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A study of vice presidents' perceptions and uses of microcomputers for decision support in Michigan's four-year colleges and universities

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A STUDY OF VICE PRESIDENTS' PERCEPTIONS AND USES OF MICROCOMPUTERS FOR DECISION SUPPORT IN MICHIGAN'S FOUR-YEAR COLLEGES AND UNIVERSITIES

By

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ABSTRACT

A STUDY OF VICE PRESIDENTS' PERCEPTIONS AND USES OF MICROCOMPUTERS FOR DECISION SUPPORT IN MICHIGAN'S FOUR-YEAR COLLEGES AND UNIVERSITIES

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Purpose: This study sought to: (1) assess college and university vice presidents' perceptions and uses of microcomputers for decision support in Michigan's four-year colleges and universities; and (2) determine the extent to which the use of microcomputers has lived up to the expectations of vice presidents.

Methodology: A questionnaire was distributed to 192 selected vice presidents and 55% responded. The data analysis used included descriptive statistics, Pearson correlation coefficient, ANOVA, and Multiple Regression Analysis. The study consisted of six research questions and twenty null hypotheses.

Findings & Conclusions: College and university vice presidents have a positive perception toward the use of microcomputers for decision support, and their expectations were met. When comparing direct/indirect microcomputer use for decision support by vice presidents, direct users had a more positive perception. Direct microcomputer use for decision support

by vice presidents is negatively correlated with their age, which may be attributed to younger vice presidents coming in already more familiar with computer use. Therefore, as older vice presidents retire and are replaced with younger executives, this may explain: (a) this study's detection of the increase in direct microcomputer use for decision support by executive administrators as compared to previous studies; and (b) the expected continued increase in direct microcomputer use for decision support by vice presidents. More decisions of vice presidents were supported by data generated through the use of mainframes than microcomputers or minicomputers. Microcomputer software was most used to support vice presidents' budgeting and planning decisions. The highest selected reasons for not directly using microcomputers for decision support were "it is someone else's job," followed by the "lack of available time."

Recommendations: Among the recommendations emerged from this study were: (1) "MAD-CUE" Microcomputer Assisted Decisions for College and University Executives, a support group which should be organized and established nationwide to include executive administrators interested in the applications of microcomputer technology into college and university administration and decision making; and (2) More funds should be provided to introduce the use of microcomputer technology to support vice presidents' decision making, including suitable hardware and software, adequate support services and training sessions.

In Memory of My Grandmother Whom I Love and Miss

Meriam Issa Al-Dossary

(May God Rest Her Soul In Heaven)

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Ignoring Information Is A Turbulent Road To Institutional Destruction . . .

T. Alsohaim

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CHAPTER I

INTRODUCTION

New technology can provide many solutions to many problems in our society. Certain technology, such as computers, however, can be useful in achieving specific goals and objectives, and in many cases, in a minimal amount of time. Further, the development of the microcomputer during the early 1970s attracted many organizations to adopt such technology in their daily operations.

In higher education, increasing financial constraints and declining enrollment may hinder the survival of many colleges and universities. Keller (1983) reported that "between 10 percent to 30 percent of America's 3,100 colleges and universities will close their doors or merge with other institutions by 1995" (p. 3). These frightening statistics cannot be ignored by college and university executive administrators, where many sensitive decisions have to be made for the survival of their institutions. Wolotkiewicz (1980) agreed that college and university executive administrators have recognized that "decisions are becoming increasingly interdependent and mistakes becoming increasingly unacceptable" (p. 240). Norris and Mims (1984) argued "although decision making will remain imperfect, the penalties for poor decision making will be extreme" (p. 707). Hence, executive administrators are expected to produce better and more effective decisions, not to mention the tremendous pressure this may hold for these administrators.

With these given conditions and perhaps more, it is obvious that many administrators are seriously adopting more sophisticated management support systems to improve their decision capacity. Yet because of the fact that "hard data" are becoming more vital for administrative decision making in colleges and universities (Wyatt and Zechauser, 1975, p. 175), a potential candidate is the microcomputer, which can be a powerful decision support tool for college and university executive administrators.

For the past decade microcomputers have "invaded" many operational areas in higher education institutions. This was largely due to the declining cost of microcomputer hardware and software, the attractive discounts offered by microcomputer industries to institutions of higher education, and the need to adopt such technology.

Although the use of microcomputers for decision support by executive administrators in colleges and universities is relatively a new phenomenon, some authorities on decision making agree that the "proper use of a microcomputer can greatly improve the quality of information for decision making and planning" (Tanner and Holmes, 1985, p. 9). It is claimed that it can increase administrative effectiveness (O'Danial, 1984), and productivity (Baldridge, Roberts and Weiner, 1984; Brown and Droegemueller, 1983; Browne, 1985; Hutten, 1984; Madron 1983).

Microcomputers can also increase efficiency in the decision making process (Callamaras, 1984). While most colleges and universities continue to use mainframe computers to serve many administrative functions, the application of microcomputers for financial analysis, planning, and modeling can be more flexible and inexpensive for word processing (Madron, 1983). In general, microcomputers are more cost effective than

large mainframes and minicomputers (Baldridge, Roberts and Weiner, 1984; Compeau, 1984; Davis, 1988; Garmon, 1984; Madron, 1983).

However, the lack of information regarding the reliability of microcomputer systems make them vulnerable (Brown, 1983). While such a claim can be disputed by Evans (1983), it is indeed the decision maker as the "master" who plays a significant role in utilizing the microcomputer for his/her own advantages in the decision making process. As Lyon (1981) put it "good tools do not make good managers, but they can assist a good manager in making better decisions" (p. 73).

Since the decision maker's perception may hinder or enhance the potential use of the microcomputer as a tool of decision support, this study will focus on the perceptions of college and university vice presidents with respect to the use of microcomputers for decision support in Michigan's four-year colleges and universities.

Statement of the Problem

The decision making process may take many forms, but the basis on which many decisions are made can be labeled differently. Rational decision making, as one model of decision making, can be an essential element for institutional prosperity. Chaffee (1983) stated "when rational decisions and the conditions that make rational decisions possible consistently characterize a college or university, that institution experiences not only a high proportion of excellent decisions but also a high degree of confidence in itself, in its values, and in its administration" (p. 2). Based on previous studies, Chaffee explained the lack of rational decision making process in colleges and universities (p.2). While rational decision making, as Simon (1958) contended, "always requires the comparison of

alternative means in terms of the respective ends to which they will lead" (p. 65), the "comparison" or perhaps the effective evaluation of alternatives may very well require both mental and technological processing of information. As we advance further into the information age and to the twenty-first century, more information needs to be analyzed to effectively support rational decision making.

The advancement in microcomputer technology has increased its potential use for information processing and as tools for decision support in many organizations. It has been claimed that using microcomputers can increase administrative effectiveness and productivity. It can also increase efficiency in the decision making process. Hence "more, better and faster information is associated with rationality" (Weisband 1987, p. 150). Interestingly enough, the extent of microcomputer use as decision support by college and university executives as well as whether it makes a difference to use them represent a concern that should be investigated. Exploring the perceptions of Michigan college and university vice presidents toward the use of microcomputers, in addition to the application of such technology as decision support, should enable one to assess the extent to which administrative effectiveness and productivity are increased by microcomputer use.

Purpose of the Study

The purpose of this study was to assess college and university vice presidents' perceptions and uses of microcomputers for decision support in Michigan's four-year colleges and universities. In assessing the perceptions, the extent to which microcomputers lived up to the expectations of the vice presidents was considered. In addition, several

independent variables were investigated for any relationship with the perception of vice presidents toward microcomputers, and the extent of their use of such technology.

Importance of the Study

Considerable research has been conducted on the applications of microcomputers as decision support which resulted in various decision models that can be applied to administrative functions in colleges and universities. Several studies were also conducted to investigate the perceptions and attitudes of college presidents, deans and chairpersons toward computers, but they rarely included vice presidents, where many critical decisions lie within their hands.

Interestingly enough, through the reviewed literature and to the best of the researcher's knowledge, there were no studies conducted to investigate vice presidents' perceptions and uses of microcomputers for decision support in Michigan's four-year colleges and universities.

The results of this study may contribute to the two reasons for studying societal attitude toward computers as proposed by Mathews and Wolf (1983):

1. To better understand and correct the fallacious and often irrational attitudes toward this integral component of modern life.

2. To better understand the rational attitudes against computers and their uses so that individual and society may be protected. (p. 4)

The introduction of computer technology into the human world has initiated and supported effective research related to such technology. Zemanek (1975) stressed "The computer creates by its existence and by the growing number of applications, a world of human decisions and choices

which did not exist before; they deserve attention and study, investigation and publicity" (p. 10).

Information stemming from this study could prove vital to college and university vice presidents for future planning of more suitable hardware and software based on current composite applications of microcomputers as decision support. In addition, information from this study will provide college and university vice presidents an inside look at other vice presidents' utilizations of microcomputers in their decision making process.

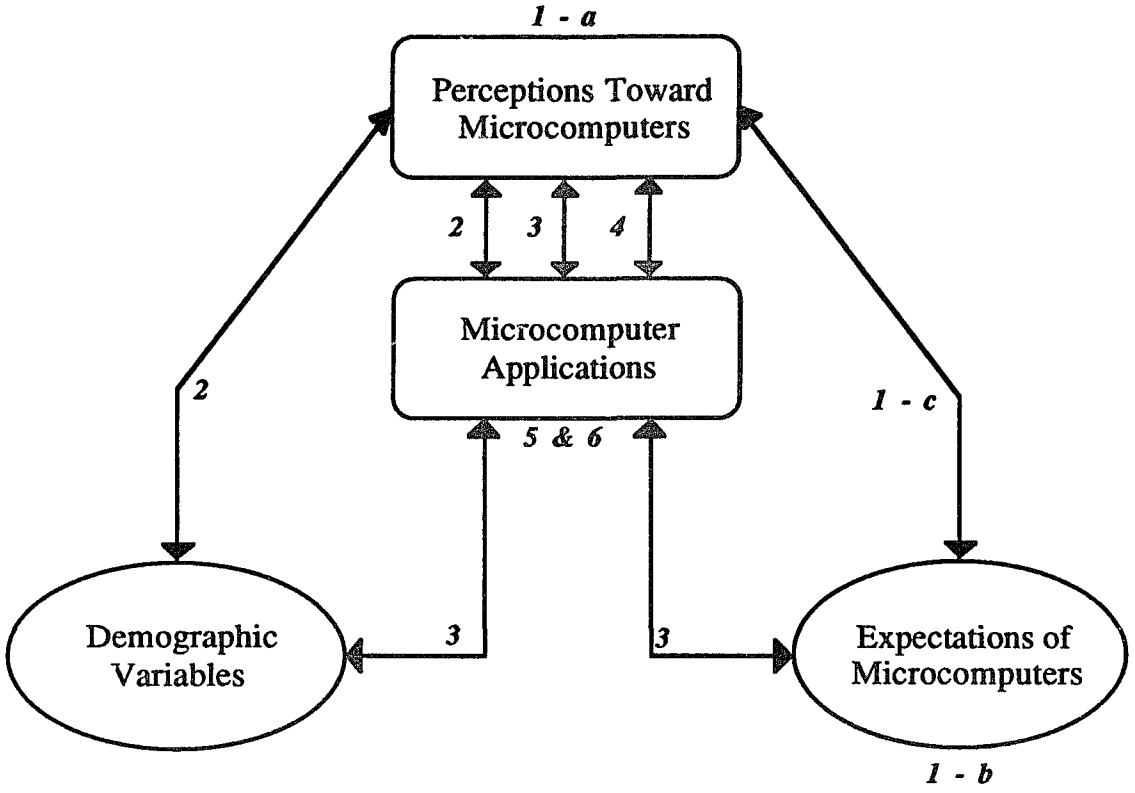
Other groups which may benefit from the results of this study are microcomputer designers and software developers. The results could provide up-to-date information for these groups to create more appropriate hardware and software to serve college and university vice presidents' tasks more efficiently, flexibly and effectively. Thus, better application of microcomputers in the decision making process.

Research Questions

To accomplish the purpose of this study, six research questions were developed to be explored as follows (for the following Arabic numerals and their sub-alphabetical letters, see their correspondences in Figure 1.1):

1. What are the perceptions toward the use of microcomputers for decision support by vice presidents at Michigan's four-year colleges and universities:
   a. Present perceptions toward microcomputers.
   b. The extent to which microcomputers live up to the expectations of the vice presidents.

Figure 1.1--Themes and Relationships to be Investigated



c. Relationships existing between vice presidents' perceptions and expectations of microcomputers.

2. What relationships exist between vice presidents' perceptions toward microcomputers as decision support and the type of their institution (major/non-major research institution), age, highest degree held, age of highest degree, possession of technical degree, and direct/indirect microcomputer use for decision support?

3. What relationships exist between the extent of microcomputer direct use for decision support by vice presidents and their positions, length

of employment in current position, size of institution, type of institution, age, gender, age of highest degree held, possession of technical degree, perception, expectation, and the total number of supportive staff?

4. What relationships exist between vice presidents' perceptions and their direct and indirect use of microcomputers for decision support?
5. To what extent are microcomputers and related software used to generate data, as compared to other computer sources, to support areas of decision making by vice presidents (either directly or indirectly)?
6. What are the reasons, if any, for not directly using microcomputers for decision support by vice presidents?

Hypotheses

In order to answer the research questions presented in this study, the following hypotheses (stated in null form) were formulated for investigation:

I. There is no significant relationship between vice presidents' perceptions and expectations of microcomputers as decision support.

II a. There is no significant difference between vice presidents from major research institutions and those who are not with regard to their perceptions toward the use of microcomputers for decision support.

II b. There is no significant relationship between vice presidents' perceptions toward the use of microcomputers for decision support and their age.

II c. There is no significant difference among the perceptions of vice presidents toward the use of microcomputers for decision support based on their highest degree held.

II d. There is no significant relationship between vice presidents' perceptions toward the use of microcomputers for decision support and the age of their highest degree.

II e. There is no significant difference between vice presidents who possess technical degrees and those who do not with regard to their perceptions toward the use of microcomputers for decision support.

II f. There is no significant difference between vice presidents who are directly using microcomputers and those who are not with regard to their perceptions toward the use of microcomputers for decision support.

IIIa. There is no significant difference among vice presidents for Academic, Business, Students or Public affairs with regard to the extent of their direct use of microcomputers for decision support.

IIIb. There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and the length of employment in their current positions.

IIIc. There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and the size of institution.

IIId. There is no significant difference between vice presidents from private institutions and those from public institutions with regard to the extent of their direct use of microcomputers for decision support.

IIIe. There is no significant difference between vice presidents from major research institutions and those who are not with regard to the extent of their direct use of microcomputers for decision support.

IIIf. There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and their age.

IIIg. There is no significant difference between male and female vice presidents with regard to the extent of their direct use of microcomputers for decision support.

IIIh. There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and the age of their highest degree held.

IIIi. There is no significant difference between vice presidents who hold technical degrees and those who do not with regard to the extent of their direct use of microcomputers for decision support.

IIIj. There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and their perceptions of microcomputer as decision support.

IIIk. There is no positive relationship between the extent of vice presidents' direct use of microcomputers for decision support and the degree of their expectation related to the use of microcomputer for decision support.

IIIl. There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and the total number of vice presidents' supportive staff.

IV. There is no significant relationship between vice presidents' perceptions toward using microcomputers as decision support and

their direct and indirect use of microcomputers for decision support (through their supportive staff).

Delimitations

This study was delimited to four selected types of vice presidents' positions at each of Michigan's four-year, baccalaureate granting colleges and universities that are accredited by the North Central Association of Colleges and Schools. This included both public and private institutions (see Appendix A). The four types of vice presidents' positions that this study focused on are as follows:

1. Vice President for Academic Affairs.
2. Vice President for Business Affairs.
3. Vice President for Students Affairs.
4. Vice President for Public Affairs.

This study shall be restricted to investigate the selected vice presidents' perceptions and uses of microcomputers for decision support.

Limitations

As with all questionnaire type research, where the researcher is dependent upon the validity of the responses, one should be cautious in generalizing the findings of such research. However, if the four-year institutions available in the state of Michigan approximate the variety of the four-year institutions that are in the United States, to that extent, conclusions drawn from this study could be generalized to vice presidents in public and private four-year colleges and universities in the United States.

Assumptions

It was assumed in this study that the response rate to the questionnaires by the subjects might be relatively low. One possible factor is perhaps due to the fact that college and university vice presidents are extremely busy with their tasks. One attempt by the researcher to elevate the response rate, was to keep the length and average time required to complete the questionnaire to a minimum and to display the questionnaire in an attractive fashion to procure the attention of the subjects.

It was also assumed in this study that many of the college and university vice presidents' tasks performed on computers are normally conducted by their supportive staff.

Definitions of Terms

In this study, some terms were used frequently. To clarify any ambiguity that may relate to such terms, their intended meanings are described as follows:

Ø Hypothesis: This refers to the null hypothesis which is, "merely the statistical and logical equivalent of the opposite of the research hypothesis" (Cates, 1985, p.17). In this study all of the null hypotheses are introduced for a possible rejection.

Age of Highest Degree: Number of years lapsed since respondents attained their highest academic degree.

Attitude: This term refers to "a relatively enduring and consistent set of opinions, often implying a value judgment, about particular persons or objects" (Gardner 1978, p. vi).

Decision Making: A process of formal or informal procedures that may be followed to arrive at a final choice.

Decision Support: Any method or tool used to enhance decision making.

Decision Support System (DSS): For the purpose of this study, this term refers to "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" (Jamieson and MacKay, 1984, p. 56).

Direct Micro Use: The extent of microcomputer use for decision support by vice presidents -- measured in percent of microcomputer total usage time directly by vice presidents for their decision support.

Expectation: The extent to which microcomputers lived up to, fell short of, or exceeded vice presidents' expectations as tools for decision support.

Indirect Micro Use: The extent of microcomputer use for vice presidents' decision support by their supportive staff -- measured in percent of total microcomputer usage time by supportive staff for vice presidents decision support.

Mainframe Computer: "The largest of the computers ... marked by fast CPU operating speed, almost limitless memories and storage, and a large number of users" (Hollander, 1986, p. 72).

Microcomputer: "A complete tiny computing system, consisting of hardware and software, whose main processing blocks are made of semiconductor integrated circuits" (Sippl and Sippl, 1980, p. 320). It is also called a Personal Computer(PC) or Micro.

Perception: This term refers to "the interpretation of received stimuli in light of past experiences and knowledge" (Hopkins 1976, p. 90). Perception, in this study, is assessed by the degree of positive or negative feeling, as measured by a forced choice Likert-type scale, toward statements about the use of microcomputers for decision support.

Supportive Staff: Personnel including secretaries and persons who reports directly to the vice president and have at east some staff responsibilities.

Vice President: In this study, this term refers to a deputy of a president of a college or university.

Vice President for Academic Affairs: This term refers, but not exclusively, to a college or university "Chief Academic Officer" who "directs the academic program of the institution. Typically includes academic planning, teaching, research, extensions and coordination of inter-departmental affairs" (Torregrosa, 1990, p. xxi). The holder of this position may also be called the Provost.

Vice President for Business Affairs: This term refers, but not exclusively, to a college or university "Chief Business Officer" who "directs business and financial affairs including accounting, purchasing, physical plant and property management, personnel services, food services, auxiliary enterprises and related business matters" (Torregrosa, 1990, p. xxi). This position may also refer to the vice president for business and finance.

Vice President for Students Affairs: This term refers, but not exclusively, to a college or university "Chief Student Life Officer" who directs "the student life programs including counseling and testing, housing, placement, student union, relationships with student organizations and related functions" (Torregrosa, 1990, p. xxi). At small institutions, this position may refer to the dean of students.

Vice President for Public Affairs: This term refers, but not exclusively, to a college or university "Chief Public Officer" who "directs public relations program. May include alumni relations, publication and development" (Torregrosa, 1990, p. xxi).

Organization of the Study

This study was organized in five chapters. Chapter I included an introduction, statement of the problem, purpose of the study, importance of the study, research questions, hypotheses, delimitations, limitations, assumptions, definition of terms and organization of the study.

Chapter II consisted of reviewed related literature which included microcomputer applications in college and university administration, decision support system (DSS), administrators' attitudes and perceptions toward computers as decision support, and a summary.

Chapter III covered the methodology of the study which included the population, instrumentation--validity and reliability, data collection, treatment of the data, and a summary.

Chapter IV revealed presentation and analysis of the data, which included the introduction, descriptive analyses, research questions and hypotheses, and a summary. And finally, Chapter V presented a summary, findings, conclusions, and recommendations.

CHAPTER II

REVIEW OF RELATED LITERATURE

The review of related literature to this study is organized and reported under three main headings, each of which included its own sub-headings. The three main headings are: (1) Microcomputer applications in college and university administration. (2) Decision Support Systems (DSS), and (3) Administrators' attitudes and perceptions toward computers as decision support.

Microcomputer Applications in College and University Administration

In order to comprehend the potential application of microcomputers in administrative function, recent trends and perhaps a brief highlight on the advancement of such technology may prove helpful.

Microcomputer Advancement:

Although it has taken the human race many years to develop the modern microcomputer, the basic idea of such a computing machine was traced all the way to China during the year 600 B.C. The following are selected development stages of the modern microcomputer from Gustafson (1985):

Dates	Development
600 B.C.	The abacus came into common use in China, allowing for faster more accurate numerical calculations...
1640s	Blaise Pascal ... developed a mechanical adding and subtracting machine to help his tax-collector father perform his job faster.
1830s	Charles Babbage ... developed the idea of a mechanical digital computer. He called it the Analytical Engine ... Babbage is considered the father of the computer.
1930s	Konrad Zuse ... built a simple computer from an Erector Set. This machine could perform a variety of calculations and was controlled by a program.
1936	IBM installed the first large tabulating machine at the U.S. Social Security Office. It used punch cards and could handle 120 million calculations per year.
1940s	Alan Turing ... built a mechanical computer, Colossus I ... it was the first machine to use the binary, 0/1 numbering system.
1949	Maurice Wilkes ... built the first working, electronic digit, stored program computer.
1971	Ted Hoff, an Intel Corporation engineer, placed the whole central processing unit on one silicone chip.
1975	The first hobbyist microcomputer kit was marketed, the Altair 8800. It sold for $395. (pp. 177-79)

Beyond 1975, microcomputers were increasingly manufactured by many different enterprises in the United States, including manufacturers like IBM, Apple, Commodore, Radio Shack, Texas Instruments etc. Even though the United States Government imposed strict regulations on the export of American made microcomputers and microchips, it was not long before other countries in the Far East began manufacturing different

brands of microcomputers using the same basic idea of such technology. In fact, they began exporting to many countries in the world, including the United States. This contributed to a significant decrease in the price of microcomputers in the American markets as being more and more of a mass market product. McWethy and McKirgan (1977) stated that "The 1-Million-dollar computer of 1950 costs $20 today, and computing speed is 100,000 times faster" (p. 65).

The dramatic decrease in computer prices was deeply felt by Schwartz, of SRI International, a research facility in California, (qtd. in Sleight, 1980). As Schwartz stated "if cars and jets had been decreasing in price at the same rate as microchips, cars would cost just $5 and a Boeing 707 jet would cost only $2,000" (p. H2). Davis (1988) supported a similar position: "in a period of roughly 30 years, computer technology moved from a condition where a room full of million dollar hardware was required to obtain 12,000 bytes of memory ... to the modern desktop microcomputers that provide two million bytes of main memory for under $10,000" (p. 3).

The decrease in microcomputer prices was not the only relevant change occurring to such technology. With an increasing number of microcomputer manufacturers, the competition pressure to produce better and more powerful microcomputers increased as well. Smaller and faster microcomputers with more memory were being developed, as compared with the computers of the 1950s (Miller, 1988). Evans (1982) agreed with these rapid changes, stating "the units of which computers are made are getting smaller and smaller, shrinking beyond the range of ordinary microscopes into the infinities of the molecular world" (p. 54). This is not to say that the whole microcomputer as a unit is shrinking beyond the recognition of human vision, but rather what Evans referred to was the

"component units--central processor, program unit, memory, etc." of the microcomputer unit, which is considered to be the heart of the microcomputer.

Further, Simons (1985) wrote "Today computers are learning how to think about the information that they hold, how to draw conclusions from their knowledge in ways that are starting to outstrip human intellectual competence" (p. ix). Whether or not computers may compete with human capabilities is both debatable and yet to be seen. Bergley, Carey and Reese (1980) argued that "true intelligence involves elements of will, consciousness and creativity of which today's computers are incapable" (p. 52).

While the overall changes of computer technology may enhance the quality and attractiveness of microcomputers for buyers, Dellow and Poole (1984) argued that such changes may perplex purchasers trying to determine the right time to acquire a microcomputer; the issue of whether to get it now or wait for better bargain. The choice of "waiting" may not be the answer as Jamieson and MacKay (1984) argued "waiting for the industry to settle down is not a choice ... development will continue at a fast pace for many years" (p. 61).

Many computer experts agree that microcomputers "are here to stay." As Schwartz (qtd. in Sleight 1980) indicated: "Just as the steam engine brought unheard-of power to our hands in the Industrial Revolution, the microcomputers are bringing new dimensions of power to our brains." He further stressed that "The impact has barely begun to be felt. We're only at the earliest stages, and the major applications of this new technology have not yet been realized" (p. H2). Evans (1982) reported that microcomputers will "become the most common pieces of technology in the world, and the

most useful" (p. 59). The recent development of the modern microcomputer made it more attractive to new and old users from diverse professions, including industry, governmental agencies, and the field of education in its various levels. Interestingly enough, the reviewed literature revealed positive views relevant to the future of microcomputers, both in terms of their application and their capabilities.

However, reviewing the advancement of microcomputer technology seems to be incomplete without exploring some of the recent trends of its related software.

Microcomputer Software:

The microcomputer as an exclusive unit is relatively worthless without the use of software/programs; a microcomputer by itself is like having "a car without gasoline." The recent development of the microcomputer has created a demand in the market to develop and design different software using different kinds of program languages such as BASIC, FORTRAN, COBOL, PASCAL, C Language, and APL. While the microcomputer applications may vary depending on the intended purpose of the user, the goal of the microcomputer software industry is clear: to design a maximum user-friendly software that serves the maximum needs of the user while keeping the price as competitive as possible for the consumers.

