compare program enrollments by semester.
7. Database management for faculty records, such as maintaining faculty evaluations and tracking part-time instructors.
8. Database management for class scheduling.
9. Database management for equipment inventory.
10. Database management for recording and tracking the status of goals and objectives.
11. Telecommunications to access central mainframe computer(s).
12. Telecommunications to access remote databases and information services.
13. Telecommunications for electronic mail.
14. Programming to develop your own applications.
15. Time management system for scheduling appointments.
16. Time management system for report deadlines or task scheduling.
17. Other? Please specify. ________________________________
III. Computer Training

**DIRECTIONS:** Please circle the appropriate number to rate each of the following training areas according to the criteria:
* First, to what extent have you (personally) been trained (through any source) in that area?
* Second, how important is it that training be provided to you (personally) in that area in the future?

<table>
<thead>
<tr>
<th>Training Area</th>
<th>Current Level of Training</th>
<th>Importance of Future Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Computer orientation, including terminology, set-up, and using the hardware and operating system.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>2. Training in using database management software.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>3. Training in using word processing software.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>4. Training in using spreadsheet software.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>5. Training in using graphics software.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>6. Training in using telecommunications.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>7. Programming training.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>8. How to evaluate administrative software.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>9. Other? Please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

IV. Conditions Affecting Computer Use

**DIRECTIONS:** Please circle the appropriate number to rate each of the following conditions according to the criteria:
* First, how adequate is the condition currently for your personal use of the computer?
* Second, how important is the condition to your personal use of the computer?

<table>
<thead>
<tr>
<th>Condition</th>
<th>Current Adequacy</th>
<th>Importance of Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Computer availability.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>2. Environmental considerations, such as space, furniture, lighting, and noise.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>3. Established process for evaluating administrative software.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>4. Availability of applications software.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>5. The availability of add-on equipment (peripherals).</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>6. Funding for computer maintenance.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>7. Technical personnel and/or &quot;hot-line&quot; support.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>8. Practice time.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>9. Other? Please specify.</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
</tbody>
</table>
V. Respondent Information

DIRECTIONS: Please provide the following information about yourself.

1. Circle the number that you believe best reflects your current overall use of the microcomputer.
   Low 1 2 3 4 5

2. Your age? Check the appropriate box.
   • 29 years or less  • 30 to 34 years
   • 35 to 39 years  • 40 to 44 years
   • 45 to 49 years  • 50 years or older

3. Your sex? Check the appropriate box.
   • Male  • Female

4. Year in which last degree was granted: ______

5. Number of years experience as an administrator: ______

6. Administrative position: ________________________________

7. Enrollment and type of institution: ________________________

   ☐ Yes ☐ No 8. Please check. Are you interested in learning more about microcomputers and their use as an administrative tool?

VI. Trends in Administrative Computer Usage

DIRECTIONS: Please estimate your use of microcomputers, mainframes, and other systems for three years ago, currently, and five years in the future. The total for each column should be 100 percent.

1. Use of microcomputers. 3 years ago currently In 3-5 years
   ______%  ______%  ______%

2. Use of mainframes.
   ______%  ______%  ______%

3. Use of other computer systems.
   ______%  ______%  ______%

4. Computer is not used.
   ______%  ______%  ______%

   Total of above. 100% 100% 100%

DIRECTIONS: Please check.
   ☐ Yes ☐ No 5. Do you expect the use of microcomputers by administrators to increase and the use of mainframe computers to decrease?

If you answered "No" to question 4, skip to part VII.

   ______% 5. What percent of administrative jobs currently being done with mainframe computers will be done with microcomputers five years from now?

VII. Comments

DIRECTIONS: Please make comments you wish about future use, current use, etc., of computers in higher education administration and/or campus data processing centers. Use the back if more space is needed.
APPENDIX D

Letter to the College Presidents

Southeastern Oklahoma State University
Durant, Oklahoma

Leon Hibs
President

May 9, 1986

Inside address

Dear

One of our employees, Mr. D. L. Deel, is conducting a survey of computer usage among administrators for his doctoral dissertation. I think the results will be important for us to know.

Could I ask a favor of you? Would you mind attaching a personal note to the three enclosed envelopes and forwarding them to the appropriate people? I think this will help the response rate since the questionnaire is somewhat long.

Mr. Deel will send copies of his findings to you as soon as his work is completed. It could be that the results will affect some of our decisions about computer systems.

Sincerely yours,

/s/ Leon

Enclosures
APPENDIX E

Cover Letter

Southeastern Oklahoma State University
Station A, Box 2584
Durant, OK 74701
May 9, 1986

Dear Administrator,

I am a graduate student working toward a doctorate in education. The proposed title of my dissertation is AN ANALYSIS OF THE USE OF MICROCOMPUTERS BY ADMINISTRATORS IN HIGHER EDUCATION IN OKLAHOMA. The attached questionnaire solicits information on the current uses of computers (particularly microcomputers), computer training, and conditions affecting the use of computers by administrators. The perceived importance and trends in computer use are also investigated. A summary of this research project will be sent to each college and university president.

Your participation in this research project has been approved by the president of your university. Would you take five to ten minutes to complete the attached questionnaire and return it in the stamped, addressed envelope by May 23, 1986? When completing the questionnaire, please answer all questions as directed whether you use a computer or not. Your response will be kept confidential.

Thank you for your prompt attention. Your participation is essential to the success of this research project.

Sincerely,

/s/ Dickie Deel

Dickie Deel

ac

Encl.

P. S. Please return by May 23, 1986.
APPENDIX F

Follow-up Cover Letter

Southeastern Oklahoma State University
Station A, Box 2584
Durant, OK 74701
June 9, 1986

Dear Administrator,

In May, you should have received an envelope from the president of your institution that contained a questionnaire and a letter signed by me. The questionnaire solicited information concerning your use of computers. Since I have not received your response, another questionnaire is provided in hopes that you will assist me in this research project.

Would you take five to ten minutes to complete the attached questionnaire and return it in the stamped, self-addressed envelope by June 27, 1986? Please answer all questions as directed whether you use a computer or not. Your response will be kept confidential.

Thank you for your prompt attention.

Sincerely,

/s/ Dickie Deel

Dickie Deel

Enclosure

P. S. Please return by June 27, 1986.
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Books


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Heath, Betty, and William G. Camp, Microcomputers in Small Business Management, Columbus, Ohio, Leadership and Training Series No. 64, National Center for Research in Vocational Education, Ohio State University, 1984.

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Articles


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Howard, Geoffry S., *Computer Anxiety and Other Determinants of Managers' Attitudes Toward the Usefulness of Microcomputers in Management*, unpublished doctoral dissertation, Graduate School of Management, Kent State University, Kent, Ohio, April, 1984.


