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An analysis of Regional Occupational Center/program administrators' perceptions regarding the utilization of computer technology as a management tool

Sheila Riggs Keeling

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AN ANALYSIS OF
REGIONAL OCCUPATIONAL CENTER/PROGRAM
ADMINISTRATORS' PERCEPTIONS REGARDING THE UTILIZATION
OF COMPUTER TECHNOLOGY
AS A MANAGEMENT TOOL

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Education

by
Sheila Riggs Keeling
June 1995
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Approved by:

Dr. Ted Zimmerman, Advisor, First Reader

Dr. Ron Pendleton, Second Reader
This study surveyed all 72 superintendents and directors (administrators) of California's Regional Occupational Programs/Centers (ROC/Ps) which provide vocational training. It analyzed their perceptions regarding the utilization of computer technology in the management of their organizations.

Each administrator was asked questions regarding computer literacy (training and competence), computer usage (frequency and application), and attitudes/anxiety toward computers. They were also asked to provide information regarding availability of computer hardware and software.

Computer literacy results were mixed; administrators had had minimal formal training but were moderately competent, indicating that many were self-taught. Findings indicated that their personal computer usage was limited in both frequency and application. Equipment was generally available; almost all of the administrators had a microcomputer but only half had modems. Mainstream applications such as word processing, database, and spreadsheet programs were the most available and used, whereas management/information systems used in decision making were limited in both availability and usage. Attitude may have contributed toward minimal personal usage as a large percentage agreed with statements that others could do the computer work for them. Computer anxiety was found to be minimal, mainly due to prior experience with computers. It was concluded that ROC/P administrators had generally positive attitudes toward computer technology but were not using it to its greatest potential in the management of their organizations.
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CHAPTER ONE

Introduction

The computer revolution in the United States began in earnest during the 1980s with the introduction of microcomputers, and has continued to expand to the point where people's lives are touched by computers almost everyday. American business has been at the forefront of this revolution with an estimated fifty percent of the workforce using computers regularly on their jobs (Digest of Education Statistics, 1994).

Unfortunately, there is an apparent lag by education, in general, behind industry in terms of computer equipment and application of computer technology. Seaward points out that, historically, classroom equipment "has been obsolete by at least five years when compared to equipment in offices" (1983, pg. 247). Research on use of computer technology by administrators is limited, but what is available indicates that administrators are not taking advantage of the computer and its capabilities (Visscher, 1988; Holloway, 1989; Kearsley, 1990; & Picciano, 1993).

Despite the fact that educational institutions are beginning to employ more computer technology in instruction, primary administrative uses are clerical and business functions. Teachers are now being required to become computer literate; however, educational administrators are not. Many educational administrators do not personally use computers--have "hands on" experience--and are not considered computer literate. According to Kearsley, "If you are going to be responsible for administering schools full of computer literate teachers and students, then it follows that you better be computer literate yourself" (1990, pg. 3).
The apparent illiteracy of administrators can be attributed to many factors such as a lack of training and attendant unfamiliarity with computers, limited availability of equipment/software, misconceptions about computer technology, and anxiety toward computers. Much of the literature addresses problems with computer technology in terms of business executives, university administrators, public school administrators and teachers, but none has specifically addressed Regional Occupational Center/Program (ROC/P) administrators. ROC/Ps constitute a unique California system for providing vocational education and training, including computer literacy, to ensure a trained workforce. This study analyzed the perceptions of ROC/P administrators regarding the utilization of computer technology in the management of their organizations.

Background

Computer technology has seen vast changes over the last 50 years, from a room-sized system designed for scientific calculations to the desk-top and lap-top personal computers designed for processing all types of data. Despite improvements in computer technology and its potential for improving productivity, there is a segment of the population which is reluctant to become personally involved. This segment includes top-level executives (Boone, 1991) and educational administrators (Sidman, 1979; Gustafson, 1985; & Kearsley, 1990).

Educational administrators, including ROC/P administrators, are responsible for ensuring proper use of computer technology for both education and administration of their educational institutions. Ewell (1989)
addresses this responsibility in light of prior discussion as follows:

It seems paradoxical for senior administrators to make huge investments in computer technology to make sure that faculty have it in their laboratories, that students learn to use it in the classrooms, that clerical staff use it to make record keeping and other support services as efficient as possible, while at the same time these same administrators do not or cannot use the benefits of this technology in carrying out their own responsibilities (cited in Picciano, 1993, pg.96).

One of the reasons for this lack of use is limited or no training in computers. Most colleges and universities have not required computer literacy as part of their educational administration curricula until very recently, and some still do not require it (Garland, 1990; Holloway, 1989; Bosch, 1988; & Kearsley, 1990). Many ROC/P administrators were educated prior to these newly-instituted changes in curricula and attained their high-level positions without having to jump on the computer bandwagon.

Because of their lack of training, these individuals are unfamiliar with the potential uses for computers and that "they can also be used to experiment with varying patterns of staffing, student scheduling patterns and projecting possible future needs thus utilizing the computer to supply information vital to decision-making." (Sidman, 1979). Many people still have the mistaken belief that computers are good for only office administration and accounting tasks, or for typing letters and reports.

The lack of availability of hardware and software by educational institutions, including ROC/Ps, is a contributing factor to lack of personal use
and gaining a familiarity with computer technology. Budgets typically have not allowed for each individual within an organization to have a personal computer. Beaver (1991) points out that during the late 1980s, funding levels for computers declined dramatically. Because educational institutions are always subject to changing economic conditions and resultant budget cuts, administrators typically select high-cost items such as computers for reductions.

A final reason for lack of use relates to computer anxiety, also called computerphobia, which manifests itself as a fear and avoidance of computer technology. Because adults in high level positions have not grown up with computer technology as younger people today, they may experience anxiety when enrolled in a computer class or given a computer for their office. This researcher experienced just such a situation with Air Force civilian executives in the late 1980s; there was a reluctance to allow a computer in the office, and a resistance to learning how to use it. This was due partly to a general resistance to change that most people experience, but also because of a fear of failure in front of subordinates.

Discussions with a former Regional Occupational Program (ROP) director and a current ROP director confirmed the possibility that among ROC/P superintendents and directors, there is a lack of personal use of computer technology for decision-making and management similar to what has been discussed above regarding executives and school administrators. As a result, this study surveyed all 72 ROC/P administrators to analyze their perceptions regarding the utilization of computer technology.
Significance of the Problem

With the advent of a new political administration which has embraced a philosophy of cutting and consolidating government and government-funded programs, the ROC/P institution in California must be productive to stay in business. The increased, better use of computer technology by chief administrators to manage ROC/Ps can augment productivity and insure their institutions' survival by, for example, better reporting of numbers of students and their successes at locating employment and projecting future needs.

The information contained in this study reflects superintendents and directors' perceptions of computer technology and its uses in managing ROC/Ps. The study is significant because it points out whether or not they are using computer technology to its best advantage. It also shows County and State administrators/officials where budgets need to be increased to allow for additional computer training for ROC/P administrators, greater numbers and variety of computer technology, and development of executive and management information systems. Individual superintendents/directors can discern from the study where they can improve their use of technology to make more informed decisions.

Statement of the Problem

Many top level officials (executives) in all types of occupations have achieved their positions without having to sit in front of a computer terminal. These executives do not therefore understand computer technology and its potential for improving thinking and decision making. As a result of this lack of familiarity and an attendant lack of computer training, mentioned previously, these executives may also exhibit anxiety toward computers
(variously referred to as computerphobia, cyberphobia, and technophobia). It is hypothesized that ROC/P superintendents and directors fall into this category mainly because computer literacy has not been a requirement in the administration curriculum at the university level until recently, if at all. They may or may not use computer products generated by others but most likely do not personally use computers (usually referred to as "hands-on" use) and therefore do not know what computers are capable of doing. Because they may lack familiarity with computer technology and may experience anxiety at the prospects of learning how to use a computer, they could be missing out on ways to increase their productivity.

To determine whether or not this hypothesis was true, a study was needed to assess the perceptions of ROC/P superintendents and directors' perceptions of the use of computer technology; that is, whether or not they were personally using computer technology, what tools or applications they were using, and whether or not they had anxiety about using computers.

Purpose of the Study

The purpose of this study was to analyze the perceptions of ROC/P superintendents and directors regarding utilization of computer technology in the management of their organizations. It showed what decision-making, management tools (computer or manual) they were currently using, whether or not they were personally using computer technology, and whether or not they exhibited anxiety about using computers. Also included are data reflecting levels of training (computer literacy) and amounts/types of computer equipment available to these administrators.
Scope of the Study

Superintendents and directors of all ROC/Ps in California were surveyed to determine their perceptions regarding the use of computer technology to make decisions and manage their organizations; that is, to accomplish their jobs.

Research Questions

To determine the perceptions of ROC/P superintendents and directors regarding utilization of computer technology in the management of their institutions, the following research questions were developed as a basis for analysis:

1. Are ROC/P superintendents and directors computer literate; that is, have they been trained in computer technology and are they familiar with and know how to use it?
2. Are ROC/P superintendents and directors personally using computer technology to make decisions and manage their institutions?
3. Is there a high level of anxiety among ROC/P superintendents and directors about computer technology?

Limitations

Because the ROC/P is an institution unique to California, the data collected are only immediately relevant to these organizations. The data, however, can be generalized somewhat to public school administrators in areas where management functions are similar.
There is a wealth of information about the use of computer technology for educational instruction, such as CAI (computer-aided instruction), which will not be addressed. This study will deal only with administrative and/or management applications of computer technology.
CHAPTER TWO
Review of the Literature

Introduction
This literature review includes a brief history of computers in the United States, a look at the development of the ROC/P system in California, and a review of literature related to computer literacy (training and competence) of educational administrators, use of computers in educational administration, and computer anxiety. Because the ROC/P system is unique to California, it was deemed necessary to include a discussion of its development for background information on the subjects of the study. There is a lack of literature addressing ROC/P administrators; therefore, literature related to business executives, educational administrators, and teachers was considered germane to this study and included in this review.

Brief History of Computers in the United States: 1940 to Present
Computer technology has gone through various stages of development over the last 50 years. In the 1940s, extremely large and difficult-to-program computers such as the IBM Mark I and the ENIAC were developed and used to perform scientific applications consisting of complex calculations; for example, plotting missile trajectories (Gustafson, 1985).

The development of the silicon chip in the 1950s (Gustafson, 1985) facilitated the downsizing of computers and initiated a change in computing toward commercial, rather than scientific tasks. The principal use of computers was for automating clerical work, thereby increasing efficiency and reducing personnel (Boone, 1991). Computing in education, as late as
the mid-1950s, was limited to only a few large school districts, and would not reach most school districts until a decade later (Bozeman, Raucher, & Spuck, 1991).

Business computing in the 1960s continued to have an administrative focus, concentrating on mathematical, accounting, and clerical operations. During this period, computers consisted of primarily large mainframes which required a technical staff to operate. The earliest computer applications initiated by many school districts during the 1960s mirrored those of the business world, and consisted of payroll, financial reporting, and accounting which required almost all data processing time and resources (Bozeman, Raucher, & Spuck, 1991).

The late 1960s and early 1970s introduced changes in computer hardware and software. Hand-wired control panels necessary to operate 1950s hardware were no longer required, and equipment progressed from mainframes to smaller mini-computers. Database systems, called management information systems, came into being, and were used by business to capture data resulting from operational transactions which were then displayed on computer printouts rather than as typewritten reports (Boone, 1991). Word processing software was also introduced in the 1970s but was considered to be only a means for improving secretarial typing efficiency. The educational system increased its administrative use of computers to include operations such as personnel record-keeping, inventory control, attendance tracking, grade reporting, and student scheduling (Bozeman, Raucher, & Spuck, 1991). Most data processing in school districts was, and continues to be, handled by a full data processing department.
The free-standing microcomputer, or personal computer, was developed in the late 1970s, and its popularity continued to grow throughout the 1980s (Gustafson, 1985; Green & Gilbert, 1988; & Boone, 1991). Unfortunately, according to Boone (1991) the majority of these microcomputers were used by business as calculators and filing cabinets. Instructional computing, however, became more popular and economically feasible as a result of the availability of microcomputers (Bozeman, Raucher, & Spuck, 1991).