The software industry has flooded the market with a variety of microcomputer software. Available software ranges from single purpose, such as wordprocessing to multi-purpose which includes, but is not limited to, Data Base, Communication, Spreadsheet, Graphics and Statistics. The

selection of microcomputer software depends a great deal on the need of the user(s). However, for educational administrators, Gustafson (1985) suggested that "efficiency" was the prime consideration. Hutten (1984) argued that "ease of use, quality of documentation, integration, and support of hardware devices," should all be considered when possible selection of software is sought (p. 48). While each software can be used to support a specific task for the user, the primary purpose for administrators is essentially to provide the needed information/decision model at the right time for administrative decision making.

Microcomputer Applications:

During the past decade, the advancement in microcomputer technology, the declining cost of hardware and software, and the large discount offered by the computer industry to institutions of higher education has at least, contributed to the "invasion" of microcomputers to assist in many areas in colleges and universities. Roskens (1974) argued that "no single force, with its myriad permutations, has had greater impact upon the style and operations of American Colleges and Universities in the last half century than computer technology" (p. 142).

There is no doubt that microcomputers manipulate data much faster than the human mind. In turn, data can be presented as vital information to decision makers in colleges and universities. As Jones (1982) stated, "in higher education, data are used by analysts to construct information for the use of administrators and other-decision-makers" (p. 21). The development of computer technology has a great effect on the administration of colleges and universities, Wolotkiewicz (1980) reported that "technology,

particularly computerization, has added a sophistication to administration not only in control and monitoring activities, but also in providing information and completing transactions for day to day operation" (pp. 3-4). Simon (1977), stressing the importance of computer technology for problem solving and decision making, wrote:

> Assuming new responsibilities is frequently painful. We see many difficulties in the world today that we did not see ten years ago. Sometimes we despair of dealing with all of the difficulties that confront us. We can take comfort, perhaps, in recognizing that there are really not more problems; there is just an increasing awareness of what the problems are. The information-processing technology is playing a major role both in producing that recognition and in providing new alternatives for handling the problems (pp. 167-68).

Use of microcomputers as tools for information manipulation and control is evident. As Madron (1983) contended, "Both microcomputers and large mainframes can assist accessibilities by allowing us to make more intelligent and selective use of the information produced" (p. 157), further stressing, "when managers can actually access required information for making decisions, then decisions will be better informed" (p. 160). As the use of information is expected to increase during this decade, similarly, "direct management use of terminals and micros will increase from a relatively low rate to a very high rate" (Madron 1983, pp. 158-60).

Many authors support the application of microcomputer technology to help college and university administrators construct their own decision models using relevant information -- Harris (1984), Cloutier and Hoffman (1985), O'Danniel (1984) etc.

One successful application of microcomputers in administrative function in higher education, was reported by Cloutier and Hoffman (1985).

At a time of budget reduction at the University of Illinois at Chicago, the Office of Campus Planning used a microcomputer and software called "VisiCalc" to develop a decision support system named "Budgeting for University eXecutives (BUX)." BUX which included a "what-if" function and was designed to serve the Vice Chancellor for Administration as a decision support. One essential dimension of this system was to "test resource allocation alternatives" (pp. 22-28). Such creative applications of microcomputer technology into college and university management were evident in the reviewed literature. However, in any microcomputer application as a tool for decision support, decision makers must accept their own responsibility. As Tanner and Holmes (1985) wrote:

> Microcomputer and technology to be the servants of persons who are involved in planning, research, and decision making -- not their master. Hence, the microcomputer is a sophisticated hireling, where the sophistication is dependent upon the master as well as the servant. (p. 8)

The decision makers are the "masters" who play significant roles in utilizing the microcomputer for their own advantages in the process of decision making.

One incentive for microcomputer application as an expert system into problem solving and decision making is explained by Simons (1985): "the design of expert system is to enable computers to think about specialist knowledge in ways that help human experts, bring new insight in difficult areas, and provide a cost-effective way of tackling problems in fields where there might be a shortage of skilled (and sufficiently cheap) human experts" (pp. 174-75).

Although only a small number of executive administrators directly use microcomputers as reported in a study by Deel (1987), many have someone

else use microcomputers for them. Deel found in his study of Oklahoma college and university administrators that "51.3 percent of the respondents have someone use the microcomputer on their behalf." Only "18.9 percent of the respondents personally use a microcomputer." In addition, among the results of Deel's study were: respondents expressed the need for training related to computer use, microcomputers were mostly used for wordprocessing, and respondents anticipated that microcomputer use would increase. While Deel found no significant relationship between the "overall use of microcomputers" by executive administrators and their sex, position, type of institution, interest in learning more about microcomputers, graduation date, and administrative experience; age however, was found to be negatively correlated (r = -.25) (p. 99). Baldridge, Roberts and Weiner (1984) claimed that administrators already heavily utilizing computer technology, especially in large institutions, they pointed out that:

> Large university campus administrative applications generally absorb 50 to 60 percent of the computing usage. These activities cover a broad spectrum, including accounting, physical plant scheduling, payroll, student registration, registrar's records, budgeting analysis, and personal files. (1984, p.7)

Microcomputers can be very useful tools for decision makers at the higher education level. Tanner and Holmes (1985) contended "proper use of a microcomputer can greatly improve the quality of information for decision making and planning ... also operation within an organization will improve" (p. 9). In supporting such a claim, Madron (1983) reported "one collective objective of any large organization is to make its staff more productive, and one way to make the people in the organization more productive is to provide them with better tools ... one of the major

productivity tools of the 1980s is the personal computer" (p.2). As such, efficiency is increased for decision makers familiar with the form of storage and retrieval of information, either in or through the microcomputer. Harris (1984) argued that decision makers could then concentrate on the needed information rather than the "availability" of information (p. 23).

To maximize the potential use of microcomputers by administrators in the decision making process, the user(s) need to have enough knowledge on how to operate the hardware and execute the needed software. Baldridge, Roberts and Weiner (1984) suggested "It is probably more feasible for an administrator to gain a functional knowledge of a computer system's operation than for the computer specialist to fully comprehend the administrator's complex needs and concerns" (p. 27). While such concern was also supported by Mann (1979), a question can be raised at this point as to why should administrators in higher education adopt microcomputers for their task support. In response to this concern, the "Big Ten" advantages of microcomputers reported by Baldridge, Roberts and Weiner (1984) should be listed:

1. Microcomputers have an excellent ratio between cost and usefulness.
2. Microcomputers can be quickly installed and people can be quickly trained to use them.
3. Microcomputers increase the flexibilities of existing campus networks.
4. Microcomputers software is cheap and readily available.
5. A decentralized microcomputer network does not go down when one unit fails.
6. Microcomputers maximize local control and decentralization.
7. Productivity increases when microcomputers are used.

8. The spread of microcomputers may slow the increase in computer specialists.
9. Microcomputers give excellent security for sensitive topics.
10. Microcomputers are "user-friendly." (pp. 35-37)

In addition, microcomputers are portable which provide an easy way to be used in different locations within an organization. All these advantages provide a threshold for executive administrators to consider the application of microcomputers to assist in their decision making process. Madron(1983) said "micros should be welcomed as a major step forward in using our technology for greater productivity" (p. 15).

Decision Support System (DSS)

During the early 1970s, a new phase from Information and Management Science was developed to support decision making -- the Decision Support System (DSS). Although DSS evolved from the concept of Management Information System (MIS), it was distinguished from MIS in its "flexibility, interactivness, discovery orientation, and ease of use for noncomputer decision makers" (Attaran and Bidgoli, 1986, p. 10).

As there is no one definition of DSS (Keen, 1986), DSS may vary somewhat in the literature. Jamison and MacKay (1984) defined DSS 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" (p. 56). Keen (1983) defined DSS as "a computer-based system (say, a data base management system or a set of financial models) which is used personally on an ongoing basis by managers and their immediate staffs in

direct support of managerial activities - that is, decisions" (p. 326). DSS was considered "any type of computerized system used to provide information for managers and other decision makers within an organization" (Edmunds, 1987, p. 166). In general, however, DSS was used to solve many types of managerial decision making problems. Thierauf (1988) explained:

> Decision support systems allow the decision maker to combine personal judgment with computer output in a user-machine interface to produce meaningful information for support in the decision-making process. Such systems are capable of solving all types of problems (structured, semistructured, and unstructured) and use query capabilities to obtain information by request. As deemed appropriate, they use quantitative models as well as database elements for problem solving. (p. 50)

One must keep in mind that DSS does not replace the decision maker nor it does make the decision for the user; rather, it enhances the decision maker's "judgement." King (1981) contended "by allowing experimentation with alternatives in ways that would never be feasible without the DSS" (p. 64). In short, the definition and purpose of DSS is clear -- the use of computer-based information to construct path alternatives/models to support, if not improve, the user's decision making capacities. Graham (1983) concluded:

> An intelligent computer could help us with many of the personal, social, financial, and business problems we face every day. We would not want a computer to make all our decisions for us, of course, but we might well seek its advice, just as we might seek the advice of a knowlegable friend with no emotional stake in the issue at hand. (p.295)

Since the creation of DSS, a few of its products have been developed as well -- Executive Support System (ESS), Executive Information System (EIS), Expert Systems (ES), Artificial Intelligence (AI), etc. The latter two (ES and AI) may become more famous in the 1990s as reported by Stemp et. al. (cited in Towey 1989). While each of these DSS products is geared to

certain fields of application, their major purpose is the same as for the original DSS. Interestingly, their unique characteristics may vary somewhat. ES "examines and compares a given situation and its symptoms against the information stored in the knowledge base to help hypothesize: the likely outcome from a given set of circumstances; the cause of problem; or the best course of action" (Davis, 1988, pp. 64-65). Since ES draws its conclusions from stored information, the effectiveness of such a system depends heavily on the accuracy, relevancy, depth and currency of such information. AI, on the other hand, focuses more on the use of natural language to communicate with the user. AI, as Thierauf (1988) reported, "relates fundamentally to the capability of the computer to reason, that is, to make inferences about known facts so as to reach logical conclusions" (p. 366). Future trends in AI seems to be both bright and challenging, because of the competition increase between Japanese and American computer scientists in the area of AI development. This may result in more advantages toward the use of DSS in the area of decision making, as Thierauf (1988) stated:

> The use of AI in future DSS focuses not on mere information but on knowledge of the highest quality that is pared, shaped, and tailored to the needs of the specific needs of the decision maker. This knowledge will be accessible to anyone, anywhere, at any time in an organization. It will be fast, powerful, and useful to decision makers. (p. 366)

In the past, most of DSS was implemented using mainframe computers. Present and expected future capabilities of microcomputers are diverting the application of DSS to smaller and more cost effective computer devices (Karon, 1986; Callamaras, 1984). It is interesting to note that much of the reviewed literature extensively covered the development of DSS, the different types of DSS and their applications as decision support

tools in the management of business and industry with less focus on the management of higher education institutions.

Microcomputer-Based DSS:

As the advancement in microcomputer technology continued, Martin (1989) noticed the increase use of microcomputer as a "workstation" for DSS. Callamaras (1984) argued that "most professionals can obtain the benefits of an MIS/DSS with a good microcomputer system" (p. 123). A parallel agreement was also supported by Davis and Sardinas (1985).

Most of the reviewed related literature, however, had relative agreement on the major components or elements of DSS (Attaran and Bidgoli 1986; Brown and Droegemueller, 1983; Gray and Lenstra 1988; Sprague, 1986; Kassicieh et. al., 1986; Sprague and Watson, 1983; Stemp et. al. cited in Towey 1989; Tayagi et. al., 1988). If a DSS is to be implemented using a microcomputer unit, then these authors suggested that a well developed DSS must incorporate the following major elements:

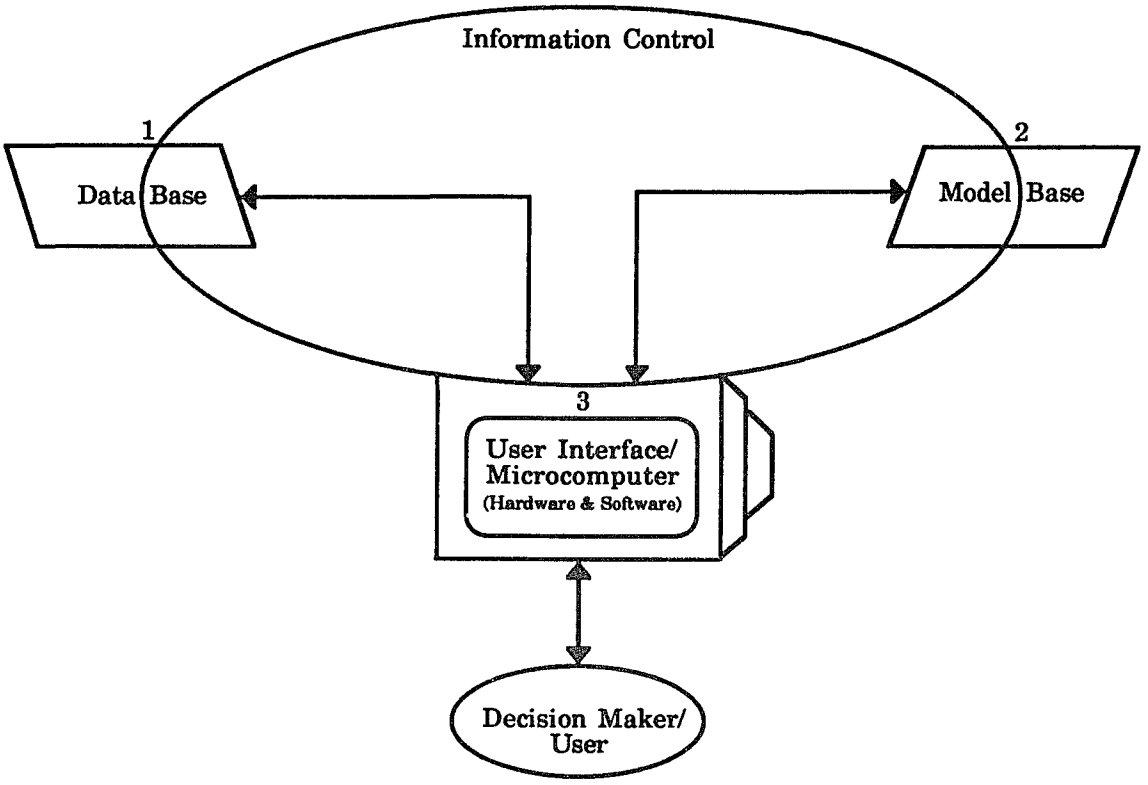
1. Data Base.
2. Model Base.
3. User Interface.

The links between the above three elements are displayed in Figure 2.1 (adopted and modified from Sprague and Watson, 1983, p. 21-23). Each of the above elements represent a crucial pillar in the appropriate development and application of most of the DSS and should be clarified as follows:

1. Data Base:

The data base is an imperative element of any DSS as it is considered to be the "blood" of such a system. The data base must contain

Figure 2.1--Major Elements of a Decision Support System



sufficient data related to internal and external information that may affect the institution (Attaran and Bidgoli, 1986; Thierauf, 1988). The availability of external information within the data base of a DSS is crucial for executive decision makers (Sprague, 1986). The data base is either "stored in the microcomputer ... or interface with data residing in a mainframe" (Karon, 1986, p. 101). The data base must be updated as required, with data organized and maintained in a manner that is easily accessed and

retrieved by authorized personnel. The data base should be capable of absorbing the needed data to effectively develop and implement the DSS.

2. Model Base:

The objective of modeling within a DSS environment is to "represent and simulate segments of the decision-making process itself" (Stemp et. al. cited in Towey, 1989, p. 53). To implement a model element on a microcomputer-based DSS, Brown and Droegemueller (1983) suggested various types of microcomputer software that can be used, such as "electronic spreadsheet, statistical packages, graphics and plotting packages, data base systems" (p. 14). However, Sprague (1983) stressed that the model base of a DSS should include:

- the ability to create new models quickly and easily;
- the ability to catalog and maintain a wide range of models, supporting all levels of management;
- the ability to interrelate these models with appropriate linkages through the database;
- the ability to access and integrate model "building blocks;" and
- the ability to manage the model base with management functions analogous to database management (e.g., mechanisms for storing, cataloging, linking, and accessing models). (p. 111)

3. User Interface:

The interface is considered the link between the user and the system (DSS), which includes both the hardware and software. While the user normally controls DSS, Brown and Droegemueller (1983) argued that the decision maker (user) was a "critical element in the microcomputer-based DSS ... he or she must be willing to use the available tools and routines and to weld the data, tools, and routines into models which will support and test various problem solutions and decisions"(p. 14). Thierauf (1988) stressed

"the focus of the user-machine interface is on learning, creativity, and evaluation rather than on replacement, automation, and routine procedures" (p. 42). The interface software "must be flexible, easy to use, reliable, reasonably self-explanatory, and responsive--just like a staff assistant" (Keen, 1983, p. 385). In general, however, the user interface element of a DSS should have the following capabilities:

- the ability to handle a variety of dialogue styles, perhaps with the ability to shift among them at the user's choice;
- the ability to accommodate user actions in a variety of media;
- the ability to present data in a variety of formats and media; and
- the ability to provide flexible support for the users' knowledge base. (Sprague, 1983, p. 113)

Most of the reviewed literature supported a bright future for the previously discussed elements of DSS, as Sprague (1986) pointed out:

> New developments from artificial intelligence will make major contributions to all three of the DSS capability sets. Data base management will benefit from infusion of library science as well as AI to create better ways to organize and manage text-based data. Developments in model management are leading to better ways of defining and manipulating models. Dialog will profit significantly from the inclusion of natural language processing techniques and voice recognition (p. 24)

When implementing a Decision Support System, there are a few, but serious, considerations recommended by Norris and Mims (1984), especially for leaders in institutions of higher education:

1. The process for evaluating existing or planned systems must be carefully orchestrated, taking into consideration decision performance (how decision are made as well as their quality);

2. The full range of possibilities must be considered, including the use of microcomputers, main frames, and whether to design unique systems or to purchase proprietary software packages;

3. Until users become acclimated to the potentials of decision support systems, researchers and planners may be necessary intermediaries between decision makers and data processing professionals;

4. There is a growing need for persons with knowledge of decision making as well as technical skills, persons who can speak multiple "languages" which cut across EDP, MIS, MS, and planning or other disciplines;

5. Finally, the process for developing decision support systems must have a significantly shorter development time and involve decision makers more effectively than has development for data processing systems. (p. 712)

The reviewed literature supported the position that for a DSS to be an effective management tool, the users (or perhaps the management) must have a positive attitude toward such technology. Thierauf (1988) argued that "the key to successful future decision support systems is organization personnel -- from the highest level to the lowest level" (p. 369).

Administrators' Attitudes and Perceptions Toward Computers as Decision Support

The reviewed literature revealed relatively few studies related to the attitudes and perceptions of college and university administrators toward using microcomputers for decision support, and studies involving vice presidents were even more scarce. The study of attitude assessment of microcomputer users and their managers is essential to determine the successful application of such technology. Mann (1979) argued that "the greatest problems with computing in higher education are people problems" (p. 74).

While computers will not totally replace human jobs, many employees perceive computers as a threat to job security (Blumenthal, 1982; O'Brien, 1982). Such perceptions may relate to how humans react to computerization within their own environment. Fuhrman and Buck (1986) indicated that managers and employees "may resist and, in some instances, almost

sabotage the implementation of a computerized system ... not only do employee resist computerization, managers often react in the same manner" (p. 417). Basically, if an organization monitor cost-effectiveness within its operation, then many of its staff must be concerned with other competitors, even if one happens to be a microcomputer. Simon (1987) argued that "any technical device or machine that is supposed to increase productivity will presumably reduce the number of workers that are needed to turn out the product in question" (p. 7). The attitudes of individuals toward computers were among the three necessities for adopting computerization within an organization. Kiesler and Sproull (1987) stressed:

> To introduce new technology or modify old technology requires change in three areas: resources, behavior, and attitudes. Changing resources means changing the built technology and creating its necessary infrastructure. The necessary infrastructure of computing includes allocations of time and money, service people, teachers, physical space, computing procedures, and organizational units. Changing behavior means learning to use the new technology. It also means supporting and fostering new technology and acting to introduce it in specific areas. Changing attitudes means coming to believe that the new technology is instrumental to one's work and life. It also means holding symbolic beliefs in the legitimacy and value of computing, regardless of whether computers are actually used. (p. 30)

At higher education institutions, registrars were the target population in some studies. Demarais (1987) examined the "interest, attitude, and experience" toward the use of microcomputer as a decision support by registrars. While 54% of the sample responded to Demarais' survey, among the study conclusions were those that registrars lack the familiarity with Decision Support Systems. A positive correlation was also found between the higher the degree held by registrars and their perceived importance of microcomputers. "Opinions of college and university

registrars toward computers" was one of the themes studied by Brewer (1987). He found some variables significantly correlated ($p < .05$), with the perception of registrars toward computers. These variables were "headcount enrollment group, ownership of a microcomputer, age group, and educational level."

Behan (1985), interviewed 16 college executives regarding the use of a "computer-based information system (CBIS)," in the area of "strategic planning." Behan's study revealed that the system was perceived as "essential to effective strategic planning," and the perceptions were "positively influenced by top management support of CBIS utilization." As such, management support was also claimed as an essential requirement for successful microcomputer application into college and university administrative functions (Smallen, 1988).

Harris (1984) studied the use of computer-based modeling by decision makers to assist in their decision making capacity in 130 institutions. The results of his study revealed that a positive attitude of the users was a necessity to benefit from such tool. In addition, Harris also concluded that "cause of habit, ease of access, or just plain laziness," by the users were intervening in adapting computer-based as a decision support tool. However, Harris did not find any correlation between successfully adapting computer-based modeling as a tool for decision support and the users' "educational emphasis or level, background in higher education, or even job classification" (p.23).

Madron (1983) conducted a survey related to the use of microcomputers in organizations. One hundred thirty-six subjects responded to the survey from the Dallas Chapter of the Data Processing Management Association. Of the respondents surveyed 3.2 percent were from the education

profession. The attitudes of the respondents toward using microcomputers revealed that "80.6 percent of the large organization users having micros rated themselves as either enthusiastic (41.8 percent) or positive (38.8 percent)" (pp.131-43). This was parallel to the claim that micro users enjoyed the support in which microcomputers provided. As Ohles (1985) enthusiastically stated "To those of you with your fingers on the keyboard, introduce the microcomputer to education and educators, but please don't love it to death" (p. 53).

The attitudes of educational administrators toward the use of computers, within the colleges of education located in the southeastern region of the United States, were the focus of a study by Conwill (1989). The results of Conwill's study included that the use of computers in a decision making mode was conducted more by associate deans than deans; also administrators were significantly different in their attitudes toward computers and the frequency of their computer use in a decision making mode, based on the size of their employed institution's students enrollment.

The attitudes of college and university administrators may relate to their direct use of computers, as Weisband (1987) indicated "To predict whether an administrator uses a computer, one ought to be able to ask the administrator what he or she thinks of computers" (p. 155). Weisband also agreed that the "higher and more central the administrator's position, the more positive the attitudes that an administrator will express about computing" (p. 157).

Summary

The purpose of this chapter was to review pertinent literature to the topic of this study, in which three major areas were addressed. The first

was a review of the major advancement in microcomputer technology which included the trend in cost and power capabilities. Also, microcomputer applications in college and university administration were reviewed and documented.

Second, the Decision Support System (DSS) as a tool for decision support was investigated to its relevancy to increasing the user's decision capacity. The major elements of a microcomputer-based DSS were presented and discussed.

Third, the importance of the attitudes of the decision makers with regard to the use of computer technology as decision support tools was examined, which included variables found to have significant relationships with the attitudes of the users toward using such technology.

No previous studies were found through reviewing the related literature which investigate the extent to which microcomputers have lived up to the expectations of top management personnel at institutions of higher education. This provided a major foundation for reasons to investigate an imperative issue with regard to the subject under study. In the following chapter, Chapter III, the methodology used in this study is presented.

CHAPTER III

METHODOLOGY

The primary purpose of this study was to investigate vice presidents' perceptions and uses of microcomputers for decision support in Michigan's four-year colleges and universities. The purpose also included exploring the extent to which microcomputers have lived up to the expectations of vice presidents. To support the purpose, relevant views and information were needed from the subjects for the data analysis, therefore, a detailed discussion related to the subjects, instrumentation, data collection, and treatment of the data are essential as they are discussed in the following:

Population

The target population for this study included 192 vice presidents from 48 colleges and universities within the state of Michigan (see Appendix A). This included 15 public institutions and 33 private institutions. Of the 192 vice presidents identified, 48 were Vice Presidents for Academic Affairs, 48 were Vice Presidents for Business Affairs, 48 were Vice Presidents for Students Affairs and 48 were Vice Presidents for Public Affairs.

The study considered both male and female vice presidents. The 1990 Higher Education Directory was used for the selection of colleges and universities, based on the following criteria:

1. Four-Year college or university, located within the state of Michigan.
2. Baccalaureate granting institution.
3. Accredited by the North Central Association of Colleges and Schools.
4. Public or private institution.

Instrumentation

The reviewed literature revealed no appropriate instrument to assess college and university vice presidents' perceptions toward using microcomputers for decision support. Thus, such an instrument was developed by the researcher. The instrument consisted of three parts (see Appendix D).

The first part of the instrument was intended to collect background data about the respondents and their institutions. Part II was designed to gather information regarding the respondents' use of microcomputers for decision support, by themselves and their supportive staff.

Part III contained a number of statements with one scale on each side. The scale on the left of each statement (Perception Scale) is a forced-choice, four-point Likert-type scale for alternative responses ranging from strongly agree (SA) to strongly disagree (SD). This scale was designed to capture the respondents' perceptions toward using microcomputers for decision support. The scale on the right of each statement (Expectation Scale) was designed for the subjects to indicate the extent to which microcomputers fell short of, lived up to, or exceeded their expectancy level as decision support tools, ranging from less than expected (LTE) to more than expected (MTE). As Table 3.1 shows, each of the choices in both the perception and

expectation scales were assigned a numerical value to facilitate the data analysis. At the end of part III, two questions were included to secure information regarding reasons for subjects not directly using the microcomputer for decision support, and an opportunity for the subjects to explain their concern on the extent to which microcomputers did/didn't live up to their expectation as decision support tools.

Table 3.1--Assigned Numerical Values for Choices in Both the Perception and Expectation Scales

Perception Scale		Numerical Value		Expectation Scale
SD	=	1	=	LTE
D	=	2	=	AE
A	=	3	=	MTE
SA	=	4		

The development of the instrument used in this study reflects (a) arguments found through reviewing the related literature and (b) input from consultants with expertise in the area of methodology and measurement, faculty members with interest in the topics investigated in this study, and a number of doctoral students in the college of education.

Validity of Instrument:

It is not necessary to measure the validity of Part I and II of the instrument used for this study as it was intended to collect descriptive data related to the subjects' background and the extent of their direct and

indirect use of microcomputers for decision support. On the other hand, it was imperative to validate Part III of the instrument as it was designed to be used to assess the respondents' perceptions toward the use of microcomputers for decision support and the extent to which microcomputers lived up to their expectations.

Validity according to Nunnally (1978), "is a matter of degree rather than an all-or-none property" (p. 87). He further confirmed that content validity is "more ensured by the plan of content and the plan for constructing items" (p. 111). This "plan" was relatively explained by Cates (1985), and it was followed to validate the content of part III of the instrument:

> Researchers determine the content validity of a measurement instrument by considering the content which might have been included, the use to which the instrument will be put, the ways in which items were selected to be included, and the ways in which the designer of the instrument confirmed that the included items cover the desired content adequately. (p. 123)

As a result, preliminary perception and expectation scale items for Part III of the instrument were constructed which consisted of 31 item statements. The content validity test of these items was executed through the development stages of the entire instrument. It was determined that 11 items should be omitted as being ambiguous and/or relatively redundant. The remaining 20 items were tested for their face validity as they related to the finishing quality of the instrument. Nunnally (1978) stressed that "face validity can be considered as one aspect of content validity, which concerns an inspection of the final product to make sure that nothing went wrong in transforming plans into a complete instrument" (p. 111).

To test the face validity of the perception and expectation scale, the instrument was sent with a cover letter, a five-point face validity scale, and

a copy of the study proposal to a panel of judges (see Appendix B). The panel consisted of six university administrators from both public and private higher education institutions within the state of Michigan. The judges were chosen based on their expertise in the application of microcomputer technology into the decision making process and/or their administrative functions within their institutions. All of the expected responses were returned, evaluated, and the formulas (3.1 & 3.2) of Ghods (1979) used to estimate the face validity of each and all items of the perception and expectation scales. In arriving at each item's face validity (F_j), formula (3.1) was employed as follows:

$$F_j = \sum_{i=1}^{6} R_i / 24 \qquad (3.1)$$

Where F_j = The face validity for each item estimated by all judges [$_j$=1, 2, 3, ..., 20 (number of items)]

R_i = The face validity for each item estimated by each judge ($_i$ = 1, 2, 3, 4, 5, 6)

24 = The total possible score for any item estimated by all judges.

While $0.000 \leq F_j \leq 1.000$,

Thus, the face validity of each item in the perception and expectation scale was calculated and recorded in Table 3.2.

Further, in calculating the face validity of the whole perception and expectation scale (F), formula (3.2) was used as follows:

$$F = \sum_{j=1}^{20} F_j / 20 \qquad (3.2)$$

Where F = The face validity for the whole perception and expectation scale, estimated by all judges.

20 = The total number of items in the perception and expectation scale.

Therefore, the face validity of the whole perception and expectation scale (F) was calculated and recorded at 0.767. Based on the Face Validity Scale used to evaluate all items by the panel of judges, F = 0.767 indicated a high face validity for the perception and expectation scale. A strong recommendation was made by most judges to reduce the number of statement items in the perception and expectation scales, to decrease the time required by vice presidents to complete the questionnaire, thereby increasing the response rate. Thus, the decision was made to delete items with face validity of less than 0.750 as they represented less than high face validity. In contrast, items with face validity of 0.750 or above were retained as they represented high to very high face validity. As a result, 8 items were retained to represent the final perception and expectation scales. The face validity of the final scale was computed at F = 0.923 which designates a high to relatively very high face validity scale.

In support of the judges' recommendation of minimizing the time spent in responding to the instrument by the subjects, the length and the average time required to complete the instrument was kept to a minimum. The instrument did not exceed six pages in length, excluding the cover letter, and the time required to complete the questionnaire was averaged at 14 minutes.

Table 3.2--Calculated Face Validity of Each Item in the Perception and Expectation Scales

Item Number	Face Validity (F_j)
1	0.875
2	0.708
3	0.667
4	0.917
5	0.625
6	0.958
7	0.667
8	0.625
9	0.708
10	0.625
11	0.667
12	0.958
13	0.875
14	0.917
15	0.708
16	0.958
17	0.667
18	0.708
19	0.583
20	0.917

Reliability of Instrument:

Reliability of a measure was defined by Lemke and Wiersma (1976) as "the degree to which a test is consistent in its measurements" (p. 275). Similarly, Cates (1985) defined reliability as "the consistency with which an instrument produces equivalent scores" (p. 124). Cates indicated that a high consistency measure should provide a high correlation coefficient (r). Thus, it was crucial to compute a reliability estimate for both the perception and expectation scales.

The internal-consistency estimates of reliability for each of the perception and expectation scales were computed using Cronbach α (1951). As SPSS-X was used to compute both scores (see Appendix G), the degree of internal-consistency reliability for the perception scale was computed at α = .93 and α = .65 for the expectation scale. While the expectation scale revealed a relatively lower α level than the perception scale, the judgment of the appropriate use of such scale, should not have been hindered. Cronbach (1951) argued "A high α is therefore to be desired, but a test need not approach a perfect scale to be interpretable. Items with quite low intercorrelations can yield an interpretable scale" (p. 332). Hence, both α levels for the perception and expectation scales indicated fairly acceptable degrees of internal-consistency reliability.

Data Collection

The 1990 Higher Education Directory was used to obtain the subjects' names, positions, and the addresses of the institutions at which they were employed. The self-administered instrument was mailed directly to the subjects on January 2, 1990. An introductory cover letter accompanied each instrument, introducing the researcher, the nature of the study, and expressed appreciation for the subjects' participation in this study (see Appendix D). Each survey instrument mailing also included a self-addressed, stamped envelope. On January 10, 1990, follow-up letters were dispatched to all of the subjects (see Appendix E). This was conducted as a reminder for subjects to complete the questionnaires, aiming to increase the response rate as much as possible.

Because this study's subjects were college and university vice presidents, it was anticipated at the initial stages of this study that the response rate to the questionnaire might be relatively low. This assumption was attributed to the notion that the schedule of vice presidents is full and busy. Interestingly enough, the response rate was impressive, especially when given the time span in which a total of 59% of the number of questionnaires sent were received (see Table 3.3).

Table 3.3--Accumulated Number and Percent of Questionnaires Received by Number of Weeks Lapsed

Weeks Lapsed After Questionnaires Were Sent		Accumulated	
		N	%
	1	53	28 %
	2	76	40 %
	3	99	52 %
	4	112	58 %
	5	114	59 %
Total	5	114	59 %

As data were received through the mail from the respondents, they were organized and checked by the researcher for any error to determine their deletion or inclusion for this study. As a result, 8 of the total 114 received questionnaires were omitted, due to their incompletion. Respondents were unavailable to complete these questionnaires, for

reasons such as vacant positions, travel or retirement. Hence, a total of 106 responses were judged as being usable, which yielded a usable response rate of 55%.

Treatment of the Data

After the data for this study were compiled and ready to be analyzed, data screening was conducted to assure that the data were appropriate to be used for statistical analysis. The data were coded and entered into a data file using an IBM compatible microcomputer. A printout of the data file was retrieved and thoroughly compared with the original raw data to secure accuracy. The data were then uploaded to an IBM 3090-180 VF (Vector Facility) Mainframe Computer for statistical analysis.

The Statistical Package for the Social Sciences, Version X (SPSS-X) was used to analyze the data for this study. The data analysis involved both descriptive and inferential statistical techniques. The descriptive analyses focused on demographic and background data, reporting frequencies and percentages. For testing the hypotheses and answering the research questions, means, standard deviations, the Pearson Correlation Coefficient, Analysis of Variance (ANOVA), and Multiple Regression Analysis were employed. The conventional 0.05 level of significance was set for testing the null hypotheses.

Summary

It was determined that in order to accomplish the purpose of this study, an instrument should be constructed to collect the needed data related to the subjects under study. The instrument consisted of three

parts, the first part was intended to collect background data about the subjects. The second related to the subjects' direct and indirect use of microcomputers for decision support. The third part of the instrument was designed to assess the subjects' perceptions and expectations of microcomputers as decision support tools. The third part included two relatively open-ended questions for subjects to indicate their reason(s) for not directly using microcomputers for decision support, and the extent to which microcomputers lived up to their expectations as decision support tools.

The instrument was validated through a panel of judges. While most of part three of the instrument was intended to measure two single traits, the internal-consistency estimates of reliability was conducted, resulting in Cronbach α = .93 for the perception scale and α = .65 for the expectation scale.

The 0.05 level of significance was set for testing all of the 20 null hypotheses. Data were collected by mail during the month of January 1990. A usable response rate of 55% was attained. Data were uploaded into an IBM 3090-180 VF mainframe computer for statistical analysis, which included frequencies, percentages, means, standard deviations, Pearson correlation coefficient, Analysis of Variance (ANOVA), and Multiple Regression Analysis. The following chapter, Chapter IV, reveals presentation and analysis of the data.

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

Introduction

In this chapter, the results based on data gathered from the responses of 106 vice presidents from Michigan's four-year colleges and universities, are presented in two stages: (1) Descriptive analyses, which include characteristics of respondents with respect to the demographic and general background, assumed to be related to the perception and expectation of vice presidents toward, and the extent of their use of, microcomputers for decision support; and (2) Testing the 20 null hypotheses under investigation to support answering the following research questions:

1. What are the perceptions toward the use of microcomputers for decision support by vice presidents at Michigan's four-year colleges and universities:
   a. Present perceptions toward microcomputers.
   b. The extent to which microcomputers live up to the expectations of the vice presidents.
   c. Relationships existing between vice presidents' perceptions and expectations of microcomputers.
2. What relationships exist between vice presidents' perceptions toward microcomputers as decision support and the type of their institution (major/non-major research institution), age, highest degree held, age

of highest degree, possession of technical degree, and direct/indirect microcomputer use for decision support?

3. What relationships exist between the extent of microcomputer direct use for decision support by vice presidents and their position, length of employment in current position, size of institution, type of institution, age, gender, age of highest degree held, possession of technical degree, perception, expectation, and the total number of their supportive staff?
4. What relationships exist between vice presidents' perceptions and their direct and indirect use of microcomputers for decision support?
5. To what extent are microcomputers and related software used to generate data, as compared to other computer sources, to support areas of decision making by vice presidents (either directly or indirectly)?
6. What are the reasons, if any, for not directly using microcomputers for decision support by vice presidents?

Descriptive Analyses

Part I of the questionnaire used in this study consisted of a set of questions designed to collect the raw data necessary to determine the categories of each of the following independent variables: Current position, length of employment in current position, total students' enrollment at the employing institution, type of institution, age, gender, highest degree held, age of highest degree, and possession of technical degree. These variables, which relate to the respondents' characteristics, are presented in a systematic order, and when appropriate, tables and figures are used to enhance data presentation.

Position

As indicated in Table 4.1, of 106 total respondents, 31 (29.2%) were vice presidents for academic affairs. Both vice presidents for students affairs and public affairs share an equal number of respondents (24 or 22.6%). While 22 (20.8%) of the respondents were vice presidents for business affairs, the remaining 5 (4.7%) respondents were from other vice presidents' positions.

Table 4.1--Distribution of Respondents by Position

Position	Frequency	Percent	Cum. Percent
V. P. for Academic Affairs	31	29.2	29.2
V. P. for Business Affairs	22	20.8	50.0
V. P. for Students Affairs	24	22.6	72.6
V. P. for Public Affairs	24	22.6	95.3
Other Positions	5	4.7	100.0
Total	106	100.0	

Length of Employment in the Current Position

For the purpose of descriptive analyses, the data representing this variable were classified into 5 categories. As revealed in Table 4.2, nearly 69% of the respondents served in their current/reported position for 5 years or less. While between 6-10 years of service was reported by almost 19% of the respondents, only 7 (6.6%) respondents reported serving between 11-15 years, and 5 (4.7%) reported serving between 16-20 years. Twenty-one years or more of service was reported by one or less than 1% of the respondents.

Table 4.2--Distribution of Respondents According to Length of Employment

Length of Emp. As V.P.	Frequency	Percent	Cum. Percent
5 Years or Less	73	68.9	68.9
6-10 Years	20	18.9	87.8
11-15 Years	7	6.6	94.4
16-20 Years	5	4.7	99.1
21 Years or More	1	.9	100.0
Total	106	100.0	100.0

Size of Institution (Total Students' Enrollment)

This variable represents the size of the respondents' institutions. It was classified into 5 categories. As indicated in Table 4.3, a large proportion of respondents (51 or 48.1%) were employed at institutions with enrollment between 1000-4999 students. Two groups, comprised of 19 respondents each, had the same percentage of 17.9--one group was from institutions with enrollment of less than 1000 students, the other was from institutions with enrollments between 5000-14999 students. While 13 (12.3%) respondents were from institutions with enrollments of 25000 or more, only 4 (3.8%) reported enrollments between 15000-24999 students at their institutions.

Type of Institutions

Table 4.4 shows that the majority of respondents (71 or 67%) were from private institutions, with the remaining respondents (35 or 33%) were from public institutions. Out of a total 71 respondents from private institutions, 19 (26.8%) were vice presidents for both academic affairs and

Table 4.3--Distribution of Respondents According to Size of Institution

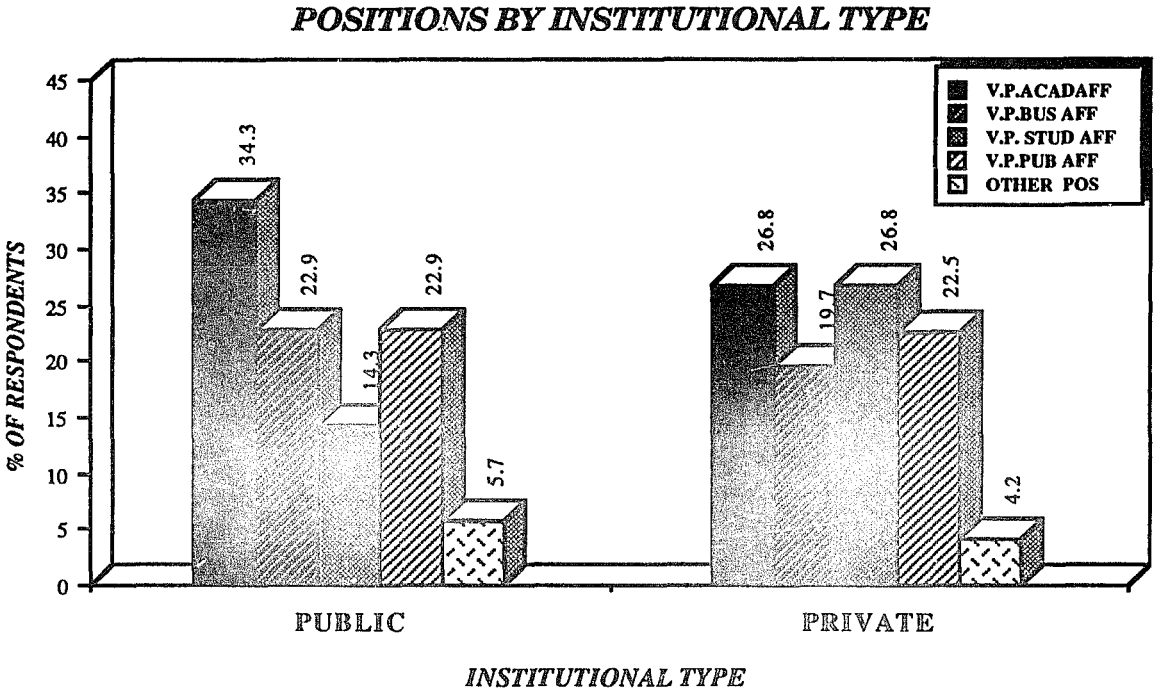
Size of Institution	Frequency	Percent	Cum. Percent
999 Students or Less	19	17.9	17.9
1000-4999 Students	51	48.1	66.0
5000-14999 Students	19	17.9	83.9
15000-24999 Students	4	3.8	87.7
25000 Students or More	13	12.3	100.0
Total	106	100.0	100.0

students affairs, 16 (22.5%) were vice presidents for public affairs, and 14 (19.7%) were vice presidents for business affairs (see Figure 4.1). Of the total 35 respondents from public institutions, the highest number was 12 (34.3%) which were vice presidents for academic affairs, followed by 8 (22.9%) representing an equal number for both vice presidents for business affairs and public affairs, while 5 (14.3%) claimed to be vice presidents for students affairs (see Figure 4.1).

Table 4.4--Distribution of Respondents by Type of Institution (Public/Private)

Type of Institution	Frequency	Percent	Cum. Percent
Public	35	33.0	33.0
Private	71	67.0	100.0
Total	106	100.0	100.0

Figure 4.1--Distribution of Respondents' Positions by Type of Institution



Most of the respondents (96 or 90.6%) reported they were from non-major research institutions; only 10 (9.4%) of the respondents were from major research institutions (see Table 4.5).

Table 4.5--Distribution of Respondents by Type of Institution (Major/Non-Major Research Institution)

Type of Institution	Frequency	Percent	Cum. Percent
Not Major Research Inst.	96	90.6	90.6
Major Research Inst.	10	9.4	100.0
Total	106	100.0	100.0

Age

The data for this variable were classified into 4 categories representing 4 age groups (see Table 4.6). As indicated in Table 4.6, nearly one-half of the respondents (51 or 48.1%) were between the age of 41-50 years, followed by 29 (27.4%) who were between the age of 51-60 years. Although 20 (18.9%) of the respondents were 40 years old or younger, only 5 (4.7%) were 61 years or older, and less than one percent of the respondents did not report their age.

Table 4.6--Distribution of Respondents by Age Group

Age Group	Frequency	Percent	Valid Percent	Cum. Percent
40 Years or Younger	20	18.9	19.0	19.0
41-50 Years	51	48.1	48.6	67.6
51-60 Years	29	27.4	27.6	95.2
61 Years or Older	5	4.7	4.8	100.0
	1	.9	Missing	
Total	106	100.0	100.0	
Valid cases 105	Missing cases 1			

Gender

Of the 106 respondents in this study, the majority were males representing about 70% of the respondents. Thirty two of the respondents (30.2%) were females (see Table 4.7). With respect to positions however, Figure 4.2 shows that the highest percent of female respondents (28.1%) were recorded at the position of vice president for students affairs, followed by 25% at the position of vice president for business affairs. On the other

hand, male respondents recorded highest at the position of vice president for academic affairs (33.8%), followed by 24.3% at the position of vice president for public affairs (see Figure 4.3).

Table 4.7--Distribution of Respondents by Gender

Gender	Value	Frequency	Percent	Cum. Percent
Male	0	74	69.8	69.8
Female	1	32	30.2	100.0
	Total	106	100.0	100.0

Highest Academic Degree Held

As indicated in Table 4.8, slightly more than 44% of the respondents earned Doctoral degrees. Forty-two (39.6%) of the respondents reported having a Master's as their highest degree held. Only 16 (15.1%) of the respondents reported a Bachelor's as their highest academic degree held. While no respondent reported a Specialist as being the highest earned degree, one respondent (0.9%) stated having other academic degree as being the highest earned.

Table 4.8--Distribution of Respondents by Highest Degree Held

Highest Degree Held	Frequency	Percent	Cum. Percent
Bachelor's	16	15.1	15.1
Master's	42	39.6	54.7
Doctorate	47	44.3	99.1
Other Degrees	1	.9	100.0
Total	106	100.0	100.0

Figure 4.2--Distribution of Female Respondents by Position

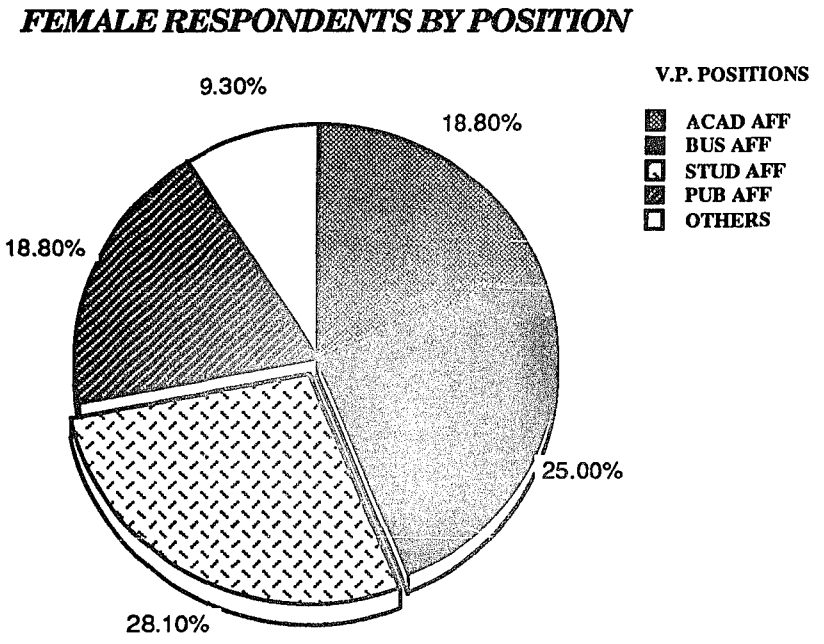
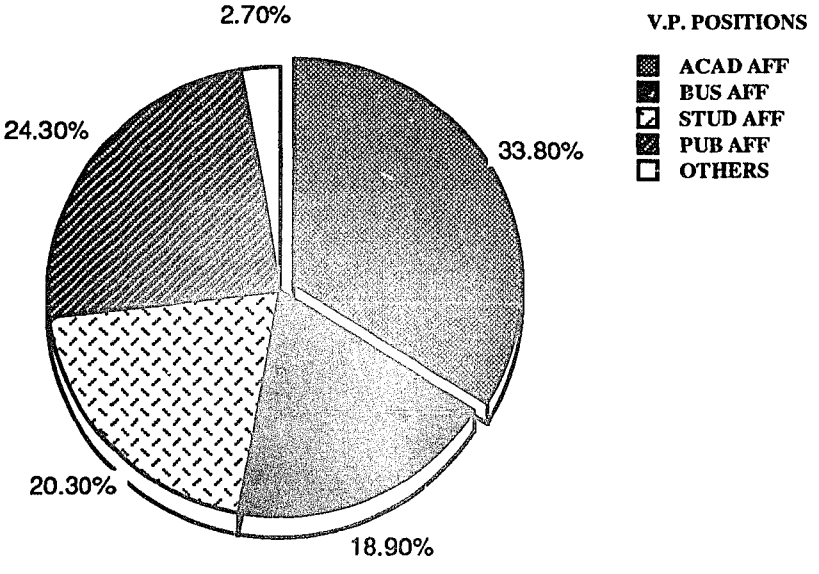
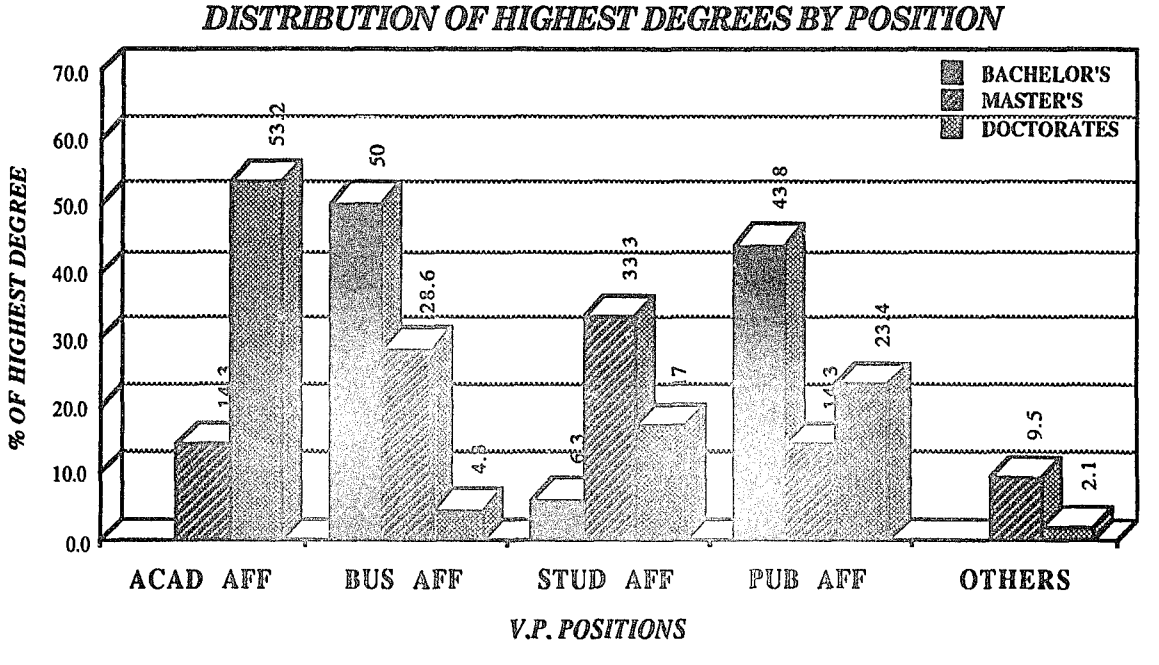


Figure 4.3--Distribution of Male Respondents by Position



With respect to positions, no vice president for academic affairs reported a Bachelor's as being his/her highest degree held. As Figure 4.4 shows, half of the respondents reporting a Bachelor's as their highest degree held were at the position of vice president for business affairs, followed by nearly 44% at the position of vice president for public affairs. Respondents from the position of vice president for students affairs comprised the highest percent (33.3%) of the claimed Master's degree as the highest degree held, followed by 28.6% by vice presidents for business affairs. Respondents from the position of vice president for academic affairs shared more than half the reported Doctoral degrees (53.2%) as their highest degree held, while 23.4% were reported by vice presidents for public affairs.