Since the development of the personal computer, many technological changes have occurred, leading to more powerful and effective computers, and more manageable and useful software programs which are available at affordable prices. Today's microcomputers resemble the minicomputer of the early 1970s and have more memory capacity than some of the mainframes introduced in the 1960s. Telecommunication improvements now make it possible to conduct face-to-face meetings with people who are geographically dispersed. Electronic mail (E-Mail) enables people to communicate at any time of the day or day of the week, and in any location. Changes continue to occur at an alarmingly fast pace with no abatement expected in the near future.

Development of the California ROC/P System

California initiated vocational education shortly after becoming a state with the development of the Mechanics Institute in San Francisco in 1854 (Smith, 1979). Since that time, vocational education has progressed through various delivery systems until the 1960s, when Federal monies for vocational
education increased tenfold, enrollments doubled, and a system of countywide vocational high schools was set in motion with the passage of California Senate Bill 1379 (Smith, 1979).

Because of resistance to the concept of separate trade schools by county superintendents, an amendment was passed in 1965 which removed the reference to separate trade schools in favor of regional occupational centers (ROCs) which would serve students from several school districts on a part-time basis. Students received instruction in general education courses at their home high schools and attended a center for vocational instruction, rather than receiving all instruction at one school (trade school) (Smith, 1979). The first ROC was created in 1967, and by 1970 there were 13. In 1967, the Senate Bill was further amended to include adults. The enactment of the Program Concept (ROP) in 1968 resulted in establishment of 15 ROPs by 1969. ROPs operate in the same manner as ROCs, except that multiple sites can be used for providing vocational education (ROC/P Operations Handbook, 1991).

The primary purpose behind California's establishment of ROC/Ps was to create a vocational education system to serve all students regardless of where they lived or attended school. "The concept of regionality was to allow for greater flexibility in program offerings and location, and to give students the opportunity to select from a larger number of course offerings than could be provided adequately, efficiently, and economically by a single school district" (ROC/P Operations Handbook, 1991, pg. 2).

ROC/Ps offer instruction to high school students and out-of-school youth and adults. Their purposes are to provide current, relevant instruction
which meets entry-level employment needs of their local communities, upgrading of skills and retraining, and counseling and guidance in vocational matters (Smith, 1979 & ROC/P Operations Handbook, 1991).

Today there are 72 ROC/Ps which are divided into three categories, as described in the ROC/P Operations Handbook (1991, pg. 5):

1. **Single District**
   a. Governing Board is the same as the district Board.
   b. Hires all teachers.
   c. Uses district services.

2. **Joint Powers**
   a. Joint venture of two or more school districts.
   b. Governing Board made up of elected representatives from each district's Boards.
   c. Hires most teachers directly.
   d. ROC/P handles most support services.

3. **County Operated**
   a. Governing Board is the same as the county Board.
   b. Teachers are district employees contracted by ROC/P.
   c. Both county and district services are used.
   d. Steering committee made up of representatives from participating school districts provides input to ROP administration.

Currently there are 6 single district, 25 joint powers, and 41 county operated ROC/Ps.

The ROC/P basic statement of philosophy is, "Through courses offered at each ROC/P, all students, both high school students and adults, shall have the opportunity to learn marketable skills in order to become gainfully employed" (ROC/P Operations Handbook, 1991, pg. 4).
Computer Literacy

One of the research questions in this study was whether or not ROC/P directors and superintendents were computer literate; that is, have they been trained in computer technology and are they familiar with and know how to use it? Since ROC/P directors and superintendents have not been the objects of a study in the area of computer literacy, the literature reviewed addressed educational administrators and teachers. This section will cover a definition of computer literacy, a discussion of literature addressing the lack of computer training and the concomitant need for computer training, and what should be included in administrative computer training programs. Because some studies on computer anxiety also address the need for training, it will be included in that section of the literature review as well.

Kearsley includes the following competencies as necessary for considering a school administrator computer literate:

- be able to explain basic computer terms and concepts
- be able to describe major hardware and software components
- understand the factors involved in evaluation/selection of hardware and software
- knowledge of administrative applications
- knowledge of instructional applications
- awareness of the social issues associated with computer use
- familiarity with the factors that affect successful use of computers
- awareness of future developments in computers and education (1990, pg. 5).

These competencies are consistent with those put forth by various researchers and organizations such as the Association of Computing Machinery (cited in Geisert & Futrell, 1984).
During the early years of the computer revolution, late 1970s to early 1980s, education was a reluctant participant. Degree-granting institutions neglected to include courses in computer competency in either teacher training programs (Masat, 1981) or educational administration programs (Gustafson, 1985; Cheever, et al., 1986; Kearsley, 1990; & Bozeman & Spuck, 1991). As a result, "large numbers of school administrators lack background and training in the computer field" (Bosch, 1988, pg. 331). Garland (1990), on the other hand, points out that her research shows a large number of institutions established computer laboratories in the 1980s and made an effort to ensure that their graduates were computer competent.

With the increased availability and affordability of computers, and the proliferation of computers throughout society during the intervening years from the early-1980s to the present, it would seem prudent for all educational institutions to have integrated computer courses into their education administration programs. According to Bozeman, Raucher and Spuck (1991) and Beaver (1991), that is still not the case, but the number doing so is expanding.

A number of studies confirm the lack of computer literacy on the part of educational administrators. Samuels and Holtzapple-Toxey's (1987) study of 266 Pennsylvania public school administrators found that a high percentage considered themselves as lacking in computer competency and needing training. Additionally, Bosch (1988) found that 85% of Virginia Beach elementary school administrators reported a lack of administrative microcomputer literacy training. This trend continued into the 1990's as evidenced by Beaver's (1991) study of 75 educational leaders from West
Florida which found that, for example, 75% cited their computer competence as nil/some (able to turn on/off a computer), and established that educational leaders lack technological competence. A more current study by Gordon (1993) of secondary technical education teachers in West Virginia found that 45% appeared to lack sufficient training in the use of the computer, further reinforcing Bozeman, Raucher & Spuck's (1991) and Beaver's (1991) contentions that higher educational institutions still are not requiring computer literacy as part of their educational programs.

Because educational administrators are viewed as leaders in their institutions, it is necessary for them to become computer literate to be not only effective users of technology, but effective managers of technology in the schools (Sidman, 1979; Kearsley, 1990; & Beaver, 1991). "Knowledge and proficiency in technology and applications of technology to education are essential to effective instructional leadership, expert decision making and competent management" (Bozeman & Spuck, 1991, pg. 515).

There is considerable divergent thinking as to what computer training is necessary for educational administrators. Bosch's study of elementary school administrators found training needs in the following areas: "(a) knowledge of instructional uses of microcomputers, (b) knowledge of administrative uses of microcomputers, and (c) knowledge of computer capabilities and constraints in education and administration" (1988, pg. 333). A different perspective resulted from Bozeman and Spuck's (1991) study of Florida and Texas faculty which found that instructional applications were rated least important, and the most important topics were database management systems, spreadsheets, and word processing. Holloway (1989),
on the other hand, notes that an introductory skill level must be assumed at the university level, and that computer classes for administrators should be redesigned from introductory topics (history of computers, programming, technical knowledge, and fundamental computer concepts) to include applications such as spreadsheets, database management, problem solving and statistical analysis. Samuels and Holtzapple-Toxey (1987) conclude that administrators realize that they do not need to become computer experts but they do recognize the need to become computer users.

One of the key points mentioned by many researchers is that until an executive or administrator has hands-on experience with a computer, he or she cannot fully understand its capabilities (Pogrow, 1985; Boone, 1991; Kearsley, 1990; Beaver, 1991; & Gordon, 1993). This lack of understanding can greatly diminish both the administrator’s use of computers and support of technological change and/or microcomputer growth in education.

**Computer Usage in Educational Administration**

Much of the literature on use of technology in education deals with the computer as an instructional tool. Literature about administrative computer use mainly relates to how to set up a computer system in the institution, what to purchase, how to integrate it into the organization, who should be in charge, and the applications available. These computer technology applications (normally entrusted to data processing departments) vary, but a fairly representative model is set forth in Figure 1 (Bozeman & Spuck, 1991, pg. 5). This list is consistent with functions identified by Sidman (1979), Gustafson (1985), Cheever, et al. (1986), Bosch (1988), Garland (1990), and
Student Applications
1. Student scheduling
2. Class registration
3. Grade reporting-transcripts
4. Daily/summary attendance accounting
5. Student & family demographic information
6. Health records
7. Instructional management
8. Test scoring & reporting
9. Tuition & fee statements
10. Class lists

Financial Applications
1. Budget Systems
2. Accounts receivable-payable
3. General ledger
4. Purchase orders
5. Salary schedule analysis
6. Negotiations

Facilities and Equipment
1. Space utilization & room assignments
2. Inventories
3. Maintenance scheduling
4. Energy utilization management & control

Research & Planning
1. Budget analysis
2. Bus routing
3. Statistical analysis
4. Testing & evaluation
5. Project planning & control
6. Enrollment analysis & projection

Personnel Applications
1. Payroll & check writing
2. Personnel records
3. Faculty & staff assignments
4. Certification records
5. Health records
6. Tax information & tax reports
7. Benefits management (insurance, retirement)

Library Systems
1. Circulation
2. Catalogs
3. On-line database search
4. Acquisitions-purchasing
5. Inventory

Office Applications
1. Word processing
2. Filing & database systems
3. Electronic & voice mail
4. Desktop publishing
5. Presentation graphics
6. Spreadsheets

Figure 1. Typical Computer Technology Administrative Applications in Education
Kearsley (1990). Information about how educational administrators are personally using, or should be using, microcomputers to manage their institutions is limited as confirmed by Picciano (1993).

In education, computers have been viewed as instructional media and tools for teaching computer programming, as tools used by the data processing department to prepare payrolls, or as tools used by secretaries for typing letters and reports. They have not been seen as "tools for writing, problem solving, decision making, data collection, creative expression, or communication" (Kearsley, 1990, pg 2). Reasons for this abound, but the one most commonly identified is a lack of understanding of the computer's capabilities which can be attributed to insufficient training and experience.

Computer use by Americans has increased dramatically in the last ten years; as of October 1993, 46% of workers, 49% of teachers, and 72% of business executives (including administrative and managerial) now use computers in their jobs (Digest of Education Statistics, 1994). In spite of these impressive numbers, there is one segment of the population that appears to have been left out of the computer revolution, the school administrator. Some administrators do personally use computer technology, but there are a great many who either do not use computers, or do not use them to their greatest potential. There have been few studies done in this area; but those that have been done have clearly shown there exists a lack of computer technology use by administrators. All (1986) studied 30 school administrators who had completed post-secondary computer training as part of their programs, and found a large discrepancy between potential administrative applications and actual use (mainly word processing), and that the frequency of use was almost nonexistent (cited in Holloway, 1989).
Naron and Estes (1986) also found a low level of use (10-25%) by administrators of the 25 institutions they studied (cited in Holloway, 1989). The results of Visscher's (1988) study show that computers are used only by clerical staff and not by managers. A 1990 survey by Picciano (1993) of 400 college presidents showed that over time, the level of usage has not increased rapidly at the higher levels of administration; most did not use the computer directly except for doing word processing. Senior administrators in the Picciano (1993) survey did not use computers but relied on computer-generated reports prepared by others. Despite the high number (72%) previously reported in the statistics for business executive use, most chief executive officers do not actually use computers as shown by Boone's (1991) research, and corroborated by Williams (1994) who reports consultants generally state that 85% of executives are computer illiterate.