Figure 4.4--Distribution of Respondents' Highest Degrees by Position



Age of Highest Degree

Although data for this variable were not provided by 4.7% of the respondents, a large portion of the respondents (47 or 44.3%) reported that their highest degrees were earned between 11-20 years in the past (see Table 4.9). While 25.5% of the respondents claimed earning their highest degrees within the previous 10 years, 19% reported that between 21-30 years had elapsed since they attained their highest degrees, followed by 6.6% whose highest degrees were earned more than 30 years ago.

Table 4.9--Distribution of Respondents by Age of Highest Degree

Age of Degree	Frequency	Percent	Valid Percent	Cum. Percent
10 Years or Less	27	25.5	26.7	26.7
11-20 Years	47	44.3	46.5	73.3
21-30 Years	20	18.9	19.8	93.1
31-40 Years	7	6.6	6.9	100.0
	5	4.7	Missing	
Total	106	100.0	100.0	

Valid cases 101 Missing cases 5

Possession of Technical Degree

As Table 4.10 reveals, the majority of the respondents (95.3%) reported having no technical degrees, while 5 (4.7%) declared having technical degrees.

Table 4.10--Distribution of Respondents by Possession of Technical Degree

Technical Degree	Frequency	Percent	Cum. Percent
Don't Hold Tech. Degree	101	95.3	95.3
Holder of Tech. Degree	5	4.7	100.0
Total	106	100.0	100.0

Research Questions and Hypotheses

In this section, the presentation of the analysis of the data is divided into six sections to reflect the research questions for which answers were sought under the consideration of this study. Each research question is followed by its applicable hypothesis(es) and/or data needed to sufficiently answer the question presented. Each hypothesis was statistically tested and interpreted as presented, to contribute to the findings of the research questions under consideration.

Research Question 1

What are the perceptions toward the use of microcomputers for decision support by vice presidents at Michigan's four-year colleges and universities:

a. Present perceptions toward microcomputers.
b. The extent to which microcomputers live up to the expectations of the vice presidents.
c. Relationships existing between vice presidents' perceptions and expectations of microcomputers.

The data used to answer parts a and b of this research question are presented in Table 4.11. The raw scores for each item statement in the perception and expectation scales were aggregated by adding respondents' scores for each item to get an item average score on each scale. An overall mean on each scale was then calculated, using each respondent's average score on each scale. The overall mean on each scale is representative of respondents' perceptions and resulted expectations, respectively, toward the use of microcomputers as decision support. The mean aggregation was built on the resulted strength of the inter-item consistency reliability, performed for items in each scale which revealed an estimated $\alpha = 0.9336$ for the perception scale, and an α of 0.6522 for the expectation scale.

To answer parts a and b of this research question, a criterion was established in which the mean score(s) can be evaluated and a conclusion drawn related to the perception of vice presidents toward the use of microcomputers for decision support, in addition to the extent of whether or not the use of microcomputers have lived up to the users' expectation. Thus, the criteria in Table 4.12 were used to evaluate the overall mean scores of both the perception and expectation scales.

As Table 4.11 shows, the overall mean for the respondents on the perception scale were calculated at 2.956. Employing the criteria revealed in Table 4.12, this suggests that vice presidents have a "positive perception" toward the use of microcomputers for decision support.

Table 4.11 also shows an overall mean for respondents on the expectation scale of 1.948. Given the criteria in Table 4.12, this score implies that "microcomputers have met the expectation of vice presidents" with regard to their application as decision support tools.

Table 4.11--Aggregated Means and Standard Deviations for the Perception and Expectation Scales

Item Statements	Perception Scale		Expectation Scale	
	Mean	S.D.	Mean	S.D.
1. I make decisions that are more effective when I use microcomputers.	2.914	.761	1.929	.433
2. Microcomputers are cost-effective decision support tools in my operation.	3.202	.798	2.012	.450
3. Microcomputers are dependable machines for my decision making.	3.165	.719	1.915	.422
4. I make decisions that are more rational when I use microcomputers.	2.670	.761	1.939	.396
5. Microcomputers offer me good security for confidential data.	2.645	.829	1.952	.377
6. Productivity in my decision making increases when I use microcomputers.	2.956	.802	2.024	.415
7. Microcomputers offer me direct access to a greater range of stored data.	3.096	.804	1.918	.442
8. My decision making is more efficient when I use microcomputers.	3.011	.734	1.880	.425
Overall	2.956	.632	1.948	.226

Table 4.12--Criteria Used to Interpret the Mean Scores of the Perception and Expectation Scales

Scale	Mean Score	Interpretation
Perception	1.00 - 1.49	Highly negative perception
	1.50 - 2.49	Negative perception
	2.50 - 3.49	Positive perception
	3.50 - 4.00	Highly positive perception
Expectation	1.00 - 1.66	Micros did not meet the expectation of their users
	1.67 - 2.33	Micros have met the expectation of their users
	2.34 - 3.00	Micros have exceeded the expectation of their users

To further support addressing the issue of whether or not microcomputers lived up to the expectation of their users, question 10 in part III of the instrument gave respondents the opportunity to clearly indicate their position related to whether or not microcomputers lived up to their expectations as decision support tools. As indicated in Table 4.13, 87.3% of the respondents answering question 10, clearly stated that microcomputers did live up to their expectations as decision support tools; only 12.7% or 10 of the respondents clearly stated that microcomputers did not live up to their expectations. Respondents were also provided with the opportunity to support their position within the same question. As Appendix H shows, there were more positive and satisfactory comments made by respondents who believed that microcomputers did live up to their expectations, than those who did not (see Appendix I).

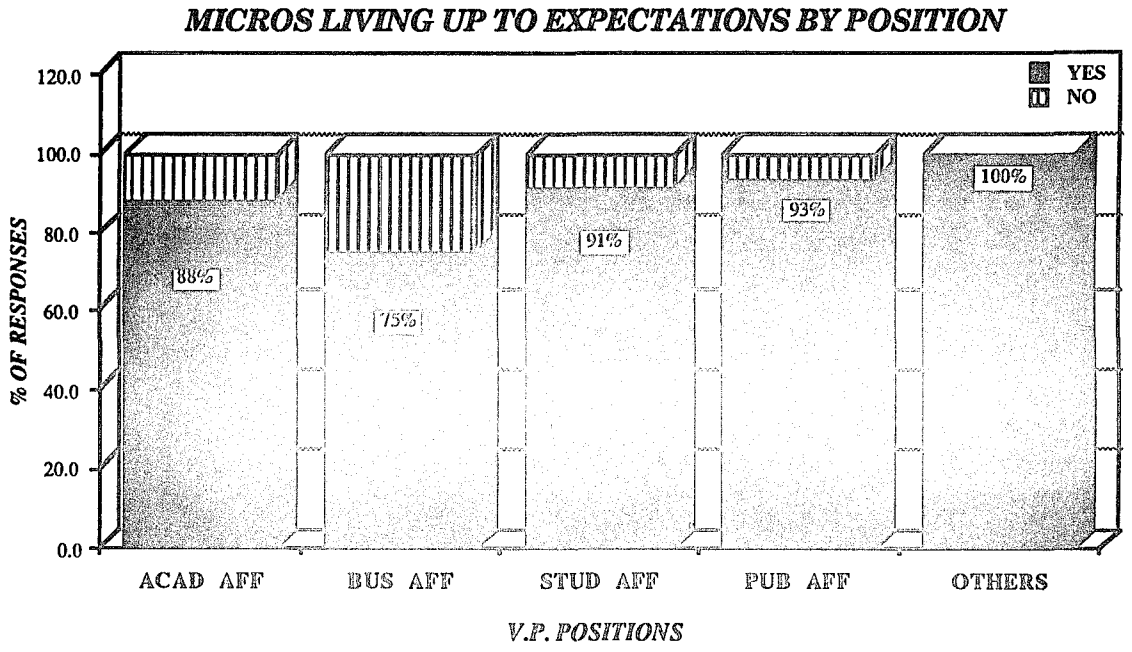
Table 4.13--Distribution of Respondents' Opinions of Whether or Not Micros Lived Up to Their Expectations as Decision Support Tools

Micros Lived Up To Expectation	Frequency	Percent	Cum. Percent
Yes	69	87.3	87.3
No	10	12.7	100.0
Total	79	100.0	100.0

Respondents to question number 10 in Part III of the instrument were cross-tabulated with their positions. As Figure 4.5 shows, excluding the category of other positions, 93% of the respondents from the position of vice president for public affairs indicated that micros have lived up to their expectations as decision support tools. Only 7% from the same position indicated that micros did not live up to their expectations. Although 91% of the respondents from the position of vice president for student affairs supported that micros lived up to their expectations, 25% of respondents from the position of vice president for business affairs felt that micros did not live up to their expectations, while the remaining 75% said that micros did live up to their expectations as decision support tools.

Part c of research question 1 raised the issue of whether or not any relationships exist between vice presidents' perceptions and expectations of microcomputers as decision support. For this reason Hypothesis I, in a null form, was introduced for investigation as follows:

Figure 4.5--Respondents' Opinions of Whether or Not Micros Lived Up to Their Expectations as Decision Support Tools by Type of position



Ø Hypothesis I: There is no significant relationship between vice presidents' perceptions and expectations of microcomputers as decision support.

In testing this hypothesis, the Pearson Correlation Coefficient (Pearson *r*) was used to compute the strength in relationship sought. While Pearson *r*, normally fails to detect any curvilinear relationship, and may affect the interpretation of the results (Khazanie, 1979; Mendenhall and Ott, 1976; Norusis, 1988), the mean scores on both the perception and expectation scales were scatterplotted using the Plot command of the SPSS-X program. The scatterplot revealed no sign of curvilinear relationship.

Thus, based on the results of the Pearson r test (Table 4.14), there was a significant and positive relationship ($r = .529, p < .001$) between vice presidents' perception toward microcomputers as decision support and the extent of their expectations of microcomputers as decision support tools. Therefore, hypothesis I was rejected at the .001 level of significance.

Research Question 2

What relationships exist between vice presidents' perceptions toward microcomputers as decision support and the type of their institution (major/non-major research institution), age, highest degree held, age of highest degree, possession of technical degree, and direct/indirect microcomputer use for decision support?

To answer this research question, six hypotheses, in null forms (IIa-f) were introduced for investigation:

Ø Hypothesis II a: There is no significant difference between vice presidents from major research institutions and those who are not with regard to their perception toward the use of microcomputers for decision support.

The data used to test this hypothesis are presented in Table 4.15. The independent variable of this hypothesis was "type of institution" which had two levels: those who were from major research institutions (group 1), and those who were not (group 2). The dependent variable was the "mean scores on the perception scale" for each of the two groups. A one-way analysis of variance was conducted to test the degree of association between the type of institution and the previously mentioned dependent variable. As shown in Table 4.16, the ANOVA test results did not indicate a significant

Table 4.14--Pearson Correlation Coefficients of Perception With Expectation, Age and Age of Highest Degree (Two-Tailed Test)

Variables	Perception	Expectation	Age	Age of Highest Degree
Perception	1.0000			
Expectation	.5293 (85) p = .000*	1.0000		
Age	-.0440 (93) p = .676	.0882 (84) p = .425	1.0000	
Age of Highest Degree	.0429 (90) p = .688	.1654 (82) p = .138	.7240 (100) p = .000*	1.0000

* Significant at .001 level

difference at the .05 level among group 1 and group 2 with regard to their mean scores on perception toward the use of microcomputers as decision support. Hence, the null hypothesis is not rejected. There is little or no difference among vice presidents who are from major research institutions and those who are not, with regard to their perception toward the use of microcomputers as decision support.

Table 4.15 --Number, Mean, and Standard Deviation of Scores on the Perception Scale for Vice Presidents by Type of Institution (Major/Non-Major Research Institution)

Type Of Institution	N	Mean	Standard Deviation
Not Major Research Inst.	84	2.976	.6328
Major Research Inst.	10	2.788	.6293
Total	94	2.956	.6318

Table 4.16--ANOVA Results for Comparison of Scores on the Perception Scale for Vice Presidents by Type of Institution (Major/Non-Major Research Institution)

Source of Variation	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.3184	.3184	.7960	.3746
Within Groups	92	36.8006	.4000		
Total	93	37.1190			

Ø **Hypothesis II b**: There is no significant relationship between vice presidents' perceptions toward the use of microcomputers for decision support and their age.

A Pearson Correlation Coefficient was used to test the relationship between the age of vice presidents and their perception. While the data under examination for both variables were scatterplotted, no curvilinear relationship was detected. Thus, based on the results shown in Table 4.14, the computed correlation was -.044 ($p > .05$), indicating no evidence for a significant relationship between the age of vice presidents and their perception toward the use of microcomputers for decision support. Thus, null hypothesis II-b was not rejected.

Ø **Hypothesis II c**: There is no significant difference among the perceptions of vice presidents toward the use of microcomputers for decision support based on their highest degree held.

As shown in Table 4.17, the "highest degree held" served as the independent variable in this hypothesis, which consisted of three groups. Each of the three groups represented different educational levels. Group 1, consisted of vice presidents who reported a Bachelor's as their highest degree held, group 2 covered vice presidents who reported a Master's as their highest degree held; and group 3 represented vice presidents who reported their highest degree to be a Doctorate. The dependent variable, on the other hand, was the "mean scores on the perception scale" for each of the three groups. A one-way analysis of variance was performed to test the degree of association between the highest degree held with the perception mean scores for the three groups. The ANOVA test results, shown in Table 4.18, indicated no significant mean difference between the three groups at

the .05 level of significance. Therefore, hypothesis II-c was not rejected. This reveals the lack of evidence to support any significant difference in vice presidents' perceptions toward the use of microcomputers for decision support based on their highest degree held.

Table 4.17--Number, Mean, and Standard Deviation of Scores on the Perception Scale for Vice Presidents by Highest Degree Held

Highest Degree Held	N	Mean	Standard Deviation
Bachelor's	14	3.241	.4963
Master's	34	2.874	.6772
Doctorate	45	2.926	.6279
Total	93	2.954	.6349

Table 4.18--ANOVA Results for Comparison of Scores on the Perception Scale for Vice Presidents by Highest Degree Held

Source of Variation	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	1.4071	.7035	1.7745	.1755
Within Groups	90	35.6832	.3965		
Total	92	37.0902			

Ø Hypothesis II d: There is no significant relationship between vice presidents' perceptions toward the use of microcomputers for decision support and the age of their highest degree.

In testing this hypothesis, data related to both variables were scatterplotted. As a result, no apparent curvilinear relationship was detected. Further, a Pearson Correlation Coefficient was used to compute the strength in the relationship between the age of the highest degree held by vice presidents and their perceptions towards the use of microcomputers as decision support. The findings in Table 4.14 show a computed correlation of .04 ($p > .05$). This indicates that no significant relationship between the age of the highest degree held by vice presidents and their perceptions toward the use of microcomputers for decision support was supported by the data. As a result, hypothesis II-c was not rejected.

Ø Hypothesis II e: There is no significant difference between vice presidents who possess technical degrees and those who do not with regard to their perceptions toward the use of microcomputers for decision support.

Table 4.19 includes the data used to test this hypothesis. The independent variable of this hypothesis was "possession of technical degree" which had two categories: those who hold technical degrees (group 1), and those who do not (group 2). The dependent variable was the "mean scores on the perception scale" for both groups. While the mean scores of vice presidents holding technical degrees (3.4) were higher than those with no technical degrees (2.93), a one-way analysis of variance was performed to investigate whether this difference was significant at the .05 level. The results of the ANOVA test, revealed in Table 4.20, indicated no significant difference ($p > .05$). Thus, the null hypothesis was not rejected as there was no evidence to support any significant difference in vice presidents' perception toward the use of microcomputers for decision support with regard to whether or not they hold any technical degree.

Table 4.19--Number, Mean, and Standard Deviation of Scores on the Perception Scale for Vice Presidents Who Hold Technical Degrees and Those Who Do Not

Technical Degree	N	Mean	Standard Deviation
Holder of Tech. Degree	5	3.400	.3992
Do not Hold Tech. Degree	89	2.931	.6346
Total	94	2.956	.6318

Table 4.20--ANOVA Results for Comparison of Scores on the Perception Scale for Vice Presidents Who Hold Technical Degrees and Those Who Do Not

Source of Variation	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	1.0402	1.0402	2.6525	.1068
Within Groups	92	36.0788	.3922		
Total	93	37.1190			

Ø Hypothesis II f: There is no significant difference between direct and indirect use of microcomputers for decision support by vice presidents with respect to their perceptions toward microcomputers.

The data used to test this hypothesis are presented in Table 4.21. The independent variable considered in this hypothesis was the "direct/indirect use of microcomputers for decision support," which was divided into two groups: group 1 consisted of vice presidents directly implementing or using

microcomputers for decision support, and group 2 which includes vice presidents implementing microcomputers for decision support through their supportive staff, including their secretaries. The dependent variable in this hypothesis was the perception mean scores for vice presidents toward the use of microcomputers for decision support. As Table 4.21 shows, the perception mean score of vice presidents directly using microcomputers for decision support (3.16) was higher than those indirectly using microcomputers for decision support (2.61). To test for any statistical difference, a one-way analysis of variance was performed. As Table 4.22 shows, there was a significant difference ($p < .001$). Hence, the null hypothesis was rejected, which suggest that vice presidents directly using microcomputers for decision support have higher or more positive perceptions toward the use of microcomputers for decision support than those indirectly using microcomputers for the same purpose.

Table 4.21--Number, Mean, and Standard Deviation of Scores on the Perception Scale for Vice Presidents Who are directly and Indirectly Using Micros for Decision support

Direct/Indirect Micro Users	N	Mean	Standard Deviation
Direct Micro Users	57	3.158	.4774
Indirect Micro Users	35	2.607	.7094
Total	92	2.948	.6331

Table 4.22--ANOVA Results for Comparison of Scores on the Perception Scale for Vice Presidents Who are Directly and Indirectly Using Micros for Decision Support

Source of Variation	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	6.5998	6.5998	19.8808	.0000*
Within Groups	90	29.8770	.3320		
Total	91	36.4768			

*Significant at .001 level

In contributing to the answer of research question 2, a Multiple Regression Analysis was employed to estimate the proportion of the variance of the dependent variable, accounted for by a composite of independent variables considered in hypotheses I through II-f. The multiple regression analysis was performed using the "Enter" method within the SPSS-X environment (see Appendix G). The method "Enter," begins with no variables in the regression model/equation and forces pre-specified independent variables one at a time, according to a predetermined level of significance, when controlling for any other independent variables already in the regression model.

Independent variables found to be significantly correlated with the perception of vice presidents through testing hypotheses I through II-f were forced into the regression equation one at a time. The independent variables entered into the regression equation were in the order of their entry, A = Expectation, and B = Micro Direct Use vs. Indirect Use. The results of the regression analysis included a coefficient of multiple

correlation (r), coefficient of determination (r^2), and an F probability for the significance of each model at each step (see Table 4.23). The results in Table 4.23 shows that when the independent variable "Expectation" entered into the regression equation, it accounted for 26% ($r^2 = .2615$) of the variation in the perception of vice presidents (dependent variable). The explained variation of the dependent variable was significantly increased by 6% when the second independent variable "Micro Direct Use vs. Indirect Use" entered into the regression equation. As a result, independent variables A and B together in step number 2, accounted for 32% ($r^2 = .3179$) of the total variation in the perception of vice presidents. Further, based on the fundamental multiple regression equation (formula 4.1), reported by Kerlinger (1986, p. 533),

$$Y' = a + b_1 X_1 + \ldots + b_k X_k \qquad (4.1)$$

Where

Y' = predicted value from a regression equation on the dependent variable, from an observed X_i value.

a = the constant of the Y-intercept; it is the Y value where the regression line crosses (or intercept) the Y axis.

b_i = the regression coefficient of X_i

X_i = the observed score for variable X_i used to predict the Y value of the dependent variable

The computed regression equation at step number 2 of the enter method of multiple regression analysis was:

$$Y' = .7524 + 1.0995\,(X_1) + .2531\,(X_2)$$

Where

Y' = predicted average perception score for vice president i

Table 4.23--Multiple Regression Analysis of Relationship Between the Perception of Vice Presidents Toward the Use of Microcomputers for Decision Support and Independent Variables

Method	Step No.	Indepen. Variable	(r) Coefficient of Multi Correlation	(r^2) Coefficient of Determination	Increment in r^2	F Probability
Enter:	1	A	.5114	.2615	.2615	.0000*
	2	B	.5638	.3179	.0564	.0000*

* Significant at .001 level

Variables' Definition:
A = Expectation
B = Direct Micro Use vs. Indirect Use

Regression Equation: $Y' = .7524 + 1.0995\ (X_1) + .2531\ (X_2)$

X_1 = observed average expectation score for vice president *i*

X_2 = 1 or 0; 1 = vice president who were directly using micros for decision support, 0 = vice president who were indirectly using micros for decision support

Thus, the above regression equation yielded a predictive model with a significant coefficient of determination (r^2) at the .001 level. The r^2 for the two predictor model above was computed at (0.3179).

Research Question 3

What relationships exist between the extent of microcomputer direct use for decision support by vice presidents and their positions, length of employment in current position, size of institution, type of institution, age, gender, age of highest degree held, possession of technical degree, perception, expectations, and the total number of supportive staff?

To answer this research question, 12 hypotheses (III a-l) in null form were investigated. The dependent variable for these hypotheses was the extent of microcomputer direct use by vice presidents for decision support. The data used to represent the dependent variable under study, were extracted from vice presidents' replies to question number 5 in part II of the instrument. Respondents were asked to break down the percentage of microcomputer use for their decision support, with regard to three groups of users; themselves, their supportive staff, or others. Respondents who reported themselves as users of microcomputers for decision support, by indicating any percent between 1 to 100, were selected and their responses used as the data to be analyzed to answer research question 3. This type of variable control was accomplished through the use of the "Select If" command in the SPSS-X program (see Appendix G). Each of the 12

hypotheses investigated different independent variables to reflect all variables raised in research question 3. All 12 hypotheses shared the same dependent variable which was the extent of direct microcomputer use by vice presidents for decision support. Each of the 12 hypotheses are presented in a null form, followed by its statistical test results.

∅ Hypothesis III a: There is no significant difference among vice presidents for Academic, Business, Students or Public affairs with regard to the extent of their direct use of microcomputers for decision support.

The data used to test this hypothesis are presented in Table 4.24. Four types of vice president positions were included in this hypothesis, each representing a separate group of vice presidents, as shown in Table 4.24. The group of vice presidents for students affairs had the highest average percent of direct microcomputer use for decision support (45.9%), whereas the lowest was for vice presidents for academic affairs (30.8%). A one-way analysis of variance was employed to test if there was any significant difference between vice presidents' positions with regard to the extent of their direct use of microcomputers for decision support. The ANOVA test results, as revealed in Table 4.25, showed no significant difference at the .05 level. Hence, hypothesis III-a was not rejected. Thus, there is no evidence to suggest any statistical difference in the extent of vice presidents' use of microcomputers for decision support with regard to their positions.

Table 4.24--Number, Mean, and Standard Deviation of Vice Presidents' Extent of Direct Micro Use for Decision Support by Type of Position

Position Type	N	Mean	Standard Deviation
V.P. Academic Affairs	17	30.7647	28.6128
V.P. Business Affairs	13	41.6923	31.1672
V.P. Students Affairs	17	45.8824	32.5593
V.P. Public Affairs	9	38.8889	25.5903
Total	56	39.1964	29.8502

Table 4.25--ANOVA Results for Comparison of Vice Presidents' Extent of Direct Micro Use for Decision Support by Type of Position

Source of Variation	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	2050.3576	683.4525	.7569	.5234
Within Groups	52	46956.4816	903.0093		
Total	55	49006.8393			

Ø **Hypothesis III b**: There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and the length of employment in their current positions.

In testing this hypothesis, a Pearson Correlation Coefficient was conducted to compute the relationship between the extent of microcomputer use for decision support by vice presidents and the length of employment in their current positions. The use of scatterplot for the data of both variables

under examination revealed no curvilinear relationship and the test results of Pearson *r* (Table 4.26) showed a computed correlation of -.12 ($p > .05$) indicating no significant relationship between vice presidents' length of employment in their current positions and the extent of their direct use of microcomputers for decision support. Therefore, hypothesis III-b was not rejected.

∅ Hypothesis III c: There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and the size of institution.

This hypothesis was tested in two stages. First, the data for both variables under investigation were scatterplotted, revealing no curvilinear relationship. Secondly, a Pearson Correlation Coefficient was used to calculate the strength in relationship between the size of institutions at which vice presidents were employed (represented by the total number of student enrollments), and the extent of their direct use of microcomputers for decision support. The test results of Pearson *r*, as shown in Table 4.26, indicated a computed correlation of -.25 ($p = .06$). Although, the results were not significant at the .05 level in the two-tailed test, it was found to be significant in the one-tailed test ($p < .05$, see Table 4.27). Since the null hypothesis was "non-directional," the result of the two-tailed test of significance should therefore be used whether or not to reject the null hypothesis. Thus, hypothesis III-c was not rejected at the .05 level of the two-tailed test of significance. This study produced no evidence of relationship between vice presidents' size of employed institution and the extent of their direct use of microcomputers for decision support.