One reason for lack of use, reinforced by Kearsley's (1988) study of principals, is that the extent of use depends on the level of understanding; a low level of understanding or knowledge of computers leads to a low level of use. Other reasons for lack of personal use by executives include: (1) an impression that computer keyboarding is typing, and beneath an executive; (2) a fear that the computer will replace the secretary who is considered by many as a status symbol; (3) a mistaken belief that one must be able to type in order to use a computer, and many executives do not have typing skills; (4) perceived difficulty in training to use new equipment; (5) an attitude that others can do the actual computer work, as evidenced by Picciano's (1993) study of college presidents; (6) a belief that there is not enough time to attend training classes; and, (7) a general view that the computer does not have
relevance to what executives do (Seaward, 1983; Brod, 1984; Boone, 1991; & Craig, 1994). As a result of interviews with chief executive officers who use computers, Boone provides rebuttals to these misconceptions or misbeliefs, and states "it is important to dispel these myths, because they have been largely responsible for the slow growth of executive computing" (1991, pg. 239). This can also be said for educational administrative computing. However, those who do have hands-on experience with computers have discovered its many benefits in time management, decision making, strategic planning, and communications.

The benefits of personal computer usage are many. They include, but are not limited to, leveraging time, managing complexity, thinking creatively, and improving communications. One of the most important contributions of the computer to leveraging time and improving communications is the way it supports asynchronous work (working and communicating independently of time and location). By having access to people and information around the clock (especially with the addition of a laptop or home computer, modem, and electronic mail), the executive or administrator is able to think, work, and communicate without everyday distractions, during free time. This can "add minutes or hours to an executive's day, speed and improve decision making, increase the amount of work an executive is able to accomplish, and allow executives better control of their time" (Boone, 1991, pg. 245).

Educational administrators, like other executives, are constantly deluged with data. One of the ways to "synthesize data into understandable patterns of usable information," or manage complexity, is to use databases, spreadsheets, management information systems and integrated data systems (Bozeman, Raucher, & Spuck, 1991, pg. 71). In this way administrators can
better understand the dynamics at work rather than by examining voluminous printed reports, or having to wait for others to develop them.

The California State Department of Education sees the computer on the administrator's desk as a way to reduce the mountains of paperwork which inundate them; a means of independence because the administrator can pull up information immediately rather than waiting on someone else to locate it; and, a tool to increase efficiency by enabling the administrator to secure more information when planning budgets, and by allowing for "what if" questions regarding changing budgets and student enrollments (Software Guide, 1987). Through the use of spreadsheets and databases, one ROP director was able to reduce the normal 10-15% error rate of predicting accumulative positive attendance to less than 1%. Hands-on computer use can provide insight into all aspects of educational administration and "with insight comes more accurate projections, better response to daily problems, and more control over the shape of future budgets" (Software Guide, 1987, pg. 9).

In addition to spreadsheets which can give administrators a sense of power over their budgets and the confidence to defend them (Cheever, et. al., 1986 & Kearsley, 1990), there are systems to support both operational and strategic management decisions, referred to as management information systems, and decision support systems and executive information systems, respectively. These systems pull information from multiple sources and rely on integrated applications of word processing, spreadsheets, databases, and graphics to aid decision makers in gaining practical access to data, manipulating it, and converting it into forms (such as longitudinal or comparative analysis, and models for forecasting or statistical summaries) to
be used in decision making and planning (Cheever, et al., 1986; Gustafson, 1985; Green & Gilbert, 1988; & Kearsley, 1990). But, despite the immediacy, availability and manipulation of data made possible by computers, "computers cannot make poor managers better administrators... Computer systems are designed to make good administrators more efficient" (Pogrow, 1985, pg. 52).

Computer Anxiety

"The emergence of computers, particularly the introduction of the personal and professional microcomputers, has led to a concern about the emotional reaction to them" (Cambre & Cook, 1985, pg. 37). As a consequence, a number of researchers have developed the concept of computer anxiety, also known as computerphobia, computer fear, technoanxiety, technostress, and technophobia. They have also sought to define it, determine its causes, and develop ways to alleviate it. These will be addressed in this subsection.

Many variations on the definition of computer anxiety abound but most refer to fear, ambivalence, apprehension or reluctance on the part of the user when planning to interact or when actually interacting with computers (Jay, 1981; Brod, 1984; Cambre & Cook, 1985; & Gordon, 1993). Coovert and Goldstein (1980) demonstrated that computer anxiety is experienced by people who have an externalized locus of control; they perceive their lives as being affected by events they cannot control, and they have a generalized fear of technology which can result in high levels of frustration and anxiety. To this person, the computer is a "... powerful, inhuman, controlling entity
which has only served to complicate his work tasks" (Baumgarte, 1984, pg. 2).

An entirely different opinion is espoused by Yeaman who believes that "computer anxiety is a label that blames victims" (1992, pg. 22). Instead of placing the blame on "victims," he thinks the focus should be on causes such as poorly designed computers, applications, instructional materials, and instruction; low quality instructional hardware and software; and, a lack of questioning about the usefulness of computers.

Several demographic variables and their relationship to computer anxiety have been cited in the related literature; however, very little information exists on computer anxiety of educational administrators. Only one study by Honeyman and White (1987) was found to have included administrators as subjects, but the results and conclusions were directed mainly at teachers.

A number of studies have sought to determine if gender, age, position (year in school, job title) and experience or exposure to computers can be correlated with computer anxiety or attitudes toward computers. Honeyman and White (1987) studied faculty enrolled in computer applications courses over a two year period and determined that gender, age, and position did not significantly affect computer anxiety; however, they found that exposure and experience can lessen anxiety. Massoud's (1991) study of 252 adult students in Texas also found no age-related correlation, and that computer knowledge significantly reduced anxiety. A study of 181 college students by Carlson and Wright (1993), utilizing the Anxiety subscale of Loyd and Gressard's Computer Attitude Scale (see Chapter Three), determined no correlation with gender, age, or position which is consistent with their findings. They also
found that those with prior computer experience exhibited less anxiety. A slightly different finding resulted from Gordon's (1993) study of 118 secondary technical education teachers; those with the lowest skills, especially typing, showed the highest levels of anxiety. Despite this apparently negative connection between experience and anxiety, it was hypothesized that the high anxiety resulted from a lack of sufficient training and/or experience. Another study, using Loyd and Gressard's Computer Attitude Scale and replicating their findings, was done by Dyck and Smither (1994) of over 400 subjects. The significant finding was that higher levels of computer experience were associated with lower levels of computer anxiety. These studies support a conclusion that experience or exposure to computers has a significant effect on computer anxiety.

Researchers who have attempted to study ways to reduce computer anxiety have discovered that course structure and teaching methods which take into consideration computer anxiety do lessen computer anxiety. Lawton and Gerschner (1982) suggest it is most important to take into consideration the computer's impact on people when designing courses. Baumgarte (1984) stressed the need to understand anxieties such as locus of control problems and to develop teaching strategies to reduce anxiety in courses. It is interesting to note Carlson and Wright (1993) had an unexpected finding that computer anxiety increased pre- to post-course testing, which is counter to previously-discussed literature about experience decreasing anxiety. They attribute this finding to the fact that the course was not designed to address computer anxiety, thereby confirming Baumgarte's conclusion.
Woodrow (1991) discovered that knowledge based on actual experience with computers can be effective in developing positive attitudes toward computers. This finding was confirmed by Savenye, Davidson and Orr (1992) who studied 68 preservice teachers enrolled in a five week course. They concluded that a computer literacy course designed to teach considerable knowledge and provide in-depth experience diminished anxiety toward computers. Overbaugh, in studying 154 preservice education majors, found that

... computer anxiety may be more effectively reduced in a short period of time [six hours] through the use of an application that requires little knowledge about the computer itself than through a highly structured and concentrated survey of computer terminology, uses, architecture, and elementary programming (1993, pg. 11).

Honeyman and White (1987), however, are of the opinion that 60 hours of computer training are needed to reduce computer anxiety. Pina and Harris (1994) put forth 22 strategies to reduce anxiety such as using friendly computers, hands-on experience, and cooperative learning strategies which have met with success according to course evaluations and interviews with students who have taken their courses.

Yeaman (1992) presents an opposing viewpoint; he does not agree that computer literacy instruction is the solution for computer anxiety. "Students should not be taught that they are computer anxious and that they have to be mentally fitted to accept the limits of computer programs" (pg. 25). He argues that when technology is mysterious or deficient, people have the right to resist it, and that resistance should not be called computer anxiety, considered by some a pathological state or major barrier to learning to use computers. Despite Yeaman's views, the majority of literature confirms that
instruction which takes into consideration computer anxiety and provides experience, does lessen anxiety and ensure that students have more positive attitudes toward computers.

Summary

This literature review provided a brief history of computers in the United States, and included the development of both hardware and software and how it is used by business and educational institutions. The development of the ROC/P system in California was addressed focusing on its legal framework; its history; its goals, purposes, and objectives; and, its organization.

Literature related to computer literacy (training and competence) revealed that there has been limited computer training provided for educational administrators, and that they lack computer literacy. Literature also showed that the usage of computers by executives and administrators is limited in both type and amount. Even though literature on educational administrators' anxiety is almost nonexistent, the literature review revealed that experience lessens computer anxiety.
Introduction

This study examined ROC/P administrators' perceptions of utilizing computer technology as a management tool. The three areas of focus were computer literacy, computer usage, and attitudes toward computers and computer technology.

Study Participants' Demographics

Subjects selected to participate in this study were the leaders of all California ROC/Ps which included northern, central, coastal, and southern areas of the state. Questionnaires were mailed to a total of 72 individuals, variously identified as superintendents, directors, principals and administrators. They were asked to complete the questionnaires themselves and to not pass them to assistants because the study was designed to analyze their personal perceptions, as leaders, of the use of computer technology to manage their organizations.

These administrators perform essentially similar tasks of managing an educational institution with varying degrees of complexity dependent upon the size and type of their organizations; that is, single district, joint powers, or county-operated and center or program (see descriptions in Chapter Two).

The only other demographics available to the study were as follows:

Sex: 54 males and 18 females
Age: 30s to late 50s
Availability of computer hardware and software: See discussion in Chapter Four

Age and sex demographics did not appear to significantly influence the results of the study; experience with computers, which did have some influence, is addressed in Chapter Four.

Names and addresses of administrators were obtained from the California Association of ROC/Ps (CAROC/P) (Personnel Directory, 1994). A listing of the ROC/Ps surveyed, not the names of the individuals, is included as Appendix A.

Research Design

Research designs considered for this study were ethnographic and descriptive. An ethnographic design involving interviews with ROC/P administrators was considered the best approach for obtaining valuable information about their views of computer technology as it affected their jobs. This method would have allowed for in-depth probing of their personal computer usage by, for example, being able to explain concepts and terms, and of their attitudes toward computers by personal observation. The major reason for discarding this research design was that there would have had to be a sample of subjects chosen because not all 72 administrators could be interviewed within the time allotted for conducting the study. Since the researcher's goal was to survey the entire population of ROC/P administrators and to analyze their existing situations and attitudes, a descriptive research design utilizing a survey was determined the better approach.

This nonexperimental, descriptive research was designed to analyze ROC/P administrators' perceptions of utilizing computer technology in the
management of their organizations by surveying their computer literacy (competence and training), computer usage, and attitudes/anxiety toward computer technology.

**Basis of the Instrument**

The instrument (Appendix B) used in this study requested responses to 39 questions dealing with computer usage, training, experience, and attitudes.

**Instrument Development**

As a result of the literature research, two studies were found to contain survey data regarding computer usage, training and experience which were pertinent to this effort. Toris's 1984 questionnaire entitled "Perspectives on Computers," developed to measure computer anxiety of faculty, staff and students, contains a section on computer experience and usage which was modified slightly and included in this study's survey. The majority of survey questions dealing with computer usage (including amount of time and purposes), computer competence, and training were extracted from Beaver's 1991 survey of technological competence of educational leaders in West-Central Florida. Additional questions were developed by the researcher to elicit information about availability of computer equipment and ROC/P administrators' personal use of computers.