Table 4.26--Pearson Correlation Coefficients of Direct Use of Micros by V.P. With Perception, Expectation, Length of Employment, Age, Age of Highest Degree, Size of Institution, and Total Number of Supportive Staff (Two-Tailed Test)

Variables	Extent of Direct Micro Use	Perception	Expectation	Length of Employment	Size of Institution	Age	Age of Highest Degree	Number of Supportive Staff
Extent of Direct Micro Use	1.0000							
Perception	.3348 (57) $p = .011$*	1.0000						
Expectation	.2500 (54) $p = .068$	.5080 (54) $p = .000$***	1.0000					
Length of Employment	-.1177 (58) $p = .379$	-.1477 (57) $p = .273$	.1271 (54) $p = .360$	1.0000				
Size of Institution	-.2469 (58) $p = .062$	-.2020 (57) $p = 132$	-.1690 (54) $p = .222$	.0702 (58) $p = .600$	1.0000			
Age	-.3665 (57) $p = .005$**	-.0244 (56) $p = .859$	.2410 (53) $p = .082$	.3466 (57) $p = .008$**	.1158 (57) $p = .391$	1.0000		
Age of Highest Degree	-.1877 (56) $p = .166$	-.0249 (55) $p = .857$	.2358 (52) $p = .092$	.1970 (56) $p = .146$	.0948 (56) $p = .487$	.6323 (55) $p = .000$***	1.0000	
Number of Supportive Staff	-.0843 (58) $p = .529$	-.0656 (57) $p = .628$	.1290 (54) $p = .352$	-.0139 (58) $p = .917$	.2352 (58) $p = .076$	.1750 (57) $p = .193$	-.0040 (65) $p = .979$	1.0000

* Significant at .05 level ** Significant at .01 level *** Significant at .001 level

Table 4.27--Pearson Correlation Coefficients of Direct Use of Micros by V.P. With Perception, Expectation, Length of Employment, Age, Age of Highest Degree, Size of Institution, and Total Number of Supportive Staff (One-Tailed Test)

Variables	Extent of Direct Micro Use	Perception	Expectation	Length of Employment	Size of Institution	Age	Age of Highest Degree	Number of Supportive Staff
Extent of Direct Micro Use	1.0000							
Perception	.3348 (57) $p = .005$**	1.0000						
Expectation	.2500 (54) $p = .034$*	.5080 (54) $p = .000$***	1.0000					
Length of Employment	-.1177 (58) $p = .189$	-.1477 (57) $p = .136$	.1271 (54) $p = .180$	1.0000				
Size of Institution	-.2469 (58) $p = .031$*	-.2020 (57) $p = .066$	-.1690 (54) $p = .111$	.0702 (58) $p = .300$	1.0000			
Age	-.3665 (57) $p = .003$**	-.0244 (56) $p = .429$	.2410 (53) $p = .041$*	.3466 (57) $p = .004$**	.1158 (57) $p = .195$	1.0000		
Age of Highest Degree	-.1877 (56) $p = .083$	-.0249 (55) $p = .428$	.2358 (52) $p = .046$*	.1970 (56) $p = .073$	.0948 (56) $p = .244$	.6323 (55) $p = .000$***	1.0000	
Number of Supportive Staff	-.0843 (58) $p = .265$	-.0656 (57) $p = .314$	.1290 (54) $p = .176$	-.0139 (58) $p = .459$	.2352 (58) $p = .038$*	.1750 (57) $p = .096$	-.0040 (65) $p = .488$	1.0000

* Significant at .05 level ** Significant at .01 level *** Significant at .001 level

Ø Hypothesis III d: There is no significant difference between vice presidents from private institutions and those from public institutions with regard to the extent of their direct use of microcomputers for decision support.

The data used to test this hypothesis are presented in Table 4.28. The independent variable tested in this hypothesis was the type of institution where vice presidents were employed, this variable consisted of two groups of vice presidents. Vice presidents employed at private institutions were in group 1, whereas group 2 included vice presidents employed at public institutions. While group 1 had a higher mean percent of the extent of microcomputer direct usage time for decision support (41.5%) than group 2 (33%), a one-way analysis of variance was employed to test for any significant difference between group 1 and group 2. The ANOVA test results, revealed in Table 4.29, indicated no significant difference at the .05 level. Therefore, hypothesis III-d was not rejected as there was no evidence to suggest any difference between vice presidents from private institutions and those from public institutions with regard to the extent of their direct use of microcomputers for decision support.

Table 4.28--Number, Mean, and Standard Deviation of Vice Presidents' Extent of Direct Micro Use for Decision Support by Type of Institution (Private/Public)

Type Of Institution	N	Mean	Standard Deviation
Private	37	41.5405	29.8985
Public	21	33.0000	29.0431
Total	58	38.4483	29.6258

Table 4.29--ANOVA Results for Comparison of Vice Presidents' Extent of Direct Micro Use for Decision Support by Type of Institution (Private/Public)

Source of Variation	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	977.1556	977.1556	1.1156	.2954
Within Groups	56	49051.1892	875.9141		
Total	57	50028.3448			

Ø Hypothesis III e: There is no significant difference between vice presidents from major research institutions and those who are not with regard to the extent of their direct use of microcomputers for decision support.

The data used to test this hypothesis are presented in Table 4.30. The independent variable tested in this hypothesis was the "type of institution" where vice presidents are employed. This variable consisted of two groups of vice presidents; vice presidents from major research institutions were in group 1, whereas group 2 included vice presidents from non-major research institutions (Table 4.30). While group 2 had a higher mean percent of the extent of microcomputer direct usage time for decision support (40.5%) than group 1 (23.6%), a one-way analysis of variance was performed to test for any significant difference between group 1 and group 2. The ANOVA test results (Table 4.31) revealed no significant difference at the .05 level. Therefore, hypothesis III-e was not rejected as there was no evidence to suggest any significant difference between vice presidents from

major research institutions and those who were not, with regard to the extent of their direct use of microcomputers for decision support.

Table 4.30--Number, Mean, and Standard Deviation of Vice Presidents' Extent of Direct Micro Use for Decision Support by Type of Institution (Major/Non-Major Research Institution)

Type Of Institution	N	Mean	Standard Deviation
Major Research Inst.	7	23.5714	15.9985
Not Major Research Inst.	51	40.4902	30.5715
Total	58	38.4483	29.6258

Table 4.31--ANOVA Results for Comparison of Vice Presidents' Extent of Direct Micro Use for Decision Support by Type of institution (Major/Non-Major Research Institution)

Source of Variation	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	1761.8854	1761.8854	2.0442	.1583
Within Groups	56	84266.4594	861.9011		
Total	57	50028.3448			

Ø **Hypothesis III f**: There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and their age.

In testing this hypothesis, the data for both variables under consideration were scatterplotted to detect any curvilinear relationship. The results revealed no curvilinear relationship between the two variables

plotted. It was followed by a Pearson Correlation Coefficient to compute the strength in the relationship sought. The Pearson r test results (Table 4.26) revealed a significant relationship ($r = -.37, p < .01$) between vice presidents' age and the extent of their direct use of microcomputers for decision support. Hence, null hypothesis III-f was rejected at the .01 level of significance.

Ø Hypothesis III g: There is no significant difference between male and female vice presidents with regard to the extent of their direct use of microcomputers for decision support.

The data used to test this hypothesis are shown in Table 4.32. The independent variable considered in this hypothesis was "gender," which had two categories: male vice presidents were in group 1, and female vice presidents were represented in group 2. As Table 4.32 shows, the mean percent on the extent of microcomputer direct usage by vice presidents was higher for females (47.9%) than for males (34.5%). However, to test for any statistical differences, a one-way analysis of variance was employed. The ANOVA test results shown in Table 4.33 indicated no significant difference at the .05 level. Therefore, hypothesis III-g was not rejected as there was no evidence to suggest any statistical difference in the extent of vice presidents' use of microcomputers for decision support with respect to their gender.

Ø Hypothesis III h: There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and the age of their highest degree held.

A Pearson Correlation Coefficient was performed to compute the relationship between the extent of microcomputer use for decision support by vice presidents and the age of their highest degree held. The use of scatterplot for the data of both variables under examination revealed no curvilinear relationship and the test results of the Pearson *r* (Table 4.26) showed a computed correlation of -.19 ($p > .05$). This finding indicated no significant relationship between the extent of vice presidents direct use of microcomputers for decision support and the age of their highest degree held. As a result, hypothesis III-h was not rejected.

Table 4.32--Number, Mean, and Standard Deviation of Vice Presidents' Extent of Direct Micro Use for Decision Support by Gender

Gender	N	Mean	Standard Deviation
Male	41	34.5122	29.0294
Female	17	47.9412	29.7415
Total	58	38.4483	29.6258

Table 4.33--ANOVA Results for Comparison of Vice Presidents' Extent of Direct Micro Use for Decision Support by Gender

Source of Variation	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	2167.1597	2167.1597	2.5357	.1169
Within Groups	56	47861.1851	854.6640		
Total	57	50028.3448			

∅ Hypothesis III i: There is no significant difference between college and university vice presidents who hold technical degrees and those who do not with regard to the extent of their direct use of microcomputers for decision support.

The data used to test this hypothesis are presented in Table 4.34. The independent variable under investigation in this hypothesis was "possession of technical degree," which had two groups of vice presidents. Group 1 consisted of vice presidents holding technical degrees, while vice presidents who held no technical degree were aggregated in group 2. A one-way analysis of variance was performed to test for any significant difference between these groups in the extent of their direct use of microcomputers for decision support. The ANOVA test results (Table 4.35) revealed no significant difference between the two groups at the .05 level. Thus, hypothesis III-i was not rejected, which is an indication of the lack of evidence to support any statistical difference between the extent of direct use of microcomputers for decision support by vice presidents who held technical degrees and those who did not.

Table 4.34--Number, Mean, and Standard Deviation of Vice Presidents' Extent of Direct Micro Use for Decision Support With Regard to Whether or Not They Hold Any Technical Degree

Technical Degree	N	Mean	Standard Deviation
Holder of Tech. Degree	5	26.0000	20.4328
Do not Hold Tech. degree	53	39.6226	30.2269
Total	58	38.4483	29.6258

Table 4.35--ANOVA Results for Comparison of Vice Presidents' Extent of Direct Micro Use for Decision Support With Regard to Whether or Not They Hold Any Technical Degree

Source of Variation	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	847.8920	847.8920	.9655	.3300
Within Groups	56	49180.4528	878.2224		
Total	57	50028.3448			

∅ **Hypothesis III j**: There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and their perceptions of microcomputer as decision support.

The data used to test this hypothesis were scatterplotted to detect any curvilinear relationship between the two variables under investigation. While the results of the plot did not reveal any curvilinear relationship, a Pearson Correlation Coefficient was employed to compute the strength in relationship between the two variables in this hypothesis. The test results of the Pearson r (Table 4.26) showed a significant relationship ($r = .34$, $p < .05$), between vice presidents' perception toward microcomputers and the extent of their direct use of microcomputers for decision support. The significant results at the .05 level provide a basis for rejecting hypothesis III-j.

∅ **Hypothesis III k**: There is no positive relationship between the extent of vice presidents' direct use of microcomputers for decision support and the degree of their expectation related to the use of microcomputer for decision support.

In testing this hypothesis, the data for both variables were scatterplotted to detect any curvilinear relationship between the two variables which could affect the test of relationship performed. As the scatterplot was evaluated, no sign of curvilinear relationship was noticed. While this hypothesis postulates no positive relationship between the two variables under study, a one-tailed test of Pearson Correlation Coefficient was performed to investigate, first, whether or not there is a positive correlation, and secondly whether or not the correlation is significant at the .05 level. As shown in Table 4.27, there was a significant relationship (r = .25, $p < .05$) between the degree of vice presidents' expectation related to the use of microcomputers and the extend of their direct use of microcomputers for decision support. Thus, the results of the one-tailed test of significance was used to reject hypothesis III-k at the .05 level of significance.

Ø Hypothesis III l: There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and the total number of vice presidents' supportive staff.

After a scatterplot was performed for both of the variables considered in this hypothesis, revealing no sign of curvilinear relationship, a Pearson Correlation Coefficient was employed. The test results of Pearson r (Table 4.26) indicated a computed correlation of -.08 ($p > .05$) suggesting no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and the total number of their supportive staff. Therefore, hypothesis III-l was not rejected.

As research question 3 raises the issue of whether or not there is any relationship existing between the extent of vice presidents' direct use of microcomputers for decision support (dependent variable) and a number of

independent variables tested individually in hypotheses III a-l, it was logical enough to investigate whether or not any composite of these independent variables can explain a significant proportion in the variation of the dependent variable under study. Hence, multiple regression analysis was employed.

The "Enter" method of multiple regression analysis, within the SPSS-X environment was used to force into a regression equation all variables found to have significant relationship with the dependent variable, one at a time. The entry of each of the independent variables was in accordance to their bivariate relationship strengths with the dependent variable. As Table 4.36 shows, when the independent variable "age" entered the regression equation in step 1, it accounted for 9% of the variation in the dependent variable. In step 2, there was an increment of 13% in the coefficient of determination (r^2) when the second independent variable "perception of vice president" entered the regression equation. As a result, 22% of the variance in the dependent variable accounted for, by both independent variables A and B. The coefficient of determination (r^2) incremented by 4%, at step number 3, when the independent variable "expectation" entered the regression equation. As all of predetermined independent variables entered the regression equation, the multiple regression analysis yielded a predictive model with the following regression equation:

$$Y' = -3.9429 - 1.5046\,(X_1) + 15.4698\,(X_2) + 31.8867\,(X_3)$$

Where

Table 4.36--Multiple Regression Analysis of Relationship Between the Extent of Vice Presidents' Direct Use of Microcomputers for Decision Support and Independent Variables

Method	Step No.	Indepen. Variable	(r) Coefficient of Multi Correlation	(r^2) Coefficient of Determination	Increment in r^2	F Probability
Enter:	1	A	.3031	.0919	.0919	.0343*
	2	B	.4680	.2190	.1271	.0034**
	3	C	.5077	.2578	.0388	.0036**

* Significant at .05 level **Significant at .01 level ***Significant at .001 level

Variables' Definition:
A = Age
B = Perception
C = Expectation

Regression Equation: $Y' = -3.9429 - 1.5046\,(X_1) + 15.4698\,(X_2) + 31.8867\,(X_3)$

Y' = predicted average percent of direct micro use for decision support by vice president i

X_1 = observed age, in years, for vice president i

X_2 = observed average perception score for vice president i

X_3 = observed average expectation score for vice president i

The coefficient of determination (r^2) represented by the regression equation above was significant at the .01 level. The above three predictor model yielded an r^2 of .2578, which indicates that 26% of the variation of the dependent variable (extent of microcomputer direct use by vice president) was accounted for by the independent variables, age, perception and expectation.

Research Question 4

What relationships exist between vice presidents' perceptions and their direct and indirect use of microcomputers for decision support?

In answering this research question, hypothesis IV was tested. The dependent variable for this hypothesis was the extent of microcomputers direct and indirect use (through their supportive staff) for decision support by vice presidents. The data for the dependent variable was extracted from respondents' reply to question 5 in part II of the instrument. Respondents were asked to break down the percentage of microcomputer use for their decision support by three groups of users: themselves, their supportive staff, and others. Respondents reporting between 1 to 100 percent for either themselves or their supportive staff were selected and the scores for both groups added to represent a score for each respondent. This, in turn, was used as the data needed for the dependent variable to be analyzed. The control over the dependent variable was accomplished through the

"Compute" command in the SPSS-X program (see Appendix G). As the data for both variables under the consideration of this research question were ready to be analyzed, null hypothesis IV, was raised to be tested as follows:

Ø **Hypothesis IV**: There is no significant relationship between vice presidents' perceptions toward using microcomputers as decision support and their direct and indirect use of microcomputers for decision support (through their supportive staff).

A scatterplot was used to test for any curvilinear relationship between the two variables under investigation of this hypothesis, which revealed no sign of curvilinearity. As a result, a Pearson Correlation Coefficient was performed to calculate the strength of relationship sought. The Pearson *r* test result (Table 4.37) indicated a significant relationship ($r = .52$, $p < .001$) between the perception of vice presidents and the extent of their direct and indirect use of microcomputers for decision support. Thus, based on this finding, hypothesis IV was rejected at the .001 level of significance.

Table 4.37--Pearson Correlation Coefficients of Perception With Direct and Indirect Use of Micro for Decision Support (Two-Tailed Test)

Variables	Perception	Direct & Indirect Use of Micros
Perception	1.0000	
Direct & Indirect Use of Micros	.5227 (92) $p = .000$*	1.0000

* Significant at .001 level

Research Question 5

To what extent are microcomputers and related software used to generate data, as compared to other computer sources, to support areas of decision making by vice presidents (either directly or indirectly)?

This research question raises a number of issues. For the purpose of clarity, each issue was addressed separately. Hence, the above research question is fairly represented by the following four points:

a. The extent of microcomputer direct and indirect use for decision support by vice presidents.
b. The extent to which vice presidents' decisions were supported by data generated through the use of microcomputers, as compared to other computer sources.
c. The extent that direct and indirect microcomputer generated data were used to support areas of decision making by vice presidents.
d. The extent of microcomputer software use by vice presidents or their supportive staff to generate data to support their decision making.

Data used to address the above issues of research question 5 were derived from Part II of the instrument. The first issue (a) raises the concern of whether or not vice presidents are using microcomputers for decision support, either directly or indirectly. For the purpose of responding to this concern, data were extracted from questions 3, 4, and 5 in part II of the instrument.

Prior to studying the extent of microcomputer direct and indirect use by vice presidents, it was important to find out the ratio of vice presidents with microcomputers in their own offices, and the number of micro-

computers operated by their supportive staff. As a result, Table 4.38 shows that there were more vice presidents with microcomputers in their own offices (57.5%), as compared to those who did not (42.5%). With respect to vice presidents' supportive staff, Table 4.39 reveals that only 15.1% of the respondents reported that no microcomputers were operated by their supportive staff, while the remaining respondents stated that their supportive staff operate on at least one microcomputer unit.

Table 4.38--Distribution of Respondents With Regard to Whether or Not They Have a Microcomputer in Their Own Office

Having a Micro in Own Office	Frequency	Percent	Cum. Percent
Yes	61	57.5	57.5
No	45	42.5	100.0
Total	106	100.0	100.0

Table 4.39--Distribution of Respondents With Regard to the Number of Microcomputer Units Operated by Supportive Staff

Number of Micro Units	Frequency	Percent	Cum. Percent
0	16	15.1	15.1
1-3	57	53.8	68.9
4-6	24	22.6	91.5
7-9	5	4.7	96.2
10 or more Micro Units	4	3.8	100.0
Total	106	100.0	100.0

As the extent of microcomputer direct and indirect use for decision support by vice presidents was pursued, Table 4.40 shows that vice presidents were directly using microcomputers for decision support on an average of 22% of the total microcomputer usage time in their offices. While their supportive staff reserved an average of 55% of total microcomputer usage time to support vice presidents' decisions, only 9% were computed for other staff or sources.

Table 4.40--Number, Mean, and Standard Deviation of Percent of Microcomputer Direct and Indirect Use for Decision Support by Vice Presidents

User	N	Mean %	Standard Deviation
Vice Presidents	98	22.30	29.48
Supportive Staff	98	54.45	35.61
Other Staff/Sources	98	8.91	21.36

Further, issue "b" of research question 5 raises the concern related to the extent of vice presidents' decisions supported by data generated through the use of microcomputers as compared to other computer sources. Hence, in response to this issue, data were extracted and analyzed from question 6 in Part II of the instrument. As a result, Table 4.41 reveals that the highest average percent (31%) of vice presidents' decisions were supported by data generated through the use of mainframe computer units, followed by a close margin of 29% as an average percent of vice presidents' decisions supported by data generated through the use of microcomputer units. While data generated through the use of minicomputer units supported

only an average of 7% of vice presidents' decisions, less than 3% of vice presidents' decisions were supported by data generated through the use of unknown or other computer units. To pursue the frequencies of percentages reported by respondents with regard to this issue, refer to Appendix K.

Table 4.41--Number, Mean, and Standard Deviation of Percent of Vice Presidents' Decisions Supported by Data Generated Through Different Type of Computer Units

Computer Unit	N	Mean %	Standard Deviation
Microcomputer	101	28.98	25.49
Minicomputer	101	7.19	20.17
Mainframe Computer	101	30.57	29.77
Unknown Computer Source	101	1.63	7.71
Other Computer Unit(s)	101	0.94	7.37

Issue "c" of research question 5 was raised to explore the extent of direct and indirect microcomputer generated data used to support areas of decision making by vice presidents. Therefore, data from questions 7, 8, and 9 in part II of the instrument were gathered and tabulated in response to this concern. As Table 4.42 shows, 18.17% was the highest average percent of data generated on microcomputers directly by vice presidents in support to their decision making in the area of Budgeting. Vice presidents' decision making related to the area of Planning was supported by an average of 16.9% of the data generated through their direct use of microcomputers. On the contrary, the lowest average percent (0.94%) of data generated by vice presidents on microcomputers was used to support their decisions in the area of Facilities and Physical Plants.

The highest average (23.03%) of microcomputer generated data by supportive staff was used to support vice presidents' decisions in the area of Planning, followed by an average of 20.35% to support decisions in the area of Budgeting. While vice presidents' decisions related to the area of Accounting were supported by an average of 14.89% of data generated by supportive staff using microcomputers, only an average of 2.76% of data supported vice presidents' decisions in the area of Facilities and Physical Plants (see Table 4.42).

Data generated on microcomputers by other sources beside vice presidents and their supportive staff were also used to support vice presidents' decisions. An average of 23.86% of data from this source supported vice presidents' decision in the area of Budgeting, followed by average percentages of 16.46, 15.66, 12.07, 10.53, 10.25, 9.02 and 2.2, in support of vice presidents' decisions, respectively, in the areas of Accounting, Planning, Personnel Administration, Public Relations, Purchasing, Facilities and Physical Plants, and other tasks. To pursue the frequencies of reported percent of microcomputer generated data by vice presidents, supportive staff, and other sources to support different areas of decision making, refer to Appendix L.

Issue "d" of research question 5, on the other hand, intended to gather information on the extent of microcomputer software used by vice presidents or their supportive staff to generate data to support their decision making. For this reason, data from question 10 and 11 in Part II of the instrument were extracted, analyzed, and tabulated. As shown in Table 4.43, vice presidents used Word Processing/Text Management software to generate the highest average percent of data (26.61) to support their decisions, followed by an average of 12.83% of data generated on

Table 4.42--Number, Mean, and Standard Deviation of Microcomputer Generated Data by Vice Presidents, Supportive Staff and Other Sources Used to Support Different Areas of Decision Making

		By Vice Presidents		By Supportive Staff		By Other Sources	
Area	N	Mean %	Standard Deviation	Mean %	Standard Deviation	Mean %	Standard Deviation
Planning	101	16.90	26.16	23.03	31.08	15.66	22.82
Budgeting	101	18.17	26.56	20.35	31.05	23.86	31.17
Accounting	101	4.69	16.03	14.89	30.11	16.46	31.00
Purchasing	101	2.35	8.72	7.93	22.57	10.25	24.04
Facilities & Physical Plants	101	0.94	10.36	2.76	11.12	9.02	22.11
Personnel Administration	101	7.47	14.21	9.81	16.64	12.07	23.01
Public Relations	101	2.60	11.32	7.41	19.90	10.53	25.34
Other Tasks	101	5.45	16.85	5.75	19.32	2.21	11.32

Table 4.43--Number, Mean, and Standard Deviation of Microcomputer Generated Data by Vice Presidents and Supportive Staff Using Different Type of Microcomputer Software to Support Decision Making

Microcomputer Software	N	By Vice Presidents		By Supportive Staff	
		Mean %	Standard Deviation	Mean %	Standard Deviation
Data Base	101	12.83	21.92	20.27	28.20
Spreadsheet	101	12.16	20.89	20.98	31.18
Graphics	101	5.17	12.00	8.43	18.86
Word Processing / Text Manag.	101	26.61	31.84	45.45	35.09
Communication	101	7.80	20.48	10.00	23.03
Project Management	101	3.56	12.29	5.82	19.49
Other Micro Software	101	0.606	3.66	0.26	2.54

microcomputers using Data Base software. Spreadsheet Software were used by vice presidents on microcomputers to generate an average of 12.16% of data used to support their decisions. Other microcomputer software were used by vice presidents to generate only an average of less than one percent of data to support their decisions.

Vice presidents' supportive staff were using Word Processing/Text Management software to generate the highest average percent of data (45.45) to support vice presidents' decisions, followed by the use of Spreadsheet and Data Base software to generate an average of 20.98% and 20.27% of data, respectively, which was used to support vice presidents' decisions. Other microcomputer software were used by supportive staff to generate the lowest average percent of data (0.26) to support vice presidents' decisions (see Table 4.43). However, to pursue the frequencies of percent of microcomputer generated data by vice presidents and supportive staff using different type of microcomputer software in support of their decision making, refer to Appendix M.

Research Question 6

What are the reasons, if any, for not directly using microcomputers for decision support by vice presidents?

Data needed to answer this research question were extracted from question 9 in Part III of the instrument. Question 9 provided respondents who were not directly using microcomputers for decision support to give the reason(s) for not doing so. While each respondent to this question may have more than one reason for not directly using microcomputers, the "Multi Response" command of the SPSS-X was used to analyze and rank responses in order from the most frequent to the less frequent. As a result, Table 4.44

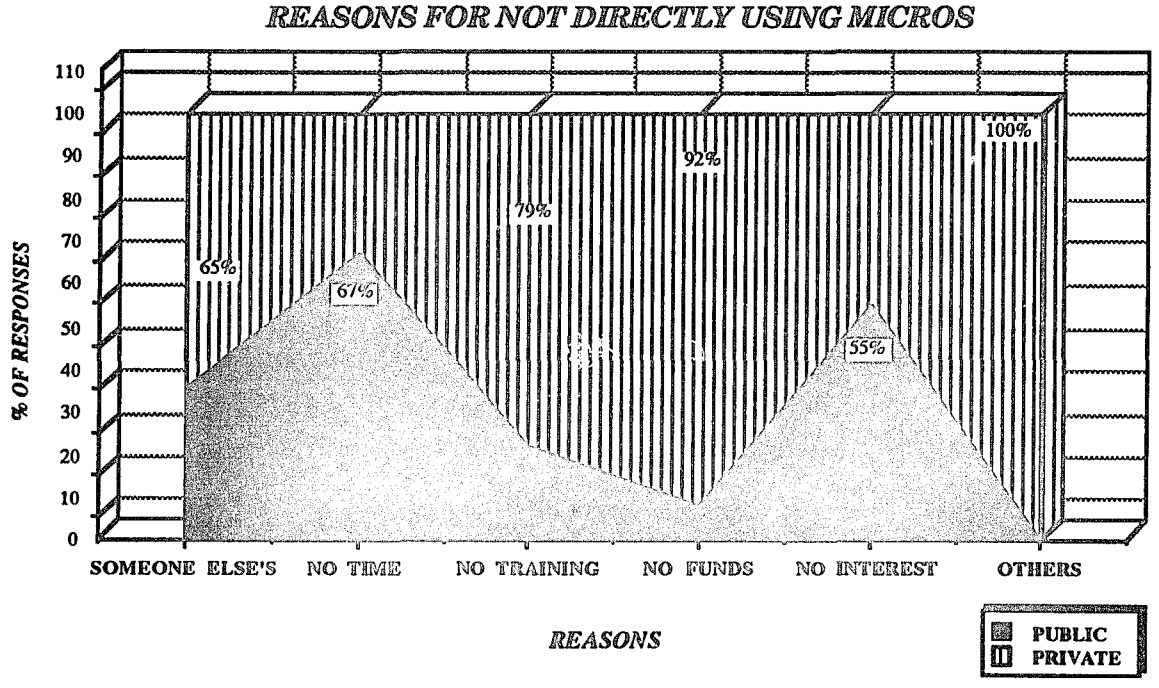
reveals that just a little over half of the respondents who replied to this question indicated that microcomputers were not directly used by them for decision support, because "it is someone else's job." This reason was given for 30% (29.5) of the total responses and ranked to be the highest frequent reason selected. "Lack of available time" by respondents for not directly using microcomputers for decision support ranked second to the highest reason (20.5%), followed by the "lack of adequate training," ranking third, accounting for about 16% of the total responses. The fourth ranked reason was the "lack of available funds" (14.8%), followed by the "lack of interest" by respondents to directly use microcomputers for decision support (12.5%), while only 6.8% of the total responses reserved for other reasons (see Appendix J).

It is interesting to note that when all of the responses were cross-tabulated with the type of institutions at which respondents were employed, the results revealed that 92% of the respondents indicated that the "lack of available funds" was one reason hindering them from directly using micros for decision support were from private institutions (see Figure 4.6). Sixty-seven percent of the respondents who indicated that they "lack the available time" to directly use micros for decision support were from public institutions. As such, respondents from public institutions made up more than half the responses indicating "the lack of interest" in using micros for decision support. Respondents from private institutions shared 79% of the responses claiming "lack of adequate training" as a reason for not directly using micros for decision support. In addition, more respondents from private institutions (65%) selected "it is someone else's job" as the reason for not directly using micros.

Table 4.44--Rank-Order of Respondents' Reasons for Not Directly Using Micros for Decision Support

Rank-Order	Reason	Frequency	Percent of Responses	Percent of Respondents
1	It's someone else's job	26	29.5	52.0
2	Lack of available time	18	20.5	36.0
3	Lack of available training	14	15.9	28.0
4	Lack of available funds	13	14.8	26.0
5	Lack of interest	11	12.5	22.0
6	Other reasons	6	6.8	12.0
	Overall	88	100.0	176.0

Figure 4.6--Distribution of Responses Regarding Reasons for Not Directly Using Micros for Decision Support by Type of Institution



Summary

The results of the data analysis were reported in this chapter. The major characteristics of subjects were tabulated and presented. Twenty null hypotheses were tested at the .05 level of significance in support of most of the research questions under study. Statistical analyses used to test the null hypotheses included the Pearson correlation coefficient, Analysis of Variance, and Multiple Regression. As a result, six null hypotheses were statistically rejected.

The regression analysis yielded two significantly predictive equations for two dependent variables. The first equation consisted of two predictors: (1) vice presidents' expectations of microcomputer use for decision support, and (2) direct/indirect use of microcomputers. These two variables accounted for 32% ($r^2 = .3179, p < .001$) of the variation in vice presidents' perception toward the use of microcomputers for decision support (dependent variable). The second equation was comprised of three predictors: (1) age, (2) vice presidents' perception toward the use of microcomputers for decision support; and (3) vice presidents' expectations of microcomputers as decision support tools. These variables accounted for 26% ($r^2 = .2578, p < .01$) of the variation in the extent of vice presidents' direct use of microcomputers for decision support (dependent variable). Each of the two yielded regression equations were also reported.

A detailed report related to the use of microcomputers and related software by vice presidents and their supportive staff to support different areas of decision making was furnished. The number of vice presidents who were directly using microcomputers for decision support were provided. As such, reasons hindering vice presidents from not directly

using microcomputers for decision support were rank-ordered and disclosed. A summary of the study, findings, conclusions based on the study findings, and recommendations are presented in Chapter V.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The rapid advancement of microcomputer technology is evident not just in the reviewed literature, but also in our daily lives. Such advancement has contributed to the movement of microcomputer applications into college and university administration. This movement was enhanced by the quality and advantages that microcomputers hold for their users. Nowadays, microcomputers are not just devices for word processing and bookkeeping. With constructive applications they become essential analyses tools to support various executive decisions in colleges and universities. As more effective decisions are expected of executive administrators, more sophisticated management support systems serve as an alternative for more rational and perhaps better decision making.

While microcomputers may increase administrative effectiveness, productivity and efficiency, the potential use of such technology may be hindered or enhanced by the perception of the user. A positive perception of the user toward microcomputers is crucial to obtain more, if not complete, benefits from such technology. This constitutes a need to investigate the characteristics of those executive administrators more likely to have positive perceptions toward, and using microcomputers for, decision support. Of equal importance is the exploration of whether or not the use of

microcomputers have lived up to the expectation of vice presidents. This could prove vital in determining the successful application of such technology to the executive administration of colleges and universities. Hence, the purpose of this study was accomplished by answering six research questions and testing twenty null hypotheses.

An instrument was developed to collect the needed data to support answering the research questions and testing the hypotheses presented. The instrument consisted of three parts: the first part was intended to collect data related to the characteristics and background of the subjects. The second part was used to gather information regarding the subjects' direct and indirect use of microcomputers for decision support, including different microcomputer software used to generate data to support vice presidents in different areas of decision making. The third part of the instrument was used to assess the subjects' perceptions and expectations toward the use of microcomputers as decision support tools. The third part also included two questions for subjects to provide reasons, if any, for not directly using microcomputers for decision support, and to firmly indicate whether or not microcomputers have lived to their expectations as decision support tools.

The developed instrument was validated through a competent panel of judges. The reliability of the perception and expectation scales were computed, resulting in Cronbach $\alpha = .93$ for the perception scale and $\alpha = .65$ for the expectation scale.

The final version of the instrument was mailed to 192 vice presidents from Michigan's four-year colleges and universities. A usable response rate of 55% was recorded. The data was thoroughly checked and screened for any detected errors. The Statistical Package for the Social Sciences,

version X (SPSS-X) was used on an IBM 3090-180 VF mainframe computer to analyze the data. The data analysis included frequencies, percentages, means, standard deviations, the Pearson correlation coefficient, Analysis of Variance (ANOVA), and Multiple Regression Analysis. To serve the purpose of this study, six research questions were investigated, including the testing of twenty null hypotheses at the .05 level of significance.

Findings

This section reflects the findings of the study supported by the data analysis conducted to investigate the research questions and testing all of the null hypotheses.

Research Question 1

What are the perceptions toward the use of microcomputers for decision support by vice presidents at Michigan's four-year colleges and universities:

a. Present perceptions toward microcomputers.
b. The extent to which microcomputers live up to the expectations of the vice presidents.
c. Relationships existing between vice presidents' perceptions and expectations of microcomputers.

In response to part (a) of the above research question, the results of the data analysis revealed that the average perception score for vice presidents were recorded at 2.956. Using the criteria in Table 4.12, it indicates that vice presidents have a "positive perception" toward the use of microcomputers for decision support. This finding parallels Weisband's (1987) study where she argued "the higher and more central the

administrator's position, the more positive the attitudes that an administrator will express about computing" (p. 157).

Part (b) of the above research question raised the issue of whether or not microcomputers have lived up to the expectations of vice presidents as decision support tools. The results showed that the average expectation score of vice presidents was computed at 1.948. Using the criteria in Table 4.12 this value fell within the parameter that microcomputers use for decision support "have met the expectations of their users." To confirm such findings, 87% of the respondents who replied to question 10 in part III of the instrument, which asked "whether or not the use of microcomputers have met their expectations as decision support tools," firmly indicated that "yes" they did. With respect to the different positions of vice presidents, the highest percentage of vice presidents within the same position who indicated that microcomputers did not live up to their expectations as decision support, were from the position of vice presidents for business affairs. The results showed that the use of microcomputers did not meet the expectations of 25% of vice presidents from the position of business affairs replying to question 10 in part III of the instrument.

For part (c) of the above research question, the findings from testing the following null hypothesis were reported as follows:

Ø Hypothesis I: There is no significant relationship between vice presidents' perceptions and expectations of microcomputers as decision support.

This hypothesis was rejected at the .001 level of significance. There was a significant relationship ($r = .529, p < .001$) between vice presidents perception toward the use of microcomputers for decision support and the extent to whether or not microcomputer use did live up to the expectations

of vice presidents. While the relationship appears to be linear and indeed positive, this finding implies that the higher or more positive the perception of vice presidents, the more likely the use of microcomputers for decision support have lived up to the expectations of vice presidents.

Research Question 2

What relationships exist between vice presidents' perceptions toward microcomputers as decision support and the type of their institution (major/non-major research institution), age, highest degree held, age of highest degree, possession of technical degree, and direct/indirect microcomputer use for decision support?

Ø Hypothesis II a: There is no significant difference between vice presidents from major research institutions and those who are not with regard to their perceptions toward the use of microcomputers for decision support.

Ø Hypothesis II b: There is no significant relationship between vice presidents' perceptions toward the use of microcomputers for decision support and their age.

Ø Hypothesis II c: There is no significant difference among the perceptions of vice presidents toward the use of microcomputers for decision support based on their highest degree held.

Ø Hypothesis II d: There is no significant relationship between vice presidents' perceptions toward the use of microcomputers for decision support and the age of their highest degree.

Ø Hypothesis II e: There is no significant difference between vice presidents who posses technical degrees and those who do not with regard to their perceptions toward the use of microcomputers for decision support.

Null hypotheses IIa through IIe were not rejected at the .05 level of significance. This suggests that the following characteristics of vice presidents may not relate to their perceptions toward the use of microcomputers for decision support: type of their employed institutions (major/non-major research institutions), age, highest degree held, age of their highest degree, and possession of technical degree. A previous study by Demarais (1987) found a positive correlation between the higher the degree held by college registrars and their perceived importance of microcomputers. Different results were also reported by Brewer (1987), where significant correlations ($p < .05$) found between the perception of registrars toward computers and their age group as well as with their educational level. Such differences between present and previous findings may be due to the differences in the two populations, although both perform administrative functions in institutions of higher education.

Ø Hypothesis II f: There is no significant difference between direct and indirect use of microcomputers for decision support by vice presidents with respect to their perceptions toward microcomputers.

This hypothesis was rejected at the .001 level of significance. There was a significant difference ($p < .001$) between direct and indirect use of microcomputers for decision support by vice presidents with respect to their perceptions toward microcomputers. The findings indicate that vice presidents directly using microcomputers for decision support had higher or more positive perceptions toward microcomputers than vice presidents indirectly using microcomputers for decision support.

A multiple regression analysis was used to estimate the variation in the perception of vice presidents that can be accounted for by the extent of their expectations of microcomputers and whether or not they were directly

using microcomputers for decision support. The findings revealed that 32% (r^2 = .3179) of the variation in the perception of vice presidents were accounted for or predicted by the extent of vice presidents' expectations of microcomputers as decision support tools and by knowing whether or not they were directly using microcomputers for decision support. While the regression equation was significant at the .001 level, it was computed and reported as follows:

$$Y' = .7524 + 1.0995\,(X_1) + .2531\,(X_2)$$

Where

Y' = predicted average perception score for vice president *i*

X_1 = observed average expectation score for vice president *i*

X_2 = 1 or 0; 1 = vice president who were directly using micros for decision support, 0 = vice president who were indirectly using micros for decision support

Research Question 3

What relationships exist between the extent of microcomputer direct use for decision support by vice presidents and their position, length of employment in current position, size of institution, type of institution, age, gender, age of highest degree held, possession of technical degree, perception, expectation, and the total number of supportive staff?

Ø Hypothesis III a: There is no significant difference among vice presidents for Academic, Business, Students or Public affairs with regard to the extent of their direct use of microcomputers for decision support.

Ø Hypothesis III b: There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and the length of employment in their current positions.

Ø Hypothesis III c: There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and the size of institution.

Ø Hypothesis III d: There is no significant difference between vice presidents from private institutions and those from public institutions with regard to the extent of their direct use of microcomputers for decision support.

Ø Hypothesis III e: There is no significant difference between vice presidents from major research institutions and those who are not with regard to the extent of their direct use of microcomputers for decision support.

Null Hypotheses IIIa through IIIe were not rejected at the .05 level of significance. These findings indicate that the following characteristics of vice presidents may not relate to the extent of their direct use of microcomputers for decision support: positions, length of employment in current positions, size of institutions, and type of institutions. These findings are consistent with Harris (1984) who found no correlation between decision makers' use of computer-based tools for decision support and their "educational emphasis or level, background in higher education, or even job classification." Deel (1987) also found no significant relationship between the "overall use of microcomputers" by executive administrators and their position, administrative experience, nor the type of institution.

Ø Hypothesis III f: There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and their age.

This hypothesis was rejected at the .01 level of significance. The findings, based on the results of the data analysis, indicated that there was

a significant relationship (r = -.37, p < .01) between the extent of vice presidents' direct use of microcomputers for decision support and their age. While the relationship was found to be negative, this indicated that the older the vice president, the less extent his/her direct use of microcomputers for decision support. This finding reveals a stronger negative correlation than Deel's (1987) study, where he found that age was negatively correlated (-.25) to the "overall use of microcomputer" by executive administrators. Such a difference in the magnitude of relationship could be due to the difference in measurement technique and/or difference in time.

Ø Hypothesis III g: There is no significant difference between male and female vice presidents with regard to the extent of their direct use of microcomputers for decision support.

Ø Hypothesis III h: There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and the age of their highest degree held.

Ø Hypothesis III i: There is no significant difference between college and university vice presidents who hold technical degrees and those who do not with regard to the extent of their direct use of microcomputers for decision support.

Null Hypotheses IIIg through IIIi were not rejected at the .05 level of significance. These findings indicate that the following characteristics of vice presidents may not relate to the extent of their direct use of microcomputers for decision support: gender, age of highest degree held, possession of technical degree. Similar results were reported by Deel (1987) where no significant relationship was found between the "overall use of

microcomputers" by executive administrators and their gender nor graduation date.

Ø Hypothesis III j: There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and their perceptions of microcomputer as decision support.

This hypothesis was rejected at the .05 level of significance. This finding indicates that there was a significant relationship ($r = .34$, $p < .05$) between the extent of vice presidents' direct use of microcomputers for decision support and their perceptions toward the use of microcomputers. As the correlation was found to be positive, this indicated that the higher or more positive the perception of vice presidents toward the use of microcomputers, the more extent their direct use of microcomputers for decision support. This particular finding is consistent with Weisband's study (1987), she argued "To predict whether an administrator uses a computer, one ought to be able to ask the administrator what he or she thinks of computers" (p. 157).

Ø Hypothesis III k: There is no positive relationship between the extent of vice presidents' direct use of microcomputers for decision support and the degree of their expectation related to the use of microcomputer for decision support.

This hypothesis was rejected at the .05 level of significance. The findings indicated that there was a significant relationship ($r = .25$, $p < .05$) between the extent of vice presidents' direct use of microcomputers for decision support and the degree of their expectations related to the use of microcomputer for decision support. The relationship was found to be positive which suggests that the closer microcomputers get to meeting the

expectations of vice presidents as tools for decision support, the more they will make direct use of microcomputers for decision support.

Ø **Hypothesis III-1**: There is no significant relationship between the extent of vice presidents' direct use of microcomputers for decision support and the total number of vice presidents' supportive staff.

Hypothesis III-1 was not rejected at the .05 level of significance. The findings, based on the results of the data analysis, indicate that vice presidents' total number of supportive staff may not relate to the extent of their direct use of microcomputers for decision support.

After testing each of the null hypotheses III-a through III-1, multiple regression analysis was performed to estimate how much of the variation in the dependent variable (the extent of vice presidents' direct use of microcomputers for decision support) can be significantly predicted or accounted for by a composite of independent variables found to have significant relationships resulted from testing hypotheses III-a through III-1 (age, perception, expectation). Hence, based on the results of the multiple regression analysis, a significant coefficient of determination was found ($r^2 = .2578, p < .01$). This indicates that 26% of the variation in the extent of vice presidents' direct use of microcomputers for decision support was accounted for or predicted by their age, perception, and expectation. The predictive model from the multiple regression analysis yielded the following regression equation:

$$Y' = -3.9429 - 1.5046\,(X_1) + 15.4698\,(X_2) + 31.8867\,(X_3)$$

Where

Y' = predicted average percent of microcomputer direct use for decision support by vice president i

X_1 = observed age, in years, for vice president *i*

X_2 = observed average perception score for vice president *i*

X_3 = observed average expectation score for vice president *i*

Research Question 4

What relationships exist between vice presidents' perceptions and their direct and indirect use of microcomputers for decision support?

Ø Hypothesis IV: There is no significant relationship between vice presidents' perceptions toward using microcomputers as decision support and their direct and indirect use of microcomputers for decision support (through their supportive staff).

This hypothesis was rejected at the .001 level of significance. The findings revealed that there was a significant relationship ($r = .52, p < .001$) between vice presidents' perceptions toward using microcomputers as decision support and their direct and indirect use of microcomputers for decision support (through their supportive staff). The positive correlation suggests that the higher or more positive the perception of vice presidents, the more direct and indirect use of microcomputers for decision support by vice presidents and their supportive staff.

Research Question 5

To what extent are microcomputers and related software used to generate data, as compared to other computer sources, to support areas of decision making by vice presidents (either directly or indirectly)?

The results of the data analysis related to this research question indicated that there were more vice presidents with microcomputers in

their own offices (57.5%) than vice presidents who did not have microcomputers in their own offices (42.5%). The majority of vice presidents (84.9%) reported that their supportive staff operated on at least one microcomputer unit. While the present findings reveal about 58% of vice presidents have microcomputers in their own offices (and assuming for the purpose of their direct use), this was much higher than Deel's findings (1987), where only 18.9% of the surveyed executive administrators directly used microcomputers. This difference is perhaps due, as Deel pointed out, to the anticipated increase use of microcomputers by administrators.

Of the total microcomputer usage time for decision support in the offices of vice presidents, an average of 22% was conducted by vice presidents themselves, 55% by their supportive staff, and only 9% by other staff or sources.

In terms of vice presidents' overall decisions supported by data generated through the use of different computer units, the findings indicated an average of 31% of vice presidents' decisions was supported by data generated through the use of mainframe computers, followed by 29% by data generated through the use of microcomputers. While 7% of vice presidents' decisions was supported by data generated through use of minicomputers, less than 3% was supported by data generated through the use of other or unknown computer sources.

The highest average percent of microcomputer generated data directly by vice presidents (18%) was used to support their decisions in the area of Budgeting, followed by 17% of microcomputer generated data by vice presidents used to support their decisions in the area of Planning. The lowest average percent of microcomputer generated data (0.94%) by vice

presidents was used to support their decisions in the area of Facilities and Physical Plants.

The highest average percent of microcomputer generated data by vice presidents' supportive staff (23%) was used to support vice presidents' decisions in the area of Planning, followed by 20% of microcomputer generated data by their supportive staff to support their decisions in the area of Budgeting. The lowest average percent of microcomputer generated data (3%) by vice presidents' supportive staff was used to support their decisions in the area of Facilities and Physical Plants.

The highest average percent of microcomputer generated data by sources other than vice presidents and their supportive staff, was 24% to support vice presidents' decisions in the area of Budgeting, followed by 17% of data to support their decisions in the area of Accounting. The lowest average percent of microcomputer generated data (2%) by sources other than vice presidents and their supportive staff, was used to support their decisions in the area of Facilities and Physical Plants.

Word Processing/Text Management software was used by vice presidents on microcomputers to generate the highest average of data (27%) to support their decisions, followed by an average of 13% of data generated using Data Base software. While Spreadsheet software was used by vice presidents on microcomputers to generate an average of 12.16% of data used to support their decisions, less than one percent of the data were generated using other microcomputer software.

Vice presidents' supportive staff used Word Processing/Text Management software on microcomputers to generate the highest average of data (46%) to support vice presidents' decisions, followed by 21% of data generated by using Spreadsheet software, and 20% by using Data Base

software all in support of vice presidents' decisions. The lowest average of data (less than one percent), was generated using other microcomputer software in support of vice presidents' decisions. Whereas in Deel's (1987) study, he indicated that microcomputers were mostly used for wordprocessing.

Research Question 6

What are the reasons, if any, for not directly using microcomputers for decision support by vice presidents?

The findings based on the results of data analysis related to this research question indicated that the highest selected reason for not directly using microcomputers for decision support by vice presidents, were because "it is someone else's job." This reason was given by more than half the vice presidents responding to question 9 of part III in the instrument. "Lack of available time" by vice presidents ranked as the second highest reason (20.5%) for not directly using microcomputers for decision support, followed by a "lack of adequate training," ranking third, which accounted for about 16% of the total responses. The fourth ranked reason was a "lack of available funds" (14.8%), followed by a "lack of interest" by vice presidents to directly use microcomputers for decision support. Only 6.8% of the total responses cited "other reasons."

Vice presidents from private institutions represent 92% of the respondents indicating a "lack of available funds" was one of the reasons hindering them from directly using microcomputers for decision support, while vice presidents from public institutions made up 67% of the respondents claiming that a "lack of available time" was a reason for not directly using microcomputers for decision support. The reasons "lack of

adequate training" and "it's someone else's job" for not directly using microcomputers for decision support were mostly selected by vice presidents from private institutions, as they occupied respectively, 79% and 65% of the total respondents to each of the two reasons. Similar findings were disclosed by Deel (1987), as the surveyed subjects in his study expressed that the need for training related to computer use. On the contrary, the present findings of reasons for not directly using microcomputers for decision support were not consistent with Harris (1984) who concluded that "cause of habit, ease of access, or just plain laziness" by decision makers were hindering their use of computers as decision support tools.

Conclusions

The above discussed findings served as the foundation in which the following conclusions were drawn, and they should be considered in light of the study limitations noted in Chapter I.

1. College and university vice presidents have a positive perception toward the use of microcomputers for decision support, and their expectations were met. When comparing direct/indirect microcomputer use for decision support by vice presidents, direct users had a more positive perception ($p < .05$). This may be due to the notion that direct users are more exposed to the quality and advantages that microcomputers offer.

2. Direct microcomputer use for decision support by vice presidents is negatively correlated with their age ($p < .01$). This may be attributed to the inkling that younger vice presidents are coming in already prepared and oriented with expectations toward using computers for decision support.

Therefore, as older vice presidents retire and are replaced with younger executives, this could explain: (a) this study's detection of the increase in direct microcomputer use for decision support by executive administrators as compared to previous studies; and (b) the expected continued increase in direct microcomputer use for decision support by vice presidents.

3. More decisions of vice presidents were supported by data generated through the use of mainframes than microcomputers or minicomputers. This could be partially due to the fact that vice presidents' decisions are normally related to the entire institution and most of the data needed to support their decisions reside in the mainframe. It is highly likely that the needed data are downloaded from the mainframe to microcomputer units for treatments and analyses. Microcomputer software, including word processing/text management, data base and spreadsheet, were used the most to support vice presidents' decisions in the areas of budgeting and planning.

4. The highest selected reasons for not directly using microcomputers for decision support by vice presidents was because "it is someone else's job," followed by the "lack of available time." This could be due to the availability of supportive staff and the full schedule of vice presidents.

Recommendations

Based on study findings and conclusions, recommendations for executive decision makers in colleges and universities, and for further research related to this study, are listed below:

Recommendations for Executive Decision Makers in Colleges and Universities

1. "MAD-CUE" Microcomputer Assisted Decisions for College and University Executives, a support group which should be organized and established nationwide to include executive administrators interested in the applications of microcomputer technology into college and university administration and decision making. The advancement in electronic networks (including electronic mail and conferences) can positively serve the members of this group to efficiently communicate with each other to share experiences related to the applications of microcomputers in their operations.

2. More funds should be provided to introduce the use of microcomputer technology to support vice presidents' decision making, including suitable hardware and software, adequate support services, and training sessions. While this suggestion is more focused on private institutions, public institutions should not be ignored.

3. Time should be spared by vice presidents to learn how to use microcomputer technology for their decision support. A special focus on young executives could prove to be beneficial in the long run.

Recommendations for Further Research

1. Similar studies which account for randomly selected vice presidents from across the four-year colleges and universities in the United States, may prove helpful in confirming the generalizability of the current study.

2. While microcomputer technology is improving rapidly, a follow-up study of vice presidents from Michigan's four-year colleges and universities is suggested in a few years. This will serve the purpose of determining the

trend and impact of microcomputer technological advancement on their perceptions and uses of microcomputers as decision support tools.

3. Microcomputer software that are easy to learn and most effective for decision support might provide an interest to those vice presidents who claimed, "the lack of available time" as a reason for not directly using microcomputers for decision support. Hence, a study could be conducted to consider surveying vice presidents directly using microcomputers for decision support to gather such information.

4. Since the present study has revealed that more than half of the surveyed vice presidents use microcomputers, it would be of great significance to investigate the magnitude in effectiveness of the different type of microcomputer hardware and software used by vice presidents. Such information could prove to be helpful and time saving for vice presidents who will begin using microcomputers for decision support.

5. A study can be conducted to compare and contrast vice presidents from colleges and universities in different regions within the United States to determine whether or not regional difference correlates to vice presidents' perception and/or extent of their use of computer technology for decision support.