The attitude portion of the survey included all questions on the Computer Anxiety Subscale of Loyd and Gressard's (1984) Computer Attitude Scale. Questions dealing with computer attitudes were developed by the researcher based on reasons for, or barriers to, executives' lack of computer usage as enumerated in the literature (Seaward, 1983; Boone, 1991;
& Picciano, 1993). The comprehensive survey developed from these models was designed to gather data in three areas: computer training and experience, usage, and attitude/anxiety.

There were six response items addressing computer training and experience (variables 2, 7, and 10-13), nine dealing with usage (variables 1, 3-6, 8-9, 14, and 15), and 24 reflecting attitudes/anxiety (variables 16-39).

To maximize return, the instrument was designed to be short, easy to understand, and quickly answered. The questionnaire was limited to two pages, and contained 39 questions. All questions which were subject to interpretation contained examples or explanations; for example, "advanced" computer competence was defined as able to create a database/spreadsheet. Questions were mainly closed-form requiring yes/no, checklist, and five point Likert scale responses. The Likert scale was chosen for the anxiety and attitude portion of the questionnaire because it allowed respondents to express their beliefs or opinions about statements in the form of "strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree."

Two open-form questions (subset of question 10) asked for information about type of degree and year obtained to validate the literature which stated that computer literacy was not, and is still not, a component of higher level school administration education. In order to obtain an accurate picture of administrators' personal use of computer technology, an open-form question (subset of question 9) was designed allowing them to write in administrative or managerial functions for which they used a computer that were not included in the checklist.
Methods and Procedures

An interview was conducted with a current ROP director during survey development to determine areas for questioning and the feasibility/adequacy of previously-developed survey questions. Based on this information, changes were made to the survey to increase specificity in the areas of usage and expertise.

Names and addresses of ROC/P directors and superintendents were obtained from the CAROC/P 1994/5 personnel directory. A total of 72 individuals were surveyed by mail.

It was anticipated that a fairly high number of surveys would not be returned because ROC/P administrators have heavy schedules with numerous demands on their time. To increase survey response and lend validity to the survey, a letter of endorsement from the President of the CAROC/P was included. He was asked to review the survey instrument and countersign a letter (Appendix C) to ROC/P administrators which expressed his approval and support of the study. The letter was also signed by the California State University at San Bernardino Master of Arts faculty advisor for Vocational Education. To further encourage participation in the survey, the CAROC/P President independently decided to discuss it and urge support for it at a monthly meeting of the association's representatives.

The survey consisted of a two-page questionnaire (Appendix B). A cover letter (Appendix C), addressed to individual directors and superintendents, provided information about the survey and instructions for completion. Respondents were advised to return questionnaires in enclosed self-addressed, stamped envelopes which contained no identifying marks to preserve their anonymity. They were offered a summary of the completed
study upon notification of the researcher by separate letter or electronic mail. Questionnaires were mailed on 15 February 1995, and were returned by 9 March 1995. A total of 58 responses were received from the 72 individuals sent the survey, for a very representative response rate of 80%. Because of this high rate of return, no follow-up mailings were undertaken.

Reliability and Validity

Questions relating to computer experience, usage, and training were extracted from surveys used by Beaver (1991) and Toris (1984), with slight modifications and additions (additional software applications). Resulting responses indicate that these questions were adequate for measuring computer literacy (training and competence) and computer usage.

The computer attitude section of the survey included Loyd and Gressard's (1984) Computer Anxiety Subscale of their Computer Attitude Scale. This scale was designed to measure respondents' perceptions of their anxiety in different situations involving computers. Marcoulides stated "the scale has a test-retest reliability coefficient of .77, and an internal consistency alpha coefficient of .97" (cited in Dyck & Smith, 1994, pg. 242). According to Woodrow (1991) who compared four computer attitude scales, her study showed the Computer Attitude Scale had the highest reliability coefficient (0.94) which compared favorably to the 0.95 value reported for teachers enrolled in computer development programs as studied by Loyd and Loyd (1985) and by Gressard and Loyd (1986). Woodrow also noted that the reliability coefficient of the Computer Anxiety Subscale (0.80) was consistent with findings of Loyd and Gressard (1984 & 1986) and supported their claim of consistent results. Studies of adults by Massoud (1991)
indicated that this attitude subscale had a reliability coefficient of 0.78, while Dyck and Smither (1994) reported a 0.87 reliability coefficient as a result of their study. These studies and others, including one by Carlson and Wright (1993), indicate a consistent reliability upon which to base this part of the survey; that is, ROC/P administrators' anxiety toward computers.

Only one subscale, Computer Anxiety, of Loyd and Gressard's (1984) Computer Attitude Scale was used because of limited space and relevancy. The questionnaire was limited to two pages to ensure responses, with the majority of space consumed by questions relating to computer literacy (competence and training) and usage. The other subscales, Computer Liking and Computer Confidence, were considered irrelevant to the study since the researcher was mainly interested in computer anxiety. Reliability and validity were not compromised because as Woodrow's (1991) and Gressard and Loyd's (1986) studies found, this subscale is stable enough to be used separately.

Computer attitude questions were developed by the researcher based on a literature review which revealed numerous reasons why executives do not use computers (Seaward, 1983; Boone, 1991; & Picciano, 1993). No reliability information exists for these questions because they were developed for this study. These questions were included to determine if ROC/P administrators possessed any attitudes which were barriers to utilizing computer technology.

A sample instrument was reviewed by a former and current ROP Director who suggested changes. The final survey was approved and determined adequate to measure the variables of computer literacy, usage, and attitude/anxiety.
Data Analysis

The data were analyzed to determine the computer literacy (competence and training) of ROC/P superintendents and directors, their personal usage of computer technology to make decisions and manage their institutions, and their levels of anxiety about computer technology.

The data were tabulated and analyzed (see Tables 1-15) by the three problem areas: training, usage and attitude. The data were then analyzed for significant differences, trends, and correlations as detailed in the next chapter.
CHAPTER FOUR
Findings

Introduction

This study was designed to determine the perceptions of ROC/P superintendents and directors regarding use of computer technology in the management of their organizations. Surveys were mailed to all (72) superintendents and directors, and there was an 80% rate of return. Survey questions were concentrated into three major areas: computer literacy, including training and competence, (variables 2, 7, and 10-13); computer usage (variables 1, 3-6, 8-9, 14, and 15); and, computer attitudes and anxiety (variables 16-39).

Findings are set forth in three sections addressing the following research questions:

1. Are ROC/P superintendents and directors computer literate; that is, have they been trained in computer technology and are they familiar with and know how to use it?
2. Are ROC/P superintendents and directors personally using computer technology to make decisions and manage their institutions?
3. Is there a high level of anxiety among ROC/P superintendents and directors about computer technology?

Findings: Research Question #1

To answer the question "Are ROC/P superintendents and directors computer literate; that is, have they been trained in computer technology and are they familiar with and know how to use it?" the survey instrument asked
for responses to queries regarding personal computer experience, personal
computer competence, and amount of computer training. Variables 2, 7, and
10-13 were analyzed for this discussion.

All but one administrator responded that they had had some experience
with a computer. The majority (87.9%) of administrators had positive
(32.8%) or very positive (55.2%) experiences with computers, as shown in
Table 1 below.

Table 1
Personal Computer Experience
Variable 2

<table>
<thead>
<tr>
<th>Rating</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Negative</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Negative</td>
<td>2</td>
<td>3.4</td>
</tr>
<tr>
<td>Neither Positive nor Negative</td>
<td>5</td>
<td>8.6</td>
</tr>
<tr>
<td>Positive</td>
<td>19</td>
<td>32.8</td>
</tr>
<tr>
<td>Very Positive</td>
<td>32</td>
<td>55.2</td>
</tr>
<tr>
<td></td>
<td>58</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Each administrator was asked to rate his or her own computer
competence as there was not enough time or space to actually test their
knowledge. The choices available to them were defined as follows:

None
Some (Example: Edit, save, print word processing documents)
Moderate (Example: Edit, save, print database/spreadsheet)
Advanced (Example: Create database/spreadsheet)
Expert (Example: Complex functions/programming)
All but two administrators (97%) showed at least "some" degree of computer competence, and over 60% rated between "moderate" and "expert" (see Table 2 for breakdown of ratings).

Table 2
Personal Computer Competence Rated by Administrators
Variable 7

<table>
<thead>
<tr>
<th>Rating</th>
<th>( n )</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>2</td>
<td>3.4</td>
</tr>
<tr>
<td>Some</td>
<td>19</td>
<td>32.8</td>
</tr>
<tr>
<td>Moderate</td>
<td>20</td>
<td>34.5</td>
</tr>
<tr>
<td>Advanced</td>
<td>16</td>
<td>27.6</td>
</tr>
<tr>
<td>Expert</td>
<td>1</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Table 3
Computer Training: Number of Computer Courses Taken by Administrators
Variables 10, 12, & 13

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>1</th>
<th>2</th>
<th>3 or More</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( n )</td>
<td>53.0</td>
<td>4.0</td>
<td>0</td>
<td>1.0</td>
</tr>
<tr>
<td>%</td>
<td>91.4%</td>
<td>6.9%</td>
<td>0%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Outside Work</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( n )</td>
<td>32.0</td>
<td>15.0</td>
<td>3.0</td>
<td>8.0</td>
</tr>
<tr>
<td>%</td>
<td>55.2%</td>
<td>25.9%</td>
<td>5.2%</td>
<td>13.8%</td>
</tr>
<tr>
<td>Administrative Apps</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( n )</td>
<td>48.0</td>
<td>4.0</td>
<td>4.0</td>
<td>2.0</td>
</tr>
<tr>
<td>%</td>
<td>82.8%</td>
<td>6.9%</td>
<td>6.9%</td>
<td>3.5%</td>
</tr>
</tbody>
</table>
Computer training was analyzed in several areas: how many training classes, if any, were provided as part of a degree program; how many hours of computer training were provided at work; how many courses were taken outside of work (on their own); and, how many courses were taken in administrative applications. Tables 3 and 5 provide summaries of these areas of training, and Table 4 expands on degree program training.

An analysis of the data shows that over 90% of ROC/P administrators received no computer training as part of their degree programs (see Table 3). To determine if literature was correct regarding lack of computer training in degree programs continuing to present day, the survey asked respondents to

Table 4
Lack of Computer Training in Degree Programs
Variable 10

<table>
<thead>
<tr>
<th>Year Obtained</th>
<th>No Courses</th>
<th>One Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>1959-1969</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>n</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>%</td>
<td>21.21%</td>
<td>0.0%</td>
</tr>
<tr>
<td>1970-1979</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>n</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>%</td>
<td>33.33%</td>
<td>6.06%</td>
</tr>
<tr>
<td>1980-1986</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>n</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>%</td>
<td>21.21%</td>
<td>0.0%</td>
</tr>
<tr>
<td>1990-1995</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>n</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>%</td>
<td>12.12%</td>
<td>6.06%</td>
</tr>
<tr>
<td>Total n</td>
<td>29</td>
<td>4</td>
</tr>
<tr>
<td>Total %</td>
<td>87.87%</td>
<td>12.12%</td>
</tr>
</tbody>
</table>
write in their degree program and year obtained. Out of 58 people responding to the survey, only 33 completed these two questions. Twenty-two of these people obtained degrees in education (or school) administration or management. Year of degree varied from 1959 to 1995, providing a good view of the progression of training in degree programs over a wide range of years. As delineated in Table 4, there is no significant difference in computer training provided by degree programs between the years 1959 and 1995.

Computer courses provided for administrators at work were limited. Approximately one-third of the surveyed population had received no computer training through their work, and another one-fifth had received less than three hours of training (see Table 5). Viewed in a more positive light, over 72% of superintendents and directors have been able to obtain some computer training on the job; that is, from "three hours or less" to "more than 30 hours."