APPENDICES

APPENDIX A

MICHIGAN'S FOUR-YEAR COLLEGES AND UNIVERSITIES

Michigan's four-year; baccalaureate granting colleges and universities that are accredited by the North Central Association of Colleges and Schools:

Private	Public
Adrian College	Central Michigan University
Albion College	Eastern Michigan University
Alma College	Ferris State University
Andrews University	Grand Valley State University
Aquinas College	Lake Superior State University
Baker College-Owosso	Michigan State University
Baker College-Flint	Michigan Tech. University
Calvin College	Northern Michigan University
Center For Creative Studies-College Of Art And Design	Oakland University
Cleary College	Saginaw Valley State University
Concordia College	University Of Michigan-Ann Arbor
Davenport College Of Business	University Of Michigan-Dearborn
Detroit College Of Business	University Of Michigan-Flint
Grand Rapids Baptist College And Seminary	Wayne State University
Hillsdale College	Western Michigan University
Hope College	
Kalamazoo College	
Kendall College of Art & Design	
Lawrence Technological University	
Madonna College	
Marygrove College	
Mercy College Of Detroit	
Michigan Christian College	
Muskegon College	
Nazareth College	
Olivet College	
Sacred Heart Major Seminary/ College & Theologiate	
Saint Mary's College	
Siena Height College	
Spring Arbor College	
University of Detroit	
Walsh College of Accountancy & Business Administration	
William Tyndale College	

Source: 1990 Higher Education Directory, Constance Healey Torregrosa (ed.) Falls Church, VA: Higher Education Publications, Inc., 1990, pp. 161-72.

APPENDIX B

LETTER TO VALIDATION PANEL

(Date)

(*Name and Title*)
(Address)

Dear Dr. _____:

I am in the process of constructing a proposal for my dissertation. The topic I have chosen is ***"A Study of Vice Presidents' Perceptions and Uses of Microcomputers as Decision Support in Michigan's Four-Year Colleges and Universities."*** I sincerely need your help in completing this stage of my doctoral program at Michigan State University.

Since there is no previously developed instrument to assess the perception of college and university vice presidents toward the use of microcomputers for decision support, I had to develop such instrument. Although I have completed the initial phase of the instrument, before it is finally used for data collection, the items in part III of this newly developed questionnaire requires to be evaluated for their Face Validity by a panel of judges who are closely associated to the population I am studying.

You have been selected as one potential candidate to judge my instrument as I am definite that your input will be crucial to shape the final product of the instrument. Please feel free to express the strength/weakness of each item in the *Item Evaluation Form*, by circling a point on the 5-point Face Validity Scale, and don't hesitate to comment on the content of my proposal.

Enclosed please find the followings:

a. *Item Evaluation Form* with numbered item statements and a 5-point Face Validity Scale (0-4).
b. A copy of my *Instrument* (consisting of three parts).
c. A copy of my *dissertation proposal* to provide an idea of the study, if needed.

Dr. _____, your assistance in this important inquiry will therefore be most valuable and greatly appreciated. Please use the enclosed self-addressed stamped envelope for your returned evaluation. If you need to reach me, you may call me *Collect* at (517) 355-6097.

Thanks again for your assistance!

Sincerely yours,

Talal A. Alsohaim
P.O. Box 6617
E. Lansing, MI 48826

Enclosures

APPENDIX C

LETTER OF HUMAN SUBJECT APPROVAL

MICHIGAN STATE UNIVERSITY

UNIVERSITY COMMITTEE ON RESEARCH INVOLVING
HUMAN SUBJECTS (UCRIHS)
206 BERKEY HALL
(517) 353-9738

EAST LANSING • MICHIGAN • 48824-1111

December 5, 1989 **IRB# 88-489**

Talal Alsohaim
P.O. Box 6617
East Lansing, MI 48826

Dear Mr. Alsohaim:

RE: "A STUDY OF VICE PRESIDENTS' PERCEPTIONS AND USES OF MICROCOMPUTERS AS DECISION SUPPORTS IN MICHIGAN'S FOUR-YEAR COLLEGES AND UNIVERSITIES **IRB# 88-489**"

UCRIHS' review of the above referenced project has now been completed. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and the Committee, therefore, approved this project at its meeting on December 4, 1989.

You are reminded that UCRIHS approval is valid for one calendar year. If you plan to continue this project beyond one year, please make provisions for obtaining appropriate UCRIHS approval one month prior to December 4. 1990.

Any changes in procedures involving human subjects must be reviewed by the UCRIHS prior to initiation of the change. UCRIHS must also be notified promptly of any problems (unexpected side effects, complaints, etc.) involving human subjects during the course of the work.

Thank you for bringing this project to our attention. If we can be of any future help, please do not hesitate to let us know.

Sincerely,

John K. Hudzik, Ph.D.
Chair, UCRIHS

JKH/sar

cc: K. Neff

APPENDIX D

THE SURVEY INSTRUMENT WITH COVER LETTER

(Date)

(*Name and Title*)
(Address)

Dear _____:

As a doctoral student at Michigan State University, I am in the process of collecting data for my dissertation. The attached questionnaire was developed to study vice presidents' perceptions and uses of microcomputers as decision support in Michigan's four-year colleges and universities.

Your experience as an executive administrator will contribute significantly to my study. Therefore, I sincerely hope you will agree to participate in this valuable study. Without the generous assistance of people such as you, this study cannot be conducted. The average time required for vice presidents to complete the attached questionnaire was 14 minutes.

Would you please assist me by taking a few minutes to complete the attached questionnaire and return it in the self-addressed, stamped envelope by January 20, 1990. I would like to assure you that all your responses will be treated in strict confidence, and that all of the respondents will remain anonymous. If you have any questions, you may reach me at (517) 355-6097.

_____ your prompt response will be greatly appreciated.

Sincerely yours,

Talal A. Alsohaim

Enclosures

PART I

BACKGROUND DATA

The questionnaire you are going to fill in does not demand your name nor your address. All your answers will be treated confidentially.

Please answer the following questions by supplying the data required, or clearly mark your answer with an (X) in the space provided.

1. Total students' enrollment in your college/university:

   _____ Students

2. Type of institution: Private _____ Public _____

   Major research institution: Yes _____ No _____

3. Title of your current position:

   Vice President for Academic Affairs _____
   Vice President for Business Affairs _____
   Vice President for Students Affairs _____
   Vice President for Public Affairs _____

   If other, please specify _____

4. Years served in the above position: _____ Years

5. Your sex? Female _____ Male _____

6. Your age? _____ Years Old

7. Highest degree of formal education you currently hold?

   Bachelor's _____; Master's _____; Doctorate _____;

   Specialist _____; Other _____ Please specify _____

8. Year highest degree obtained? _____

9. Do you hold any technical degree? Yes _____ No _____

PART II

USES OF MICROCOMPUTERS

This section focus on the uses of microcomputers by your office (the office of the vice president) including you and your supportive staff. The term "**supportive staff**" in this study refers to: personnel including secretaries and persons who reports directly to you and have at least some staff responsibility. Please note the word "**microcomputer**" in the following questions, if not otherwise stated, does not include its sole use as a medium between the user and other computer terminals.

1. How many secretarial staff do you have in your office?

   _____ Secretarial Staff

2. How many other people serving as ***supportive staff*** in your office?

   _____ Other ***supportive staff***

3. How many microcomputer unit(s) do you have in your ***own*** office. (0 for none)?

   _____ microcomputer unit(s)

4. How many microcomputer unit(s) does ***your supportive staff*** currently operate (0 for none)?

   _____ microcomputer unit(s)

5. The use of microcomputer unit(s) for your decision support are normally conducted by:

User	% Of Decision-Support Time
Yourself	_____ %
Your Supportive Staff	_____ %
Others, please specify	
_____	_____ %
_____	_____ %
	100 %

6. What percent of your decisions are based upon data generated through the following computer unit(s)?

Computer Unit(s)	% Of Your Decisions
Microcomputer	_____ %
Minicomputer	_____ %
Mainframe Computer	_____ %
Unknown Computer Source	_____ %
Others, please specify	
_____	_____ %
_____	_____ %

7. To what extent, in terms of percent, are data generated by ***you*** on microcomputers used in supporting your decisions in the following areas?

Area	% Of Microcomputer Generated Data
Planning	_____ %
Budgeting	_____ %
Accounting	_____ %
Purchasing	_____ %
Facilities & Physical Plants	_____ %
Personnel Administration	_____ %
Public Relations	_____ %
Other tasks, please specify	
_____	_____ %
_____	_____ %

8. To what extent, in terms of percent, are data generated by ***your supportive staff*** on microcomputers used in supporting your decisions in the following areas?

Area	% Of Microcomputer Generated Data
Planning	_____ %
Budgeting	_____ %
Accounting	_____ %
Purchasing	_____ %
Facilities & Physical Plants	_____ %
Personnel Administration	_____ %
Public Relations	_____ %
Other tasks, please specify	
_____	_____ %
_____	_____ %

9. To what extent, in terms of percent, are data generated through microcomputers by sources ***external*** to your office used in supporting your decisions in the following areas?

Area	% Of Microcomputer Generated Data
Planning	_____ %
Budgeting	_____ %
Accounting	_____ %
Purchasing	_____ %
Facilities & Physical Plants	_____ %
Personnel Administration	_____ %
Public Relations	_____ %
Other tasks, please specify	
_____	_____ %
_____	_____ %

10. To what extent, in terms of percent, are ***you*** using the following microcomputer software to generate data to support your decisions?

Microcomputer Software	% Of Microcomputer Generated Data
Data Base	_____ %
Spreadsheet	_____ %
Graphics	_____ %
Word Processing/Text Management	_____ %
Communication	_____ %
Project Management	_____ %
Other Micro. Software, please specify	
_____	_____ %
_____	_____ %

11. To what extent, in terms of percent, are ***your supportive staff*** using the following microcomputer software to generate data to support your decisions?

Microcomputer Software	% Of Microcomputer Generated Data
Data Base	_____ %
Spreadsheet	_____ %
Graphics	_____ %
Word Processing/Text Management	_____ %
Communication	_____ %
Project Management	_____ %
Other Micro. Software, please specify	
_____	_____ %
_____	_____ %

PART III

PERCEPTIONS TOWARD MICROCOMPUTERS

The following statements were designed so you can indicate your opinion about microcomputers and their uses as decision support tools.

For each statement, please circle ONE ***choice from each of the two scales*** provided at the left and right of each statement.

The scale on the left is designed to assess your perception toward microcomputers as decision support tools. The scale on the right is designed to indicate the extent to which microcomputers have lived up to your expectation as decision support tools.

The choices in each of the two scales represent the following:

LEFT
(present perception):

- **SA** = you *S*trongly *A*gree with the statement.
- **A** = you *A*gree with the statement but not strongly so.
- **D** = you *D*isagree with the statement but not strongly so.
- **SD** = you *S*trongly *D*isagree with the statement.

RIGHT SCALE
(related to expectation):

- **LTE** = your perception is *L*ess *T*han *E*xpected.
- **AE** = your perception is *A*s *E*xpected.
- **MTE** = your perception is *M*ore *T*han *E*xpected.

SA A D SD	1. I make decisions that are more effective when I use microcomputers.	LTE	AE MTE
SA A D SD	2. Microcomputers are cost-effective decision support tools in my operation.	LTE	AE MTE
SA A D SD	3. Microcomputers are dependable machines for my decision making.	LTE	AE MTE
SA A D SD	4. I make decisions that are more rational when I use microcomputers.	LTE	AE MTE
SA A D SD	5. Microcomputers offer me good security for confidential data.	LTE	AE MTE
SA A D SD	6. Productivity in my decision making increases when I use microcomputers.	LTE	AE MTE
SA A D SD	7. Microcomputers offer me direct access to a greater range of stored data.	LTE	AE MTE
SA A D SD	8. My decision making is more efficient when I use microcomputers.	LTE	AE MTE

9. If you personally don't use microcomputers as direct tools for decision support, please mark all that apply from the following reasons:

___ a. Lack of adequate training.
___ b. Lack of available time.
___ c. Lack of available funds.
___ d. Lack of interest.
___ e. Because it is someone else's job.
___ f. Other, please specify:

10. Do you believe that microcomputers did live up to your expectation as decision support tools?

_____ Yes _____ No

If your response is Yes or No, please state your reason(s) to support your position:

Thank you ...

APPENDIX E

FOLLOW-UP LETTER TO THE VICE PRESIDENTS

(Date)

(*Name and Title*)
(Address)

Dear _____:

Within the past two weeks you should have received an envelope containing a cover letter, dated January 2, 1990. I personally asked for your kind participation in my doctoral dissertation study. A questionnaire and a self-addressed stamped envelop was also included in the mentioned envelope so you can return the completed questionnaire. The study, if you may recall, is related to ***Vice Presidents' Perceptions and Uses of Microcomputers as Decision Support in Michigan's Four-Year Colleges and Universities.***

If you have already responded to the questionnaire and have sent it back, please disregard this letter. I am so obliged for your great assistant as your participation will contribute significantly to my study. If however, you have overlooked the questionnaire and you still have it, may I ask for your kind cooperation by taking a few minutes from your valuable time to complete and return it to me in the provided envelope by January 20, 1990.

I will sincerely remind you again, that your responses will be treated highly confidential and that all of the respondents will remain anonymous. Thanks again for your participation and I wish you a Happy New Year.

Sincerely yours,

Talal A. Alsohaim

APPENDIX F

SPSS-X COMMAND PROGRAM USED FOR DESCRIPTIVE ANALYSES

```
TITLE  "VICE PRESIDENTS' SURVEY-ALSOHAIM"
SUBTITLE 'DESCRIPTIVE ALL2.ASC DATA'

SET BLANKS = -1

FILE HANDLE ALL2 / NAME = "ALL2 ASC A"

DATA LIST FILE = ALL2 FIXED RECORDS = 5
   /1  Q1 5-9  Q2.1 11  Q2.2 13  Q3 15  Q4 17-20(1)  Q5 22
       Q6 24-25  Q7 27  Q8 29-30  Q9 32  QIII.1 TO QIII.8 33-48
       QIII.9 TO QIII.16 49-64  QII1 65-68(1)  QII2 69-72(1)
       QII3 73  QII4 74-75

   /2  QII5.1 TO QII5.3 6-17  QII6.1 TO QII6.5 18-37  QII7.1 TO QII7.8
       38-69

   /3  TO QII8.8 6-37  QII9.1 TO QII9.8 38-69

   /4  QII10.1 TO QII10.7 6-33  QII11.1 TO QII11.7 34-61 ID 73-75

   /5

COMPUTE PERCEP = MEAN (QIII.1 TO QIII.8)
COMPUTE EXPECT = MEAN (QIII.9 TO QIII.16)
COMPUTE SS = SUM (QII1 TO QII2)

VARIABLE LABELS
   Q1    'SIZE OF INSTITUTION'          Q2.1  'PRIVATE / PUBLIC'
   Q2.2  'MAJ RESEARCH INST'            Q3    'POSITION'
   Q4    'LENGTH OF EMP AS V.P'         Q5    'GENDER'
   Q6    'AGE'                          Q7    'EDUCATION'
   Q8    'AGE OF HIGHEST DEGREE'        Q9  'TECH DEGREE'
   QIII.1 'PERCEPTION IN 1'             QIII.2 'PERCEPTION IN 2'
   QIII.3 'PERCEPTION IN 3'             QIII.4 'PERCEPTION IN 4'
   QIII.5 'PERCEPTION IN 5'             QIII.6 'PERCEPTION IN 6'
   QIII.7 'PERCEPTION IN 7'             QIII.8 'PERCEPTION IN 8'
   QIII.9 'EXPECTATION IN 1'            QIII.10'EXPECTATION IN 2'
   QIII.11'EXPECTATION IN 3'            QIII.12'EXPECTATION IN 4'
   QIII.13'EXPECTATION IN 5'            QIII.14'EXPECTATION IN 6'
   QIII.15'EXPECTATION IN 7'            QIII.16'EXPECTATION IN 8'
   QII1  'SECRETARIALS'                 QII2  'SUPPORTIVE STAFF'
   QII3  'MICRO FOR SELF'               QII4  'MICROS FOR SS'
   QII5.1 'MICRO FR DS BY SELF'         QII5.2 'MICROS FR DS BY SS'
   QII5.3 'MICROS FR DS BY OTHERS'      QII6.1 'DECISION BY MICROS'
```

```
    QII6.2 'DECISION BY MINIS'          QII6.3 'DECISION BY MAINFRAME'
    QII6.4 'DECISION BY OTHR COMP'      QII6.5 'DECISION BY OTHERS'
    QII7.1 'SELF MICROS FR PLANNG'      QII7.2 'SELF MICROS FR BUDGET'
    QII7.3 'SELF MICROS FR ACCOUN'      QII7.4 'SELF MICROS FR PURCH'
    QII7.5 'SELF MICROS FR FPP'         QII7.6 'SELF MICROS FR P ADMN'
    QII7.7 'SELF MICROS FR P RELA'      QII7.8 'SELF MICROS FR OTHER'
    QII8.1 'SS MICROS FR PLANNG'        QII8.2 'SS MICROS FR BUDGET'
    QII8.3 'SS MICROS FR ACCOUN'        QII8.4 'SS MICROS FR PURCH'
    QII8.5 'SS MICROS FR FPP'           QII8.6 'SS MICROS FR P ADMN'
    QII8.7 'SS MICROS FR P RELA'        QII8.8 'SS MICROS FR OTHER'
    QII9.1 'EXTR MICROS FR PLANNG'      QII9.2 'EXTR MICROS FR BUDGET'
    QII9.3 'EXTR MICROS FR ACCOUN'      QII9.4 'EXTR MICROS FR PURCH'
    QII9.5 'EXTR MICROS FR EPP'         QII9.6 'EXTR MICROS FR P ADMN'
    QII9.7 'EXTR MICROS FR P RELA'      QII9.8 'EXTR MICROS FR OTHER'
    QII10.1 'DATA BASE BY SELF'         QII10.2 'SPREADSHEET BY SELF'
    QII10.3 'GRAPHICS BY SELF'          QII10.4 'WORD PROCES BY SELF'
    QII10.5 'COMM BY SELF'              QII10.6 'PROJ MANG BY SELF'
    QII10.7 'OTH SOFTWR BY SELF'        QII11.1 'DATA BASE BY SS'
    QII11.2 'SPREADSHEET BY SS'         QII11.3 'GRAPHICS BY SS'
    QII11.4 'WORD PROCES BY SS'         QII11.5 'COMM BY SS'
    QII11.6 'PROJ MANG BY SS'           QII11.7 'OTH SOFTWR BY SS'
    ID 'CASE NUMBER'                    PERCEP 'PERCEPTION AVERAGE SCORE'
    EXPECT 'EXPECTATION AVERAGE SCORE'
    SS 'NUMBER OF SUPPORTIVE STAFF INCLUDING SECRETARIES'

VALUE LABELS
    Q2.1 1 'PRIVATE'  0 'PUBLIC'/
    Q2.2 1 'MAJOR RES INST'                 0 'NOT MAJOR RES INST'/
    Q3   1 'V P FR ACADEMIC AFFAIRS'        2 'V P FR BUSINESS AFFAIRS'
         3 'V P FR STUDENTS AFFAIRS'        4 'V P FR PUBLIC AFFAIRS'
         5 'OTHER POSITIONS'/
    Q5   1 'FEMALE'  0 'MALE'/
    Q7   1 "BACHELOR'S"  2 "MASTER'S"  3 'DOCTORATE'
         4 'SPECIALIST'  5 'OTHER DEGREES'/
    Q9   1 'HOLDER OF TECH DEGREE'  0 "DON'T HOLD TECH DEGREE"/
    QIII.1 TO QIII.8 1 'STRONGLY DISAGREE'  2 'DISAGREE'  3 'AGREE'
         4 'STRONGLY AGREE'/
    QIII.9 TO QIII.16 1 'LESS THAN EXPECTED'  2 'AS EXPECTED'
          3 'MORE THAN EXPECTED'/

MISSING VALUES ALL (-1)

FREQUENCIES VARIABLES =  ID
            /FORMAT = CONDENSE

FREQUENCIES VARIABLES = Q1 TO Q9  QII1 TO QII9.8 PERCEP EXPECT SS
      /HISTOGRAM = NORMAL
            /STATISTICS = ALL

RECODE    Q1 (0 THRU 999 = 1) (1000 thru 4999 = 2) (5000 THRU 14999 = 3)
             (15000 THRU 24999 = 4) (25000 THRU HI = 5) (ELSE = -1)/
          Q4 (0 THRU 5 = 1) (6 THRU 10 = 2) (11 THRU 15 = 3)
             (16 THRU 20 = 4) (20 THRU HI = 5) (ELSE = -1)/
```

```
    Q6 (0 THRU 40 = 1) (41 THRU 50 = 2) (51 THRU 60 = 3)
       (61 THRU HI = 4) (ELSE = -1)/
    Q8 (0 THRU 10 = 1) (11 THRU 20 = 2) (21 THRU 30 = 3)
       (31 THRU 40 = 4) (ELSE = -1)/
    SS (0 = 1) (1 THRU 5 = 2) (6 THRU 10 = 3) (11 THRU 15 = 4)
       (16 THRU HI = 5) (ELSE = -1)

VALUE LABELS
   Q1  1 '999 STUDENTS OR LESS'                2 '1000-4999 STUDENTS'
       3 '5000-14999 STUDENTS'                 4 '15000-24999 STUDENTS'
       5 '20 STUDENTS OR MORE'/
   Q4  1 '5 YEARS OR LESS'  2 '6-10 YEARS'  3 '11-YEARS' 4 '16-20 YEARS'
       5 '21 YEARS OR MORE'/
   Q6  1 '40 YEARS OR YOUNGER'  2 '41-50 YEARS'  3 '51-60 YEARS'
       4 '61 YEARS OR OLDER'/
   Q8  1 '10 YEARS OR LESS'  2 '11-20 YEARS'  3 '21-30 YEARS' 4'31-40 YEARS'/
   SS  1 '0' 2 '1-5' 3 '6-10' 4 '11-15' 5 '16 OR MORE'/

FREQUENCIES VARIABLES = Q1 TO Q9

CROSSTABS TABLES = Q3 BY Q2.1
OPTIONS 4

CROSSTABS TABLES = Q3 BY Q5
OPTIONS 4

CROSSTABS TABLES = Q3 BY Q7
OPTIONS 4

FINISH
```