Table 5
Hours of Computer Training Provided at Work

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>(n=16)</td>
<td>27.6%</td>
</tr>
<tr>
<td>Less than 3</td>
<td>(n=12)</td>
<td>20.7%</td>
</tr>
<tr>
<td>3 to 6</td>
<td>(n=14)</td>
<td>24.1%</td>
</tr>
<tr>
<td>6 to 30</td>
<td>(n=11)</td>
<td>19.0%</td>
</tr>
<tr>
<td>More than 30</td>
<td>(n=5)</td>
<td>8.6%</td>
</tr>
</tbody>
</table>

In spite of a minimum amount of computer training on the job, a majority of respondents (55%) had not supplemented this lack by taking
computer courses on their own (see Table 3). Very few computer courses oriented toward administrative applications had been taken by ROC/P superintendents and directors; that is, only 17% had taken one or more of these types of courses (see Table 3).

Findings: Research Question #2

The survey asked questions about access to computer hardware and software, amount of usage, and personal use of computers (type of software and functions performed) in order to address the research question "Are ROC/P superintendents and directors personally using computer technology to make decisions and manage their institutions?". Variables were analyzed in the following categories: variables 4 and 8, access to computer equipment and software applications; variables 3, 5, and 6, location/purpose and frequency of usage; variables 8, 14, and 15, computer applications personally used by administrators; and, variable 9, managerial/administrative functions for which administrators personally use computers.

Table 6
Access to Computer Equipment ($N=58$)

<table>
<thead>
<tr>
<th>Access</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>(n=01)</td>
<td>01.7%</td>
</tr>
<tr>
<td>Microcomputer at Work</td>
<td>(n=53)</td>
<td>91.4%</td>
</tr>
<tr>
<td>Modem at Work</td>
<td>(n=30)</td>
<td>51.7%</td>
</tr>
<tr>
<td>Laptop Computer</td>
<td>(n=30)</td>
<td>51.7%</td>
</tr>
<tr>
<td>Microcomputer at Home</td>
<td>(n=45)</td>
<td>77.6%</td>
</tr>
<tr>
<td>Modem at Home</td>
<td>(n=25)</td>
<td>43.1%</td>
</tr>
</tbody>
</table>
As demonstrated in Table 6, there is wide access to computer equipment. Most ROC/Ps provide at least a microcomputer for use by administrators (91.4%), and over half have access to a laptop computer. It is surprising to note that over three-quarters of them also have a microcomputer at home. Table 7 lists computer applications available at each ROC/P for administrative purposes. The most available applications are word processing (100%), electronic spreadsheets (91.4%), database management systems (87.9%), desktop publishing programs (84.5%), and graphics (77.6%).

Table 7
Computer Applications Available at ROC/Ps for Administrative Purposes

<table>
<thead>
<tr>
<th>Application</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spreadsheet</td>
<td>53</td>
<td>91.4</td>
</tr>
<tr>
<td>Database Management System</td>
<td>51</td>
<td>87.9</td>
</tr>
<tr>
<td>Word Processing</td>
<td>58</td>
<td>100.0</td>
</tr>
<tr>
<td>Desktop Publishing</td>
<td>49</td>
<td>84.5</td>
</tr>
<tr>
<td>Charts/Graphs</td>
<td>45</td>
<td>77.6</td>
</tr>
<tr>
<td>Telecommunications (E-Mail)</td>
<td>30</td>
<td>51.7</td>
</tr>
<tr>
<td>Data Integration</td>
<td>19</td>
<td>32.8</td>
</tr>
<tr>
<td>Local Area Network</td>
<td>24</td>
<td>41.4</td>
</tr>
<tr>
<td>Executive Information System</td>
<td>7</td>
<td>12.1</td>
</tr>
<tr>
<td>Management Information System</td>
<td>24</td>
<td>41.4</td>
</tr>
<tr>
<td>Project Management System</td>
<td>10</td>
<td>17.2</td>
</tr>
</tbody>
</table>
To further define usage by ROC/P administrators, frequency of use (variables 3, 5, and 6) was analyzed and displayed in Table 8. Almost 80% indicated that they personally used a computer at work, at one time or another. However, nearly one-third stated that typically they seldom or never used a computer. Frequency of use on a weekly basis showed that only 16 administrators, less than one third, used a computer more than ten hours a week.

Table 8
Computer Usage: Location/Purpose and Frequency (N=58)
Variables 3, 5 & 6

<table>
<thead>
<tr>
<th>3. Location/Purpose</th>
<th></th>
<th>5. Typical Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>At Work</td>
<td>(n=46)</td>
<td>79.3%</td>
</tr>
<tr>
<td>At Home for Pleasure</td>
<td>(n=45)</td>
<td>77.6%</td>
</tr>
<tr>
<td>At Home to do Work</td>
<td>(n=32)</td>
<td>55.2%</td>
</tr>
<tr>
<td>Never</td>
<td>(n=06)</td>
<td>10.3%</td>
</tr>
<tr>
<td>Seldom</td>
<td>(n=11)</td>
<td>19.0%</td>
</tr>
<tr>
<td>Several Times a Week</td>
<td>(n=12)</td>
<td>20.7%</td>
</tr>
<tr>
<td>Daily</td>
<td>(n=18)</td>
<td>31.0%</td>
</tr>
<tr>
<td>Often</td>
<td>(n=11)</td>
<td>19.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. Frequency on a Weekly Basis</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>(n=06)</td>
</tr>
<tr>
<td>1 Hour</td>
<td>(n=09)</td>
</tr>
<tr>
<td>1-5 Hours</td>
<td>(n=12)</td>
</tr>
<tr>
<td>5-10 Hours</td>
<td>(n=15)</td>
</tr>
<tr>
<td>10-15 Hours</td>
<td>(n=08)</td>
</tr>
<tr>
<td>15 or More Hours</td>
<td>(n=08)</td>
</tr>
</tbody>
</table>
Even though ROC/Ps had many computer applications available for use as displayed in Table 7, the mean number of administrators taking advantage of these capabilities was only 13; or, 22% of the 58 respondents (see Table 9). The most popular applications used were word processing, database management systems, and spreadsheets which equated to 35%, 38%, and 43%, respectively.

Table 9
Personal Usage by Administrators of Computer Applications Available at ROC/Ps
Variable 8

<table>
<thead>
<tr>
<th>Application</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spreadsheet</td>
<td>25</td>
<td>43.1</td>
</tr>
<tr>
<td>Database Management System</td>
<td>22</td>
<td>37.9</td>
</tr>
<tr>
<td>Word Processing</td>
<td>20</td>
<td>34.5</td>
</tr>
<tr>
<td>Desktop Publishing</td>
<td>9</td>
<td>15.5</td>
</tr>
<tr>
<td>Charts/Graphs</td>
<td>11</td>
<td>19.0</td>
</tr>
<tr>
<td>Telecommunications (E-Mail)</td>
<td>18</td>
<td>31.0</td>
</tr>
<tr>
<td>Data Integration</td>
<td>6</td>
<td>10.3</td>
</tr>
<tr>
<td>Local Area Network</td>
<td>13</td>
<td>22.4</td>
</tr>
<tr>
<td>Executive Information System</td>
<td>5</td>
<td>8.6</td>
</tr>
<tr>
<td>Management Information System</td>
<td>11</td>
<td>19.0</td>
</tr>
<tr>
<td>Project Management System</td>
<td>3</td>
<td>5.2</td>
</tr>
</tbody>
</table>

Total Population Mean = 13

Availability and usage of two important administrative applications, telecommunications and information/management systems, are compared in Tables 10 and 11. Despite over half of the ROC/Ps having electronic mail (E-Mail) capability, only one-third of the administrators actually used it.
A similar situation exists with local area networks (LANs) through which mail can be sent; over 41% have LANs, but only 22% are using them. When asked what functions they were accomplishing by personal computer use (variable 9), only 25% of the administrators said they read or sent mail (communicated) by computer; however, almost half (48%) said that they could communicate better with a computer (question 25—see Table 13). Only a third of the respondents indicated that they used computers to network with their schools or district. An even lower percentage, less than 9%, used computers to network with other ROC/Ps.

Table 10
Number of Administrators Taking Advantage of Telecommunications
Variables 8, 9, 14, and 15

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>8g. E-Mail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROC/Ps with Capability</td>
<td>30</td>
<td>51.7</td>
</tr>
<tr>
<td>Administrators Using It</td>
<td>18</td>
<td>31.0</td>
</tr>
<tr>
<td>8i. Local Area Network (LAN)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROC/Ps with Capability</td>
<td>24</td>
<td>41.4</td>
</tr>
<tr>
<td>Administrators Using It</td>
<td>13</td>
<td>22.4</td>
</tr>
<tr>
<td>9g. Administrators Using Computers to Read/Send Mail</td>
<td>15</td>
<td>25.9</td>
</tr>
<tr>
<td>14. Administrators Using Computers to Network with ROC/P Districts/Schools</td>
<td>20</td>
<td>34.5</td>
</tr>
<tr>
<td>15. Administrators Using Computers to Network with Other ROC/Ps</td>
<td>5</td>
<td>8.6</td>
</tr>
</tbody>
</table>
Information/management systems are not utilized to a great extent by administrators, as shown in Table 11. Management information systems are the most common type available, over 40% of the ROC/Ps represented by survey respondents offer them; however, only 20% of administrators actually use these systems. Availability of the other types of systems included in the survey, executive information systems and program management systems, was limited to 12% and 17%, respectively.

Table 11
Number of Administrators Utilizing Information/Management Systems

<table>
<thead>
<tr>
<th>Variable</th>
<th>( n )</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>8j. Executive Information Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROC/Ps with Capability</td>
<td>7</td>
<td>12.1</td>
</tr>
<tr>
<td>Administrators Using It</td>
<td>5</td>
<td>8.6</td>
</tr>
<tr>
<td>8k. Management Information Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROC/Ps with Capability</td>
<td>24</td>
<td>41.4</td>
</tr>
<tr>
<td>Administrators Using It</td>
<td>12</td>
<td>20.7</td>
</tr>
<tr>
<td>8l. Program Management Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROC/Ps with Capability</td>
<td>10</td>
<td>17.2</td>
</tr>
<tr>
<td>Administrators Using It</td>
<td>3</td>
<td>5.2</td>
</tr>
</tbody>
</table>

Finally, when asked to indicate for which managerial and/or administrative functions they personally used a computer, the vast majority (78%) said "drafting letters/reports" (see Table 12). Budgeting, an extremely important task for administrators, was performed by about half (51%) of those responding. Other managerial and administrative functions accounted for various percentages of usage, but all were less than 25%.
Table 12
Managerial/Administrative Functions for which Administrators Personally Use Computers
Variable 9

<table>
<thead>
<tr>
<th>Function</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Range Forecasting</td>
<td>11</td>
<td>19.0</td>
</tr>
<tr>
<td>Drafting Letters/Reports</td>
<td>45</td>
<td>77.6</td>
</tr>
<tr>
<td>Facilities/Equipment Planning</td>
<td>12</td>
<td>20.7</td>
</tr>
<tr>
<td>Job Market Analysis</td>
<td>11</td>
<td>19.0</td>
</tr>
<tr>
<td>Scheduling Teachers/Classes</td>
<td>14</td>
<td>24.1</td>
</tr>
<tr>
<td>Reading/Sending Mail</td>
<td>20</td>
<td>34.5</td>
</tr>
<tr>
<td>Attendance Tracking</td>
<td>13</td>
<td>22.4</td>
</tr>
<tr>
<td>Enrollment Projecting</td>
<td>15</td>
<td>25.9</td>
</tr>
<tr>
<td>Follow-up on Completers</td>
<td>13</td>
<td>22.4</td>
</tr>
<tr>
<td>Budgeting</td>
<td>30</td>
<td>51.7</td>
</tr>
</tbody>
</table>

Findings: Research Question #3

To answer the question "Is there a high level of anxiety among ROC/P superintendents and directors about computer technology?" the survey instrument asked for responses to queries which reflected attitudes toward computers and people who use them, and anxiety about using computers. Variables 16-22, 24-26, 29, 33, 34 and 39 were analyzed to determine attitudes toward computers, and variables 23, 27, 28, 30-32, and 35-38 were analyzed to assess anxiety about computers.