APPENDIX G

SPSS-X COMMAND PROGRAM USED FOR INFERENTIAL ANALYSES

```
TITLE  "VICE PRESIDENTS' SURVEY-ALSOHAIM"
SUBTITLE 'HYPOTHESES ALL2.ASC DATA'

SET BLANKS = -1

FILE HANDLE ALL2 / NAME = "ALL2 ASC A"

DATA LIST FILE = ALL2 FIXED RECORDS = 5
   /1  Q1 5-9  Q2.1 11  Q2.2 13  Q3 15  Q4 17-20(1)  Q5 22
       Q6 24-25  Q7 27  Q8 29-30  Q9 32  QIII.1 TO QIII.8 33-48
       QIII.9 TO QIII.16 49-64  QII1 65-68(1)  QII2 69-72(1)
       QII3 73  QII4 74-75

   /2  QII5.1 TO QII5.3 6-17  QII6.1 TO QII6.5 18-37  QII7.1 TO QII7.8
       38-69

   /3  QII8.1 TO QII8.8 6-37  QII9.1 TO QII9.8 38-69

   /4  QII10.1 TO QII10.7 6-33  QII11.1 TO QII11.7 34-61  NOTRAING 63
       NOTIME 64  NOFUND 65  NOINTRST 66  ELSEJOB 67  OTHERS 68
       LIVEUP 70  ID 73-75

   /5

COMPUTE PERCEP = MEAN (QIII.1 TO QIII.8)
COMPUTE EXPECT = MEAN (QIII.9 TO QIII.16)
COMPUTE SS = SUM (QII1 TO QII2)

VARIABLE LABELS
   Q1    'SIZE OF INSTITUTION'          Q2.1   'PRIVATE / PUBLIC'
   Q2.2  'MAJ RESEARCH INST'            Q3     'POSITION'
   Q4    'LENGTH OF EMP AS V.P'         Q5     'GENDER'
   Q6    'AGE'                          Q7     'EDUCATION'
   Q8    'AGE OF HIGHEST DEGREE'        Q9  'TECH DEGREE'
   QIII.1 'PERCEPTION IN 1'             QIII.2 'PERCEPTION IN 2'
   QIII.3 'PERCEPTION IN 3'             QIII.4 'PERCEPTION IN 4'
   QIII.5 'PERCEPTION IN 5'             QIII.6 'PERCEPTION IN 6'
   QIII.7 'PERCEPTION IN 7'             QIII.8 'PERCEPTION IN 8'
   QIII.9 'EXPECTATION IN 1'            QIII.10'EXPECTATION IN 2'
   QIII.11'EXPECTATION IN 3'            QIII.12'EXPECTATION IN 4'
   QIII.13'EXPECTATION IN 5'            QIII.14'EXPECTATION IN 6'
   QIII.15'EXPECTATION IN 7'            QIII.16'EXPECTATION IN 8'
   QII1  'SECRETARIALS'                 QII2   'SUPPORTIVE STAFF'
   QII3  'MICRO FOR SELF'               QII4   'MICROS FOR SS'
```

```
    QII5.1 'MICRO FR DS BY SELF'          QII5.2 'MICROS FR DS BY SS'
    QII5.3 'MICROS FR DS BY OTHERS'       QII6.1 'DECISION BY MICROS'
    QII6.2 'DECISION BY MINIS'            QII6.3 'DECISION BY MAINFRAME'
    QII6.4 'DECISION BY OTHR COMP'        QII6.5 'DECISION BY OTHERS'
    QII7.1 'SELF MICROS FR PLANNG'        QII7.2 'SELF MICROS FR BUDGET'
    QII7.3 'SELF MICROS FR ACCOUN'        QII7.4 'SELF MICROS FR PURCH'
    QII7.5 'SELF MICROS FR FPP'           QII7.6 'SELF MICROS FR P ADMN'
    QII7.7 'SELF MICROS FR P RELA'        QII7.8 'SELF MICROS FR OTHER'
    QII8.1 'SS MICROS FR PLANNG'          QII8.2 'SS MICROS FR BUDGET'
    QII8.3 'SS MICROS FR ACCOUN'          QII8.4 'SS MICROS FR PURCH'
    QII8.5 'SS MICROS FR FPP'             QII8.6 'SS MICROS FR P ADMN'
    QII8.7 'SS MICROS FR P RELA'          QII8.8 'SS MICROS FR OTHER'
    QII9.1 'EXTR MICROS FR PLANNG'        QII9.2 'EXTR MICROS FR BUDGET'
    QII9.3 'EXTR MICROS FR ACCOUN'        QII9.4 'EXTR MICROS FR PURCH'
    QII9.5 'EXTR MICROS FR EPP'           QII9.6 'EXTR MICROS FR P ADMN'
    QII9.7 'EXTR MICROS FR P RELA'        QII9.8 'EXTR MICROS FR OTHER'
    QII10.1 'DATA BASE BY SELF'           QII10.2 'SPREADSHEET BY SELF'
    QII10.3 'GRAPHICS BY SELF'            QII10.4 'WORD PROCES BY SELF'
    QII10.5 'COMM BY SELF'                QII10.6 'PROJ MANG BY SELF'
    QII10.7 'OTH SOFTWR BY SELF'          QII11.1 'DATA BASE BY SS'
    QII11.2 'SPREADSHEET BY SS'           QII11.3 'GRAPHICS BY SS'
    QII11.4 'WORD PROCES BY SS'           QII11.5 'COMM BY SS'
    QII11.6 'PROJ MANG BY SS'             QII11.7 'OTH SOFTWR BY SS'
    NOTRAING 'LACK OF TRAINING'           NOTIME 'LACK OF TIME'
    NOFUND 'LACK OF  FUND'                NOINTRST 'NO INTEREST'
    ELSEJOB "SOMONE ELSE'S JOB"           OTHERS 'OTHER REASONS'
    LIVEUP 'MICROS LIVING UP TO EXPECTATIONS'
    ID 'CASE NUMBER'                      PERCEP 'PERCEPTION AVERAGE SCORE'
    EXPECT 'EXPECTATION AVERAGE SCORE'
    SS 'NUMBER OF SUPPORTIVE STAFF INCLUDING SECRETARIES'

VALUE LABELS
    Q2.1 1 'PRIVATE'  0 'PUBLIC'/
    Q2.2 1 'MAJOR RES INST'                   0 'NOT MAJOR RES INST'/
    Q3   1 'V P FR ACADEMIC AFFAIRS'          2 'V P FR BUSINESS AFFAIRS'
         3 'V P FR STUDENTS AFFAIRS'          4 'V P FR PUBLIC AFFAIRS'
         5 'OTHER POSITIONS'/
    Q5   1 'FEMALE'  0 'MALE'/
    Q7   1 "BACHELOR'S"  2 "MASTER'S"  3 'DOCTORATE'
         4 'SPECIALIST'  5 'OTHER DEGREES'/
    Q9   1 'HOLDER OF TECH DEGREE'  0 "DON'T HOLD TECH DEGREE"/
    QIII.1 TO QIII.8 1 'STRONGLY DISAGREE'  2 'DISAGREE'  3 'AGREE'
         4 'STRONGLY AGREE'/
    QIII.9 TO QIII.16 1 'LESS THAN EXPECTED'  2 'AS EXPECTED'
          3 'MORE THAN EXPECTED'/
    NOTRAING  1 'YES'  0 'NO'/  NOTIME  1 'YES'  0 'NO'/
    NOFUND  1 'YES'  0 'NO'/  NOINTRST  1 'YES'  0 'NO'/
    ELSEJOB  1 'YES'  0 'NO'/  OTHERS  1 'YES'  0 'NO'/
    LIVEUP  1 'YES'  0 'NO'/

MISSING VALUES ALL (-1)

DESCRIPTIVE VARIABLES = PERCEP EXPECT
```

```
RELIABILITY VARIABLES = QIII.1 TO QIII.8
        /SCALE (PERCEPT) = QIII.1 TO QIII.8
                /SUMMARY = TOTAL

RELIABILITY VARIABLES = QIII.9 TO QIII.16
        /SCALE (EXPECTA) = QIII.9 TO QIII.16
                /SUMMARY = TOTAL

MULT RESPONSE GROUPS = LIVINGUP 'MICROS LIVING UP TO
                                EXPECTATIONS' (LIVEUP (0,1))
        /FREQUENCIES = LIVINGUP

MULT RESPONSE GROUPS = LIVINGUP 'MICROS LIVING UP TO
                                EXPECTATIONS' (LIVEUP (0,1))
        /VARIABLES Q3 (1,5)
                /TABLES = Q3 BY LIVINGUP
                        /CELLS = ROW

PLOT TITLE =  "RESPONDENTS' PERCEPTION WITH EXPECTATION"
        /VERTICAL = 'PERCEPTION TOWARD USING MICROS FOR DS'
                /HORIZONTAL = "RESPONDENTS' EXPECTATION OF MICROS"
                        /FORMAT = REGRESSION
                                /PLOT = PERCEP WITH EXPECT

CORRELATIONS  PERCEP EXPECT Q6 Q8
        /PRINT = TWOTAIL

ONEWAY PERCEP BY Q2.2 (0,1)
        /STATISTICS = ALL

PLOT TITLE =  "RESPONDENTS' AGE WITH PERCEPTION"
        /VERTICAL = 'AGE OF RESPONDENTS'
                /HORIZONTAL = 'PERCEPTION TOWARD USING MICROS AS DS'
                        /FORMAT = REGRESSION
                                /PLOT = Q6 WITH PERCEP

ONEWAY PERCEP BY Q7 (1,3)
        /RANGES = SCHEFFE
                /STATISTICS = ALL

PLOT TITLE =  "RESPONDENTS' AGE  OF HIGHEST DEG WITH PERCEPTION"
        /VERTICAL = 'AGE OF HIGHEST DEGREE'
                /HORIZONTAL = 'PERCEPTION TOWARD USING MICROS AS DS'
                        /FORMAT = REGRESSION
                                /PLOT = Q8 WITH PERCEP

ONEWAY PERCEP BY Q9 (0,1)
        /STATISTICS = ALL

TEMPORARY
RECODE QII5.1 (0 = 1) (1 THRU 100 = 2) (ELSE = -1)

VALUE LABELS QII5.1 1 'NONE OR INDIRECT USERS'  2 'DIRECT USERS'
```

```
ONEWAY PERCEP BY QII5.1  (1,2)
        /STATISCTICS = ALL

TEMPORARY
RECODE QII5.1 (0 = 0)  (1 THRU 100 = 1)  (ELSE = -1)

VALUE LABELS QII5.1 0 'NONE OR INDIRECT USERS'  1 'DIRECT USERS'

REGRESSION VARIABLES = PERCEP EXPECT QII5.1
        /DEPENDENT = PERCEP
                /ENTER EXPECT
                        /ENTER QII5.1
        /CASEWISE = ALL DEPENDENT PRED RESID ZRESID DRESID MAHAL
                        COOK

TEMPORARY
RECODE QII5.1 TO QII11.7  (0 = 1) (1 THRU 25 = 2) (26 THRU 50 = 3)
                                (51 THRU 75 = 4) (76 THRU 100 = 5) (ELSE = -1)

VALUE LABELS
          QII5.1 TO QII11.7  1 '0'  2 '1-25%'  3 '26-50%'  4 '51-75%'  5 '76-100%'

FREQUENCIES VARIABLES = QII5.1 TO QII11.7

COMPUTE USAGE = SUM (QII5.1 TO QII5.2)

VARIABLE LABELS
        USAGE 'EXTENT OF MICRO USE BY SELF AND SUPP STAFF'

PLOT TITLE =  "RESPONDENTS' USE OF MICRO BY SELF AND SUPP STAFF
                        WITH PERCEP"
        /VERTICAL = 'PERCEPTION TOWARD USING MICROS FOR DS'
                /HORIZONTAL = 'EXTENT OF MICRO USE BY SELF & SUPP
                                        STAFF'
                        /FORMAT = REGRESSION
                                /PLOT = PERCEP WITH USAGE

CORRELATIONS  USAGE PERCEP
        /PRINT = TWOTAIL

SELECT IF  (QII5.1 GE 1)

ONEWAY  QII5.1  BY Q3 (1,4)
        /RANGES = SCHEFFE
                /STATISCTICS = ALL

PLOT TITLE =  "RESPONDENTS' LENGTH OF EMPLOY MENT WITH MICRO
                        DIRECT USE"
        /VERTICAL = 'LENGTH OF EMPLOYMENT'
                /HORIZONTAL = 'EXTENT OF MICRO DIRECT USE'
                        /FORMAT = REGRESSION
                                /PLOT = Q4 WITH QII5.1
```

```
CORRELATIONS QII5.1 PERCEP EXPECT Q4 Q1 Q6 Q8 SS
      /PRINT = TWOTAIL

CORRELATIONS QII5.1 PERCEP EXPECT Q4 Q1 Q6 Q8 SS

PLOT TITLE =  "RESPONDENTS' SIZE OF INSTITUTION WITH MICRO
            DIRECT USE"
      /VERTICAL = "STUDENTS' ENROLLMENT"
            /HORIZONTAL = 'EXTENT OF MICRO DIRECT USE'
                  /FORMAT = REGRESSION
                        /PLOT = Q1 WITH QII5.1

ONEWAY  QII5.1  BY Q2.1 (0,1)
      /STATISCTICS = ALL

ONEWAY  QII5.1  BY Q2.2 (0,1)
      /STATISCTICS = ALL

PLOT TITLE =  "RESPONDENTS' AGE WITH MICRO DIRECT USE"
      /VERTICAL = 'AGE OF RESPONDENTS'
            /HORIZONTAL = 'EXTENT OF MICRO DIRECT USE'
                  /FORMAT = REGRESSION
                        /PLOT = Q6 WITH QII5.1

ONEWAY  QII5.1  BY Q5 (0,1)
      /STATISCTICS = ALL

PLOT TITLE =  "RESPONDENTS' AGE  OF HIGHEST DEGREE WITH MICRO
                  DIRECT USE"
      /VERTICAL = 'AGE OF HIGHEST DEGREE'
            /HORIZONTAL = 'EXTENT OF MICRO DIRECT USE'
                  /FORMAT = REGRESSION
                        /PLOT = Q8 WITH QII5.1

ONEWAY  QII5.1  BY Q9 (0,1)
      /STATISCTICS = ALL

PLOT TITLE =  "RESPONDENTS' PERCEPTION TOWARD MICROS WITH
                  MICRO DIRECT USE"
      /VERTICAL = 'PERCEPTION TOWARD MICROS'
            /HORIZONTAL = 'EXTENT OF MICRO DIRECT USE'
                  /FORMAT = REGRESSION
                        /PLOT = PERCEP WITH QII5.1

PLOT TITLE =  "RESPONDENTS' EXPECTATION OF MICROS WITH  MICRO
                  DIRECT USE"
      /VERTICAL = 'EXPECTATION OF MICROS'
            /HORIZONTAL = 'EXTENT OF MICRO DIRECT USE'
                  /FORMAT = REGRESSION
                        /PLOT = EXPECT WITH QII5.1

PLOT TITLE =  "RESPONDENTS' NUMBER OF SUPP STAFF WITH MICRO
                  DIRECT USE"
      /VERTICAL = 'NUMBER OF SUPP STAFF'
```

```
            /HORIZONTAL = 'EXTENT OF MICRO DIRECT USE'
                  /FORMAT = REGRESSION
                        /PLOT = SS WITH QII5.1

REGRESSION VARIABLES = QII5.1 Q6 PERCEP EXPECT
      /DEPENDENT = QII5.1
            /ENTER Q6
                  /ENTER PERCEP
            /ENTER EXPECT
      /CASEWISE = ALL DEPENDENT PRED RESID ZRESID DRESID MAHAL
                  COOK

TEMPORARY
RECODE  QII3  (0 = 0) (1 THRU HI = 1) (ELSE = -1)
        QII4  (0 = 1) (1 THRU 3 = 2) (4 THRU 6 = 3) (7 THRU 9 = 4)
              (10 THRU HI = 5) (ELSE = -1)

VALUE LABELS
        QII3  1 'YES'  0 'NO'
        QII4  1 '0'  2 '1-3'  3 '4-6'  4 '7-9'  5 '10 MICROS OR MORE'

FREQUENCIES VARIABLES = QII3 QII4

DESCRIPTIVE VARIABLES = QII5.1 TO QII11.7

MULT RESPONSE GROUPS = NONUSERS 'REASONS FR NOT USING MICROS'
                              (NOTRAING TO OTHERS (1))
            /FREQUENCIES = NONUSERS

MULT RESPONSE GROUPS = NONUSERS 'REASONS FR NOT USING MICROS'
                              (NOTRAING TO OTHERS (1))
            /VARIABLES Q2.1 (0,1)
                  /TABLES = Q2.1 BY NONUSERS
                        /CELLS = COLUMN

FINISH
```

APPENDIX H

COMMENTS BY VICE PRESIDENTS SUPPORTING THAT MICROS LIVED UP TO THEIR EXPECTATIONS

-- I have been able to manipulate the data and track donors. It holds financial information and is reliable on billing and pledge payments.

-- The use of a micro is now essential to good planning. There are rapid changes occurring that require the ability to make rapid decisions based upon correct input. The use of a micro has saved me many hours of time and has reduced margin for error substantially.

-- Adequate information available when you need it. It helps with time management.

-- My use of microcomputers has assisted the delivery of my responsibilities as I expected.

-- Expected them to reduce time to produce necessary data.
Can more clearly see alternatives.
Person with knowledge of computer files has more control.
More alternatives can be generated.

-- Microcomputers provide much readier access to data. They don't make my decisions, but they enable me to have what I need to make them.

-- Provide information.
Efficient tool.
Convenient for staff to use when located in office area.

-- The programs we have are more related to training individuals to use microcomputers and to making decisions.

-- I found out that they were as good as I was taught they would be!

-- I use an intra-office network of Apple computers to link our fund-raising, alumni and communications programs. These microcomputers are used for word-processing, research, graphics, budgeting and other management tasks. The Apple Macintosh hardware and software is quite satisfactory.

-- It allows me to track activity over a period of time and see where my efforts and resources have been used most effectively. Information for decisions is timely and accurate. Causes those using computers to concentrate on what is important and gives them feedback.

-- Development is data and time sensitive/intensive business without the micros we couldn't manage the number of accounts we do with the number of staff we have.

-- We are able to be more efficient using microcomputers and get more done without increasing the number of personnel.

-- Quicker access to info.
More ways to manipulate info.
Easier and more efficient storage of info.
More cost efficient once on line.

-- Microcomputers have saved time and made it possible to be productive during staff shortages. They make it possible for everyone to use the same database--for decision and planning.

-- Rapid access to stored data.
Ability to do comparison calculations.

-- However, I find that the time it takes for initial data entry is exorbitant; also down time is a problem. It is the manipulation of data which I find most useful, and could not be done efficiently by hand.

-- As reflected in some of the questions/statements on page 5 [p. 135].

-- In previous jobs, yes. In current position -- I am in meetings and others do support work. The electronic mail is great!

-- When we can generate the data we need, the microcomputers are excellent. In several areas this is possible. However, we have a long way to go before we can realize all the capabilities of our microcomputers. There just isn't enough time.

-- They are useful, bringing data to a machine that can help analyze it. But there are many frustrations and people resist using them effectively.

-- I have found the technology very useful, relatively easy to access and implement, and most assuredly helpful in facilitating communication. We all have a common data set, even if we prefer to manipulate it for differing effects.

-- Having worked with computers prior to this position and having been a programmer, I feel that it did live up to my expectations.

-- Word processing support for my work has been very helpful, has done more than I ever hoped or dreamed it would. for all other applications my expectations have been minimal.

-- They have provided adequate data for decision making and flexibility to develop new methods for decision making.

-- More useful than expected.

-- Mainframe - micro interface still cumbersome but equipment contributes to overall performance in a positive way.

-- Decisions require data, without the use of microcomputers it would be very difficult to extract the information and prepare it for formal presentation.

-- As a product of the information age, I am accustomed to using micros and use them as part of my daily experience.

-- Increase direct involvement in using, producing data.
Increase speed of processing.
Increase accuracy of word and data processing.

-- The micro does, to an extent, "force me" into a more logical and conscious frame of mind. As I consider the need for certain data and the need to develop a certain structure for students for my decision making analysis.

-- My staff has made good use of microcomputers in developing data, but as an institution we are not yet making as much use of them as we could because we have not yet implemented mainframe systems that will provide adequate data bases for uses in the microcomputer environment.

-- They allow for gathering sufficient information and placing it in a format that is easily understood for decision making.

APPENDIX I

COMMENTS BY VICE PRESIDENTS CLAIMING THAT MICROS DID NOT LIVE UP TO THEIR EXPECTATIONS

-- Hard to collect and organize data necessary to support decision making environment. I have had some limited success but not as great as hoped for. Creating decision support systems is very time consuming and requires very good underlying data bases. Time and data are my major constraints.

-- Not yet. Soon!

APPENDIX J

OTHER REASONS BY VICE PRESIDENTS FOR NOT DIRECTLY USING MICROS FOR DECISION SUPPORT

-- Institution has long been committed to mainframe and network. Micro's are new on the scene here and well be used more during the 1990s.

-- I have used them at other institutions. When the funding becomes available, it will be useful.

-- We don't use micro's yet. We use main frame with terminals directly to mainframe. We are in the process of converting to a system which will be a combination of mainframe and PC (with access to mainframe).

-- Technology is new on campus - will not be available in this office for sometime!

-- We are a highly computerized college. Almost nothing is done manually. No administrators have secretaries. We employ a word processing center.

-- Nearest use in dept. research administration, computer systems, microsystems, program mgt.

-- Never had exposure over career.

-- Networking not completed in some areas.

-- We do not use micros in any part of our operation--we are hooked up through an administrative main frame system. Have considered use of micros--most of our needs are met through main frame.

-- most data comes to me from mainframe source and it rarely has been processed by microcomputers.

-- Because college mainframe holds all data.

-- Rely on supportive staff.

APPENDIX K

FREQUENCIES OF REPORTED PERCENT OF VICE PRESIDENTS' DECISIONS SUPPORTED BY THE USE OF DIFFERENT TYPE OF COMPUTER UNITS

--Frequencies of Reported Percent of Vice Presidents' Decisions Supported by the Use of Different Type of Computer Units

	% of Decisions						
Computer Unit	0	1-25	26-50	51-75	76-100	Missing Cases	N (% of N)
Microcomputers	16 (15.1)	45 (42.5)	24 (22.6)	13 (12.3)	3 (2.8)	5 (4.7)	106 (100%)
Minicomputers	84 (79.2)	7 (6.6)	5 (4.7)	3 (2.8)	2 (1.9)	5 (4.7)	106 (100%)
Mainframe	28 (26.4)	30 (28.3)	18 (17.0)	13 (12.3)	12 (11.3)	5 (4.7)	106 (100%)
Unknown Computer Source	92 (86.8)	7 (6.6)	1 (0.9)	1 (0.9)	0 (0.0)	5 (4.7)	106 (100%)
Other computer Sources	99 (93.4)	1 (0.9)	0 (0.0)	1 (0.9)	0 (0.0)	5 (4.7)	106 (100%)

APPENDIX L

FREQUENCIES OF REPORTED PERCENT OF MICROCOMPUTER GENERATED DATA BY VICE PRESIDENTS, SUPPORTIVE STAFF, AND EXTERNAL SOURCES TO SUPPORT DIFFERENT AREAS OF DECISION MAKING

--Percent of Microcomputer Generated Data by Vice Presidents to Support Different Areas of Decision Making

Area	% of Microcomputer Generated Data					Missing Cases	N (% of N)
	0	1-25	26-50	51-75	76-100		
Planning	51 (48.1)	29 (27.4)	10 (9.4)	6 (5.7)	5 (4.7)	5 (4.7)	106 (100%)
Budgeting	52 (49.1)	24 (22.6)	18 (17.0)	0 (0.0)	7 (6.6)	5 (4.7)	106 (100%)
Accounting	87 (82.1)	8 (7.5)	3 (2.8)	0 (0.0)	3 (2.8)	5 (4.7)	106 (100%)
Purchasing	90 (84.9)	7 (6.6)	4 (3.8)	0 (0.0)	0 (0.0)	5 (4.7)	106 (100%)
Facilities & Physical Plants	91 (85.8)	9 (8.5)	0 (0.0)	0 (0.0)	1 (0.9)	5 (4.7)	106 (100%)
Personnel Administration	71 (67.0)	16 (15.1)	13 (12.3)	1 (0.9)	0 (0.0)	5 (4.7)	106 (100%)
Public Relations	90 (84.9)	8 (7.5)	2 (1.9)	0 (0.0)	1 (0.9)	5 (4.7)	106 (100%)
Other Tasks	87 (82.1)	6 (5.7)	3 (2.8)	3 (2.8)	2 (1.9)	5 (4.7)	106 (100%)

--Percent of Microcomputer Generated Data by Vice Presidents' Supportive Staff to Support Different Areas of Decision Making

Area	% of Microcomputer Generated Data					Missing Cases	N (% of N)
	0	1-25	26-50	51-75	76-100		
Planning	39 (36.8)	34 (32.1)	14 (13.2)	2 (1.9)	12 (11.3)	5 (4.7)	106 (100%)
Budgeting	48 (45.3)	32 (30.2)	5 (4.7)	6 (5.7)	10 (9.4)	5 (4.7)	106 (100%)
Accounting	66 (62.3)	21 (19.8)	1 (0.9)	3 (2.8)	10 (9.4)	5 (4.7)	106 (100%)
Purchasing	80 (75.5)	12 (11.3)	1 (0.9)	2 (1.9)	6 (5.7)	5 (4.7)	106 (100%)
Facilities & Physical Plants	88 (83.0)	9 (8.5)	3 (2.8)	0 (0.0)	1 (0.9)	5 (4.7)	106 (100%)
Personnel Administration	60 (56.6)	26 (24.5)	11 (10.4)	3 (2.8)	1 (0.9)	5 (4.7)	106 (100%)
Public Relations	80 (75.5)	12 (11.3)	4 (3.8)	3 (2.8)	2 (1.9)	5 (4.7)	106 (100%)
Other Tasks	90 (84.9)	4 (3.8)	2 (1.9)	0 (0.0)	5 (4.7)	5 (4.7)	106 (100%)

--Percent of Microcomputer Generated Data by Sources External to the Office of Vice Presidents Used to Support Different Areas of Decision Making

Area	% of Microcomputer Generated Data					Missing Cases	N (% of N)
	0	1-25	26-50	51-75	76-100		
Planning	49 (46.2)	29 (27.4)	14 (13.2)	7 (6.6)	2 (1.9)	5 (4.7)	106 (100%)
Budgeting	45 (42.5)	21 (19.8)	19 (17.9)	4 (3.8)	12 (11.3)	5 (4.7)	106 (100%)
Accounting	62 (58.5)	21 (19.8)	5 (4.7)	0 (0.0)	13 (12.3)	5 (4.7)	106 (100%)
Purchasing	67 (63.2)	21 (19.8)	6 (5.7)	0 (0.0)	7 (6.6)	5 (4.7)	106 (100%)
Facilities & Physical Plants	73 (68.9)	16 (15.1)	7 (6.6)	0 (0.0)	5 (4.7)	5 (4.7)	106 (100%)
Personnel Administration	66 (62.3)	16 (15.1)	11 (10.4)	3 (2.8)	5 (4.7)	5 (4.7)	106 (100%)
Public Relations	77 (72.6)	8 (7.6)	7 (6.6)	3 (2.8)	6 (5.7)	5 (4.7)	106 (100%)
Other Tasks	95 (89.6)	2 (1.9)	0 (0.0)	4 (3.8)	0 (0.0)	5 (4.7)	106 (100%)

APPENDIX M

FREQUENCIES OF REPORTED PERCENT OF MICROCOMPUTER GENERATED DATA BY VICE PRESIDENTS AND SUPPORTIVE STAFF USING DIFFERENT TYPE OF MICROCOMPUTER SOFTWARE IN SUPPORT OF DECISION MAKING

--Percent of Microcomputer Generated Data by Vice Presidents Using Different Type of Microcomputer Software in Support of Decision Making

Microcomputer Software	% of Microcomputer Generated Data					Missing Cases	N (% of N)
	0	1-25	26-50	51-75	76-100		
Data Base	60 (56.6)	24 (22.6)	12 (11.3)	2 (1.9)	3 (2.8)	5 (4.7)	106 (100%)
Spreadsheet	59 (55.7)	25 (23.6)	12 (11.3)	4 (3.8)	1 (0.9)	5 (4.7)	106 (100%)
Graphics	70 (66.0)	27 (25.5)	3 (2.8)	0 (0.0)	1 (0.9)	5 (4.7)	106 (100%)
Word Processing/ Text Management	40 (37.7)	23 (21.7)	18 (17.0)	10 (9.4)	10 (9.4)	5 (4.7)	106 (100%)
Communication	78 (73.6)	13 (12.3)	5 (4.7)	3 (2.8)	2 (1.9)	5 (4.7)	106 (100%)
Project Management	83 (78.3)	15 (14.2)	2 (1.9)	0 (0.0)	1 (0.9)	5 (4.7)	106 (100%)
Other Microcomputer Software	96 (90.6)	4 (3.8)	0 (0.0)	0 (0.0)	0 (0.0)	5 (4.7)	106 (100%)

--Percent of Microcomputer Generated Data by Vice Presidents' Supportive Staff Using Different Type of Microcomputer Software in Support of Decision Making

Microcomputer Software	% of Microcomputer Generated Data					Missing Cases	N (% of N)
	0	1-25	26-50	51-75	76-100		
Data Base	44 (41.5)	30 (28.3)	14 (13.2)	6 (5.7)	7 (6.6)	5 (4.7)	106 (100%)
Spreadsheet	47 (44.3)	27 (25.5)	12 (11.3)	5 (4.7)	10 (9.4)	5 (4.7)	106 (100%)
Graphics	64 (60.4)	29 (27.4)	5 (4.7)	0 (0.0)	3 (2.8)	5 (4.7)	106 (100%)
Word Processing/ Text Management	25 (23.6)	11 (10.4)	24 (22.6)	15 (14.2)	26 (24.5)	5 (4.7)	106 (100%)
Communication	72 (67.9)	15 (14.2)	7 (6.6)	2 (1.9)	5 (4.7)	5 (4.7)	106 (100%)
Project Management	85 (80.2)	10 (9.4)	2 (1.9)	0 (0.0)	4 (3.8)	5 (4.7)	106 (100%)
Other Microcomputer Software	97 (91.5)	3 (2.8)	0 (0.0)	0 (0.0)	0 (0.0)	5 (4.7)	106 (100%)

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