A number of attitude questions were asked based on literature review which suggested that there were various barriers to executives learning and using computers (Seaward, 1983; Brod, 1984; Boone, 1991; & Craig, 1994). The data compiled from responses to these questions are displayed in Table 47.
13 as numbers \( (n) \) and percentages of respondents agreeing with the statements.

Table 13
Administrators' Attitudes toward Computers: Number Agreeing with Statements
Variables 16-22, 24-26, 29, 33, 34 and 39

<table>
<thead>
<tr>
<th>Questions (Reformatted into Statements)</th>
<th>( n )</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>16. Decisions are based on data provided by others</td>
<td>45</td>
<td>77.6</td>
</tr>
<tr>
<td>17. Knowledge/use of computers is not important to job</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>18. Typing proficiency is prerequisite to using computer</td>
<td>30</td>
<td>51.7</td>
</tr>
<tr>
<td>19. Computers aid in staying well-informed, up-to-date</td>
<td>50</td>
<td>86.2</td>
</tr>
<tr>
<td>20. Others can do computer work for administrator</td>
<td>43</td>
<td>74.1</td>
</tr>
<tr>
<td>21. Only secretaries/clerks/programmers use computers</td>
<td>2</td>
<td>3.4</td>
</tr>
<tr>
<td>22. A computer at home means one works all the time</td>
<td>2</td>
<td>3.4</td>
</tr>
<tr>
<td>24. Computers aid in time management</td>
<td>32</td>
<td>55.2</td>
</tr>
<tr>
<td>25. Computers better communications</td>
<td>28</td>
<td>48.3</td>
</tr>
<tr>
<td>26. No time to learn how to use a computer</td>
<td>6</td>
<td>10.3</td>
</tr>
<tr>
<td>29. Computers aid in creative thinking</td>
<td>30</td>
<td>51.7</td>
</tr>
<tr>
<td>33. Computers are for clerical/administrative tasks</td>
<td>5</td>
<td>8.6</td>
</tr>
<tr>
<td>34. Computers allow for asynchronous work</td>
<td>39</td>
<td>67.2</td>
</tr>
<tr>
<td>39. Computers aid in managing workload</td>
<td>39</td>
<td>67.2</td>
</tr>
</tbody>
</table>

Three-quarters of administrators believe that others can do the computer work for them, as shown by positive responses to questions 16 and 20 (see Table 13), which is consistent with a number of responses attesting to low percentages of personal computer usage in Tables 9 and 12. All but one of the respondents think that knowledge and use of computers is important to the job of ROC/P superintendent or director (question 17). Over half think that typing proficiency is a prerequisite to using a computer (question 18). It is interesting to note, in light of the low percentages for personal usage, that the majority of administrators thinks positively regarding the benefits of
computer use for such things as managing time and workload (questions 19, 24, 29, 34, and 39), and aiding communications (question 25).

Table 14
Means and Standard Deviations of Responses to the Computer Anxiety Subscale of Loyd & Gressard's Computer Attitude Scale
Variables 23, 27, 28, 30-32, and 35-38

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Question 23</td>
<td>4.60</td>
<td>.72</td>
</tr>
<tr>
<td>2. Question 27</td>
<td>4.24</td>
<td>.90</td>
</tr>
<tr>
<td>3. Question 28</td>
<td>4.43</td>
<td>.70</td>
</tr>
<tr>
<td>4. Question 30</td>
<td>4.34</td>
<td>.84</td>
</tr>
<tr>
<td>5. Question 31</td>
<td>4.43</td>
<td>.70</td>
</tr>
<tr>
<td>6. Question 32</td>
<td>3.91</td>
<td>.92</td>
</tr>
<tr>
<td>7. Question 35</td>
<td>4.12</td>
<td>.91</td>
</tr>
<tr>
<td>8. Question 36</td>
<td>3.97</td>
<td>1.02</td>
</tr>
<tr>
<td>9. Question 37</td>
<td>3.98</td>
<td>.80</td>
</tr>
<tr>
<td>10. Question 38</td>
<td>4.25</td>
<td>.76</td>
</tr>
</tbody>
</table>

Total Population
Mean 4.23
Standard Deviation .86

To determine if ROC/P administrators experienced computer anxiety or computerphobia, the Computer Anxiety Subscale of Loyd and Gressard's (1984) Computer Attitude Scale (CAS) was used in the survey. This subscale consisted of ten items which were positively and negatively worded statements of anxiety toward computers and use of computers. These items were recoded so that a higher score on the Likert scale corresponded to a lower level of anxiety. Means and standard deviations for each question and
for the entire population were calculated and presented in Table 14. The higher the mean, the lower the amount of computer anxiety. As can be seen in Table 14, there is little computer anxiety among ROC/P administrators.

Many prior studies looked at correlations between computer anxiety and computer experience, discovering that those who had more experience had less anxiety (Honeyman & White, 1987; Carlson & Wright, 1993; Gordon, 1993; & Dyck & Smither, 1994). Data in this study were analyzed to determine if the same result would occur with ROC/P administrators. Most of the data collected regarding experience were scattered among a number of survey questions which were not designed to provide consistent answers, and therefore could not be combined or used to develop a correlation. Computer competence (see Table 2) was selected as the variable for use in development of a correlation with anxiety because it was a single variable which expressed capabilities resulting from training and/or experience.

Table 15
Means and Standard Deviations of Computer Anxiety Subscale According to Degree of Computer Competence
Variables 7, 23, 27, 28, 30-32, and 35-38

<table>
<thead>
<tr>
<th>Computer Competence</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>2.70</td>
<td>0.56</td>
</tr>
<tr>
<td>Some</td>
<td>3.97</td>
<td>0.80</td>
</tr>
<tr>
<td>Moderate</td>
<td>4.31</td>
<td>0.81</td>
</tr>
<tr>
<td>Advanced</td>
<td>4.59</td>
<td>0.72</td>
</tr>
<tr>
<td>Expert</td>
<td>4.80</td>
<td>0.60</td>
</tr>
</tbody>
</table>
Table 15 presents a one way analysis of variance on data in which computer competence is the independent variable and the CAS Computer Anxiety Subscale is the dependent variable. The larger the mean (on a scale of 1 to 5, with 5 being the largest), the lower the amount of anxiety. These data show that even some computer competence, or experience, serves to lessen computer anxiety. An evaluation of the respondents within the computer competence category "none" revealed that they never or seldom used a computer (questions 5 and 6 on the survey), they did not use any of the applications available at the ROC/P (questions 8 and 9 on the survey), they had very little (one course at work) computer training (questions 10-12 on the survey), and their overall experience with computers was either negative or neutral (question 2 on the survey). This information supported use of computer competence as the variable against which to evaluate computer anxiety.

Another area which was considered for analysis of possible correlations was computer training and anxiety. As discussed in the literature review; research has found that a minimum amount of training, such as six hours, was enough to lessen computer anxiety (Overbaugh, 1993). Unfortunately, as occurred with computer experience, the survey questions did not lend themselves to being combined for proper analysis. It is noted that Tables 3 and 5 indicate most ROC/P administrators have had in excess of six hours of computer training, and the levels of anxiety shown in Table 15 indicate a low level of anxiety. The only exceptions, as discussed previously, show a higher level of anxiety and very little training which, on the surface, could support a possible correlation between the two, and confirm findings identified in the literature review.
Discussion of Findings

Results of this study with regard to whether or not ROC/P superintendents and directors are computer literate (trained in computer technology and knowledgeable as to its use) produced mixed results; they appear to be moderately knowledgeable and competent despite a general lack of formal training. The vast majority, over 90%, had received no computer training as part of their degree programs, whether pursued in the late 1950's or as recently as 1995. This continued lack of focus on computer training in education degree programs confirmed literature previously discussed in Chapter Two (Bozeman, Raucher and Spuck, 1991 & Beaver, 1991). These administrators also received minimum training at work, and less than half pursued training on their own, outside of work, to supplement this deficiency.

Familiarity with, and knowledge of, computers was demonstrated through administrators' self-ratings on computer competence; almost everyone could at least use a word processing program (97%), while over half could understand and use database management systems and spreadsheets (rated between "moderate" and "expert"); and, their use of various technological applications displayed in Tables 9-12. Because many administrators appeared to be computer literate despite a lack of formal training, there is an implication that they had obtained their knowledge of computers through other means not addressed by this study. These may have included tutor packages integral to application programs, self-teaching, or informal instruction by friends or co-workers.

Personal use of computer technology by ROC/P superintendents and directors to make decisions and manage their institutions was found to be limited not only in frequency but in application. Microcomputer usage was
not limited due to availability as most had access to microcomputers and
software applications. Despite the high percentage responding that they used
a computer at work (almost 80%), the actual frequency of use was limited in
that only half indicated at least daily usage. The most popular software
applications, word processing, database management systems, and
spreadsheets were generally available to administrators but only one-third to
less than one-half used them.

There appeared to be a discrepancy in responses to the survey
inasmuch as usage of word processors in question 8 elicited a positive
response rate of 34% whereas responses to question 9 resulted in over 75%
saying they used computers to draft letters and reports. This may have been
due to the survey format; people may have mistakenly responded to only the
left side of the list of applications in question 8, indicating availability of
applications, and not usage which was on the right side. Also, both questions
asked for respondents to indicate personal usage but this may have been
overlooked in one or both of the questions, especially since the responses to
attitude questions 16 and 20 definitely indicate that the majority
(approximately 75%) of administrators make decisions based on computer
work done by others.

Management and information systems, essential to strategic planning,
forecasting, and decision making, were limited in availability, and further
limited in usage. Over half do, however, use spreadsheets for budgeting, an
encouraging sign for decision making usage. Telecommunications, an
extremely important tool, appears to be in its infancy as far as ROC/P usage;
only half of the ROC/Ps have it, and only one-third use it. Other managerial
and administrative functions were also limited in use to approximately one-fourth of respondents.

The last research question addressed by this study was whether or not there was a high level of anxiety among ROC/P superintendents and directors about computer technology. Attitude toward computers and people who use them, and anxiety toward computers were covered by survey questions.

Most administrators had a positive attitude toward computers and the benefits of using them in managing time and workload, but many (75%) still believed that others could do computer work for them. Also, over half mistakenly believed that typing proficiency was essential to using a computer. Both of these attitudes were among those described as barriers (Seaward, 1983; Brod, 1984; Boone, 1991; & Craig, 1994) which are responsible for the slow growth of executives' personal computer usage and could explain the limited usage discussed earlier.

Computer anxiety as measured on the CAS anxiety subscale appeared to be extremely low. This could be attributed to the fact that, as people involved in education, administrators are knowledgeably able to select the "correct" answer to a question, or that experience with computers had lessened their anxiety. A comparison of computer competence (which included training and experience) with anxiety scores demonstrated that those with low competence had higher anxiety. This finding supports prior research studies which found that prior experience with computers had a tendency to diminish anxiety (Honeyman & White, 1987; Carlson & Wright, 1993; & Dyck & Smither, 1994).
CHAPTER FIVE
Summary, Conclusions, and Recommendations

Summary
This study surveyed ROC/P administrators to determine their perceptions regarding the utilization of computer technology in the management of their organizations. The researcher's prior experience and literature indicated that executives have a tendency to avoid personal use of computer technology. Discussions with prior and current ROC/P directors appeared to confirm that this situation may have existed in the ROC/P system as well. Avoidance of technology by administrators, partially due to a lack of awareness of the computer's potential for improving decision-making and productivity, could seriously impair management of their organizations and their survival in the battle for operating funds.

Review of the literature indicated that executives and administrators were not computer literate and did not personally use computer technology, and that executives, in general, exhibited computer anxiety. Literature was almost nonexistent regarding administrators' anxiety. Lack of use was attributed to computer illiteracy (lack of training, knowledge, and experience) and anxiety/attitudes toward computers. Previous studies supported a strong correlation between prior computer experience and lack of anxiety.

This was a nonexperimental, descriptive research study which included a written survey, conducted by mail, of all 72 leaders of California's ROC/Ps. The survey contained questions about computer literacy (training and competence), frequency and kind of use, and attitudes/anxiety toward
computer technology. Information was also obtained regarding availability of computer hardware and software. Data resulting from the survey were presented in the form of descriptive statistics.

Findings as to computer literacy were mixed; administrators had received little formal training but were moderately competent, indicating many were self-taught. Personal computer usage was found to be limited in both frequency and application, possibly because of a prevailing attitude that others could do the hands-on computer work for the administrator. Because of the amount of exposure to computers and generally positive attitudes toward them, the amount of anxiety experienced by administrators was determined to be minimal.

Conclusions

To determine ROC/P administrators' perceptions regarding use of computer technology in the management of their organizations, the study evaluated computer literacy, usage, and attitudes/anxiety toward computers. The results of the study supported the following conclusions:

Computer literacy. The study produced mixed results regarding ROC/P administrators' computer literacy. They had minimal formal training but appeared to be fairly competent, indicating that many were self-taught. Over 90% received no computer training as part of their degree programs; one-third had received no training at work, while an additional 45% received less than six hours of training at work; over half had taken no supplementary training classes outside of work; and, 83% had taken no classes in administrative applications. Self-ratings of competency indicated that a vast majority (97%) had "some" competence (word processor), and over 60% had
between "moderate" (databases and spreadsheets) and "expert" (complex functions/programming) competence. Kearsley's (1990) definition of literacy for an educational administrator (see page 14) included familiarity with computer terminology and hardware/software, as well as knowledge of administrative applications. Responses to the survey demonstrated some knowledge of terminology and hardware/software; however, administrators' knowledge of administrative applications had to have been extremely limited as the number not receiving training in that area exceeded 80%. Because a complete evaluation of computer knowledge was not undertaken by this survey, a definitive statement as to computer literacy based on Kearsley's (1990) definition cannot be made; however, a conclusion of moderate literacy can be made based upon the competencies indicated.

**Computer usage.** Personal computer usage by administrators was limited in both frequency and application. Because usage can be affected by availability of computer software and hardware, the survey asked questions in that regard. Results indicated that the vast majority had access to microcomputers, half had access to modems, and the majority had mainstream software (word processors, databases, spreadsheets, graphics) available. The more sophisticated software designed to support strategic planning and decision making, such as management/executive information systems (MIS/EIS) and program management systems (PMS), were limited in availability. Less than half of the ROC/Ps had an MIS, one-eighth had an EIS, and one-sixth had a PMS. Telecommunications were also limited with only half having the capability to process electronic mail.

Frequency of personal computer usage was less than what would be expected considering the availability of hardware and software. Despite the
fact that almost 80% of the respondents indicated they had ever used a microcomputer at work, nearly one-third stated they seldom or never used a computer, and less than one-third typically used a computer more than ten hours a week.

Analysis of personal usage of applications showed that, for the most part, only popular applications were used, such as spreadsheets, databases, and word processors, and that usage was limited to less than half of the respondents. Word processing usage responses to two survey questions revealed either a survey design problem or a misinterpretation of the request for information as to "personal usage": only 35% responded positively to usage of word processing while 78% indicated they used computers to prepare letters and reports.

Notwithstanding the fact that only half of the ROC/Ps had telecommunications capability, the percentage of use was even less--only one third of the administrators used it. Networking with schools in their district was accomplished by approximately a third of the administrators. Networking with other ROC/Ps, however, was almost nonexistent, consisting of only 9% of the respondents.

Use of strategic planning, decision-making tools was extremely limited; only 20% of the administrators used an MIS, 9% used an EIS and 5% used a PMS. The management and administrative functions for which administrators personally used computers, as reported in their survey responses, were restricted to drafting letters and reports and budgeting. All other management tasks, such as long range forecasting, were personally accomplished on the computer by less than 25% of the respondents.
These results effect the conclusion that ROC/P administrators have not personally taken advantage of the capabilities available to them, nor apparently have they pursued additional technology.

**Computer attitudes/anxiety.** Attitudes toward computers and the benefits of their use were mostly positive; only two administrators had negative experiences with computers. Despite positive attitudes toward the benefits of computer use, 75% still maintained the attitude that others could do the work for them, and that they based their decisions on data provided by others. This attitude could explain the minimal amount of usage, and confirm barriers presented in the literature. Picciano (1993) noted in his study a similar conclusion regarding senior administrators: they used computer-generated data but relied heavily on others to do the hands-on computer work. He, as does this researcher, projects that this will change in the future as younger people who are more familiar with computers advance to these senior level positions.

There were other inconsistencies between responses to usage and attitude questions; for example, only a fourth of the respondents indicated they actually used a computer for communications while almost half agreed with the statement "I can communicate better when I use a computer." This discrepancy could be attributed to the desire to give the right answer, rather than providing an honest response to the statement.

Computer anxiety, as measured on the Loyd and Gressard (1984) CAS, was measured as minimal. This again, could be due to educators knowing how to provide the "correct" answer. However, a comparison of computer competence (which included training and experience) and CAS
scores demonstrated that prior computer exposure lessened computer anxiety, as had been concluded in prior studies (see Chapter Two).

**Summary.** Finally, it is concluded that ROC/P administrators had generally positive attitudes toward computer technology but were not using it to its greatest potential in the management of their organizations. It is essential that administrators use whatever tools are available for, as pointed out by Cheever et al., "In today's highly politicized climate, school administrators often must produce information to show that schools are effective and efficient organizations and they must be able to back up their decisions with complete and up-to-date data" (1986, pg. 159).

**Recommendations**

To increase computer literacy and usage for management and administrative purposes, the following recommendations are made:

1. ROC/Ps should consider contracting for training courses designed to demonstrate to administrators the benefits of using computer programs for administrative/managerial activities such as long range forecasting, job market analysis, budgeting, and enrollment projecting. Sharing of information by those ROC/P administrators who already do budgeting by personal computer could be accomplished in conjunction with a CAROC/P state board meeting or conference. Because such a large percentage of administrators are of the opinion that actual computer work can be done by others, training which addresses the benefits of personal usage (for example, more control over data, being able to work independently of others, and instantaneous access to data) would be beneficial.
2. ROC/Ps should consider expanding telecommunications either through LANs to network within their organizations or through access to an on-line service for electronic mail (E-mail) exchange with those geographically dispersed. Along with E-mail capability, additional modems and laptop computers to assist administrators in working asynchronously would greatly enhance their ability to manage time and workload. Networking with other ROC/Ps should be a consideration for exchange of information, sharing of data, and developing a stronger support base (CAROC/P).

3. Consideration should be given to purchasing or developing either an EIS, an MIS, or a PMS to aid decision making and strategic planning. This recommendation echoes one made by Mitchell and Hecht in their 1989 final report on the quality and effectiveness of ROC/Ps that a Management Information System "utilizing consistent data definitions and standardized data reduction and analysis techniques" should be developed (pg. 113).

Recommendations for Further Study

This study did not undertake a complete evaluation of computer knowledge for determination of computer literacy. Prior to developing or contracting for computer training in management and/or administrative applications, it is recommended that further study be done in this area.
## APPENDIX A
### Listing of ROC/Ps Surveyed

#### Central Region

<table>
<thead>
<tr>
<th>ROC/P</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresno ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>Kern County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>Kings County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>Merced County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>North Kern Vocational Training Center</td>
<td>Joint Powers</td>
</tr>
<tr>
<td>ROC of Kern High School District</td>
<td>Single District</td>
</tr>
<tr>
<td>San Joaquin County ROC/P</td>
<td>County Operated</td>
</tr>
<tr>
<td>Stanislaus-Tuolumne-Mono ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>Tulare County Org. for Vocational Educ.</td>
<td>Joint Powers</td>
</tr>
<tr>
<td>Valley ROP</td>
<td>Joint Powers</td>
</tr>
<tr>
<td>West Side ROP</td>
<td>Joint Powers</td>
</tr>
</tbody>
</table>

#### Coastal Region

<table>
<thead>
<tr>
<th>ROC/P</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Santa Clara County ROC/P</td>
<td>Joint Powers</td>
</tr>
<tr>
<td>Contra Costa County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>Eden Area ROP</td>
<td>Joint Powers</td>
</tr>
<tr>
<td>Marin County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>Mission Trails ROP</td>
<td>Joint Powers</td>
</tr>
<tr>
<td>Mission Valley ROC/P</td>
<td>Joint Powers</td>
</tr>
<tr>
<td>Napa County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>North Santa Clara County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>Oakland/Alameda ROP</td>
<td>Joint Powers</td>
</tr>
<tr>
<td>San Francisco County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>San Mateo County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>Santa Clara County ROC-South</td>
<td>County Operated</td>
</tr>
<tr>
<td>Santa Cruz County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>Santa Lucia ROP</td>
<td>Joint Powers</td>
</tr>
<tr>
<td>Solano County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>Sonoma County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>Tri-Valley ROP</td>
<td>Joint Powers</td>
</tr>
</tbody>
</table>
Northern Region

Amador/Calaveras County ROPs*  County Operated
Butte County ROP  County Operated
Central Sierra ROP*  Joint Powers
Del Norte County ROP  County Operated
49er ROP  County Operated
Glenn County ROP  County Operated
Humboldt County ROP  County Operated
Lake County ROP  County Operated
Lassen County ROP  County Operated
Mendocino County ROP  County Operated
Modoc County ROP  County Operated
Plumas & Sierra Counties ROP  County Operated
Sacramento County ROP  County Operated
Shasta-Trinity ROP  Joint Powers
Siskiyou County ROP  County Operated
Tehama County ROP  County Operated
Tri-County ROP  County Operated
Yolo County ROP  County Operated

Southern Region

Antelope Valley ROP  Single District
Baldy View ROP  Joint Powers
Capistrano-Laguna Beach ROP  Joint Powers
Central County ROP  County Operated
Coastline ROP  Joint Powers
Colton-Redlands-Yucaipa ROP  Joint Powers
Compton Unified School District ROP  Single District
East San Gabriel Valley ROP  Joint Powers
Hart District ROP  Single District
Imperial Valley ROP  Joint Powers
Inyo County ROP  County Operated
La Puente Valley ROP  Joint Powers
Long Beach Unified School District ROP  Single District

*Operated by one director
<table>
<thead>
<tr>
<th>Southern Region (continued)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>Los Angeles Unified School District ROP</td>
<td>Single District</td>
</tr>
<tr>
<td>North Orange County ROP</td>
<td>Joint Powers</td>
</tr>
<tr>
<td>Riverside County Office of Education ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>San Antonio ROP</td>
<td>Joint Powers</td>
</tr>
<tr>
<td>San Bernardino County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>San Diego County ROP</td>
<td>County Operated</td>
</tr>
<tr>
<td>Santa Barbara County ROP-North</td>
<td>County Operated</td>
</tr>
<tr>
<td>Santa Barbara County ROP-South</td>
<td>County Operated</td>
</tr>
<tr>
<td>Southeast ROP</td>
<td>Joint Powers</td>
</tr>
<tr>
<td>Southern California ROP</td>
<td>Joint Powers</td>
</tr>
<tr>
<td>Tri-Cities ROP</td>
<td>Joint Powers</td>
</tr>
<tr>
<td>Ventura County ROP</td>
<td>County Operated</td>
</tr>
</tbody>
</table>
APPENDIX B

Survey Instrument
1. Have you ever used a computer?  
   Yes [ ]  No [ ]

2. In general, how would you describe your experiences with computers?  
   (Please circle the number that best represents your answer)  
   1 2 3 4 5  
   very negative negative neither negative/positive positive very positive

3. Do you currently use a computer; that is, do you actually have "hands on" experience?  
   a. At work [ ] Yes [ ] No  
   b. At home [ ] Yes [ ] No  
   To accomplish work [ ] Yes [ ] No

4. Do you have access to the following: (Please mark all that apply)  
   a. [ ] None  
   b. [ ] Microcomputer at work  
   c. [ ] Microcomputer at home  
   d. [ ] Laptop  
   e. [ ] Modem at work  
   f. [ ] Modem at home

5. How often do you typically use a microcomputer?  
   a. [ ] Never  
   b. [ ] Seldom  
   c. [ ] Several times each week  
   d. [ ] Daily  
   e. [ ] Often each day

6. On average, how much time do you spend using a computer each week?  
   a. [ ] None  
   b. [ ] Less than 1 hour  
   c. [ ] 1-5 hours  
   d. [ ] 5-10 hours  
   e. [ ] 10-15 hours  
   f. [ ] More than 15 hours

7. How would you rate your personal computer competence?  
   a. [ ] None  
   b. [ ] Some (ex: edit/save/print WP docs)  
   c. [ ] Moderate (ex: edit/save/print database/spreadsheet)  
   d. [ ] Advanced (ex: create database/spreadsheet)  
   e. [ ] Expert (ex: complex functions/programming)

8. Which of the following computer applications/functions are used for administrative purposes at your ROC/P? (Please check all that apply on both the left and right sides of each item.)  
   My ROC/P has I personally use  
   a. [ ] None  
   b. [ ] Spreadsheet  
   c. [ ] Database  
   d. [ ] Word Processing  
   e. [ ] Desktop Publishing  
   f. [ ] Charts/Graphs  
   g. [ ] Telecommunications (E-Mail)  
   h. [ ] Data Integration  
   i. [ ] Local Area Network  
   j. [ ] Executive Information System  
   k. [ ] Management Information System  
   l. [ ] Project Management System

9. For which of the following administrative/managerial functions do you personally use a computer? (Please check all that apply)  
   a. [ ] None  
   b. [ ] Long range forecasting  
   c. [ ] Drafting letters/reports  
   d. [ ] Facilities/equipment planning  
   e. [ ] Job market analysis  
   f. [ ] Scheduling teachers/classes  
   g. [ ] Reading/sending mail  
   h. [ ] Attendance tracking  
   i. [ ] Enrollment projecting  
   j. [ ] Follow-up on completers  
   k. [ ] Budgeting  
   l. [ ] Other: ________________________________

Please continue survey on the reverse
10. Were any computer courses required as part of your degree curriculum? Please write in degree concentration (ex: School Administration): ____________________________ Year: ________________
   a. [ ] None               c. [ ] 2 courses
   b. [ ] 1 course            d. [ ] 3 or more courses

11. Have you been provided training in microcomputer use at your job? (Please estimate hours)
   a. [ ] Fewer than 3 hours (approximately 1/2 day session)  d. [ ] More than 30 hours
   b. [ ] 3 to 6 hours (approximately 1 day session)         e. [ ] None
   c. [ ] 6 to 30 hours (several full day sessions)

12. Have you taken computer classes on your own?
   a. [ ] None               c. [ ] 2 courses
   b. [ ] 1 course            d. [ ] 3 or more courses

13. Have you taken courses in administrative applications of technology?
   a. [ ] None               c. [ ] 2 courses
   b. [ ] 1 course            d. [ ] 3 or more courses

14. Do you use a computer to network with the districts/schools in your ROC/P?
   a. [ ] Yes  b. [ ] No

15. Do you use a computer to network with other ROC/Ps?
   a. [ ] Yes  b. [ ] No

Please circle the number which best describes your feelings about the following statements:

16. My decisions are generally based on data (manual/computer generated) provided by someone in my office
   greaty disagree disagree neither agree nor disagree agree greatly agree
   1  2  3  4  5

17. Knowledge and use of computers is not important to my job
   1  2  3  4  5

18. Typing proficiency is a prerequisite to using a computer
   1  2  3  4  5

19. Computers enable me to stay well-informed & up-to-date
   1  2  3  4  5

20. There are others who can do computer work for me
   1  2  3  4  5

21. Only secretaries/clerks and programmers use computers
   1  2  3  4  5

22. I'll work all the time if I have a computer at home
   1  2  3  4  5

23. I feel aggressive and hostile toward computers
   1  2  3  4  5

24. Computers help me manage my time
   1  2  3  4  5

25. I can communicate better when I use a computer
   1  2  3  4  5

26. I don't have time to learn how to use a computer
   1  2  3  4  5

27. Computers make me feel uneasy and confused
   1  2  3  4  5

28. It wouldn't bother me at all to take computer courses
   1  2  3  4  5

29. Computers help me think creatively
   1  2  3  4  5

30. Computers do not scare me at all
   1  2  3  4  5

31. Working with a computer would make me very nervous
   1  2  3  4  5

32. I do not feel threatened when others talk about computers
   1  2  3  4  5

33. Computers are necessary for only clerical & administrative tasks
   1  2  3  4  5

34. Computers allow me to work independently of time and location
   1  2  3  4  5

35. Computers make me feel uncomfortable
   1  2  3  4  5

36. I would feel at ease in a computer class
   1  2  3  4  5

37. I get a sinking feeling when I think of trying to use a computer
   1  2  3  4  5

38. I would feel comfortable working with a computer
   1  2  3  4  5

39. Computers assist me in managing my workload
   1  2  3  4  5
APPENDIX C

Letters
To: ROC/P Superintendents and Directors

From: California State University San Bernardino
CAROC/P, Tri-Cities ROP

As a Master of Arts, Vocational Education candidate, Sheila Keeling is conducting a study of ROC/P administrators' perceptions regarding the utilization of computer technology as a management tool. Her proposal and attendant survey have been reviewed, and the enclosed survey has been given full approval for distribution. The findings resulting from this study are expected to benefit CAROC/P members by providing information as to successful managerial uses of computer technology and areas for improvement.

We urge you to take a few minutes out of your busy day to complete the enclosed survey. Thank you for your cooperation with this request.

Sincerely,

Ted H. Zimmerman, Ed.D.
Advisor, Master of Arts Vocational Education
California State University San Bernardino

Bud Davis, Ph.D.
CAROC/P President
California State University San Bernardino

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As a Master of Arts, Vocational Education, candidate at California State University San Bernardino, I am conducting a survey, part of a master's thesis, of the 72 ROC/P superintendents and directors to determine perceptions regarding utilization of computer technology as a management tool. Your position is an important one which must place heavy demands on your time, energy, and abilities. The findings from this study should provide helpful information as to successful computer usage to effectively manage ROC/P complexities and demands, and areas for improvement.

Since the focus of the study is on your personal perceptions and use of computers, please do not allow anyone else to complete the survey. The survey covers two areas: the first asks questions about your usage and training, and the second asks questions regarding your feelings about computer technology.

To ensure confidentiality, please do not put any identifying marks on, or sign, the survey. Be assured that your response will remain anonymous and confidential.

Please answer all questions and return the completed survey to me in the enclosed stamped, self-addressed envelope on or before 16 Mar 95. If you wish a summary of the study when it is completed, please let me know by separate letter or E-mail to either "srkquilts@aol.com" or "encw56b@prodigy.com".

Thank you for your cooperation!

Sincerely,

Sheila Riggs Keeling

2 Enclosures
1. Survey
2. SASE
APPENDIX D

Definitions

Administrator. The official charged with the management and operation of an organization. In this study, the term is also used as an all-encompassing term to refer to ROC/P administrators, superintendents, directors, principals, and coordinators.

Anxiety (Computer). Emotional reactions such as fear, apprehension, hope and personal threat an individual experiences when planning to interact or actually interacting with computer technology (Cambre & Cook, 1985). See also "computerphobia."

Application. General task computer programs such as word processing, database management, and spreadsheets.

Asynchronous Work. Work which is accomplished independently of time, location, and equipment centralization such as working at home through use of a modem or laptop computer (Boone, 1991).

Computer Literacy. Familiarity with the basic components of a microcomputer, ability to describe what computers and computer programs can and cannot do, ability to operate a computer and its peripherals, and ability to use computer applications.

Computerphobia. A negative attitude toward technology which takes the form of (a) resistance to talking or even thinking about computer technology, (b) fear or anxiety, and (c) hostile or aggressive thoughts or acts (Jay, 1981). See also "anxiety (computer)." Also referred to as computer fear, technoanxiety, technostress, and technophobia.

Database Management System (DBMS). Software designed for organizing and managing a collection of related information (such as addresses) for ease in filing, sorting, segmenting, and retrieving data (Computer Talk, 1993).
Desktop Publishing. An advanced form of word processing which includes graphic design, layout, and typesetting features, and is used for creating professional-looking newsletters, brochures, and other publications (Computer Talk, 1993).

Director. See "administrator."

EIS. Executive Information System. Any application of computer or communication tools to executive objectives (Boone, 1991).

Electronic Spreadsheet. See "Spreadsheet."

E-Mail. (Also referred to as Electronic Mail.) The process of sending, receiving, storing, and forwarding messages in digital form over telecommunication facilities between computers, usually personal computers (Computer Terms Dictionary, 1994).

Graphics. An application software program that allows the user to create and/or manipulate non-text images, such as artwork, illustrations, and charts (Computer Talk, 1993).

Hardware. All of the tangible, or touchable, mechanical, magnetic, and electronic equipment, components, parts, and circuitry that make up the physical computer (Computer Talk, 1993).

Laptop Computer. A lightweight portable computer designed for use in a limited work space, such as on one's lap (Computer Talk, 1993).

Local Area Network (LAN). A group of computers within a limited area (for example, within the same building) linked together via a network of cables which allow users to share software applications and peripheral devices (Computer Talk, 1993).

Mainframe. A powerful system unit that can support a number of work stations. Mainframes are generally used by large corporations, government agencies, and other organizations having a number of employees who need access to the same information (Computer Talk, 1993).
**Microcomputer.** (Also referred to as a personal computer.) A small computer, totally independent from any other computer system, which is capable of fitting on a standard desk top (Kearsley, 1990).

**MIS.** Management Information System. An information system designed to supply organization managers with necessary information needed to plan, organize, staff, direct, and control the operations of an organization (Computer Terms Dictionary, 1994).

**Network.** (Also referred to as information networks.) A series of devices and telecommunications which link computers together at geographically dispersed locations allowing them to share information (Boone, 1991 & Computer Terms Dictionary, 1994).

**Peripheral.** Any external hardware component that connects to the computer; for example, printer, monitor, mouse (Computer Talk, 1993).

**ROC.** Regional Occupational Center. A vocational education system which serves students from several school districts on a part-time basis. Students receive instruction in general education courses at their home high schools and attend a center for vocational instruction (Smith, 1979).

**ROP.** Regional Occupational Program. See "ROC." ROPs operate in the same manner as ROCs, except that multiple sites can be used for providing vocational education (ROC/P Operations Handbook, 1991).

**Software.** The intangible, or untouchable, information utilized by the computer hardware to make the computer system work (Computer Talk, 1993).

**Spreadsheet.** (Also referred to as Electronic Spreadsheet). A computer program that turns a computer terminal into a huge ledger sheet. The program allows large columns and rows of numbers to change according to parameters determined by the user. A whole range of numbers can be changed when a single entry is varied, allowing complex projections and numerical forecasts to be performed without tedious manual calculations (Computer Terms Dictionary, 1994).
Superintendent. See "administrator."

Technology. The tools that extend human capabilities, the systems within which the tools are used, and an approach to the management of the environment (Kerka, 1995).

Word Processing. An application software program designed to aid the user in creating, editing, formatting, and printing text (Computer Talk, 1993).
REFERENCES


