The Role of Administrators and Teachers in the Selection and Implementation of Computer Technology in the "Classroom of Tomorrow" Program

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THE ROLE OF ADMINISTRATORS AND TEACHERS IN THE
SELECTION AND IMPLEMENTATION OF COMPUTER
TECHNOLOGY IN THE "CLASSROOM
OF TOMORROW" PROGRAM

by
Ahmad Al-Obiedat

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Doctor Education
Department of Educational Leadership

Western Michigan University
Kalamazoo, Michigan
April 1994
The purpose of this study was to examine the role of administrators and teachers in the selection and implementation of computer technology in Kalamazoo Public Schools (KPS). Recently, KPS participated in Michigan's "Classroom of Tomorrow" program. They received 170 computers of various types (i.e., Apple, IBM, etc.). Elementary teachers received 126, middle school teachers received 16, high school teachers received 26, and 2 computers were awarded to personnel at the community education center. To date, there are no reports or research studies on the success or lack of success of the processes used to select and implement the computers in the different schools in Kalamazoo.

The focus of this study was on the 18 elementary schools within the KPS district.

A survey research design was used for the study, and two survey instruments were designed by the researcher. Six research questions guided this study and related research hypotheses were developed for Questions 1 and 2. The statistical test used for the hypotheses was the $t$ test for independent means. Finally, the data from research Questions 3, 4, 5, and 6 were analyzed using descriptive statistics to classify and
summarize specific data.

Findings from the study indicated that administrators were involved in the selection and implementation of computer technology while teachers shared a low level or no role in the processes. With respect to findings related to training and development, findings indicated that there was no difference between in-school and out-school training. It was determined that computer skills and knowledge needed to select hardware and software could be obtained through training in either in-school or out-school sites. Findings indicated that there is a lack of planning for selection and implementation of computers in the district and that no formal technology plan exists for administrators, teachers, students, and parental involvement. Findings demonstrated that school personnel did not preview or evaluate hardware or software before purchase.

Conclusions included that while schools reported local improvement plans, formal planning for computer technology was missing. Neither administrators nor teachers were satisfied with quality or quantity of hardware selected for their schools. Similarly, administrators and teachers were unsatisfied with the level of administrative support.
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The role of administrators and teachers in the selection and implementation of computer technology in the "Classroom of Tomorrow" program

Al-Obiedat, Ahmad, Ed.D.

Western Michigan University, 1994

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DEDICATION

I dedicate this dissertation to my wife, Mariam; to my son, Lyth; and to my daughter, Dena; their love, sacrifice, and contribution allowed me to gain this degree and so is earned by them as well.

Ahmad Al-Obiedat
ACKNOWLEDGMENTS

The writer is deeply indebted to many people and wishes to acknowledge their contributions in completion of this study.

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To those and many other individuals who made a contribution to the study, the writer expresses his gratitude.

Last, but not least, my deepest gratitude and appreciation are extended to my parents; my wife, Mariam; my son, Lyth; my daughter, Dena; and to my brothers and sisters for their love, patience, sacrifice, support, and prayers.

Ahmad Al-Obiedat
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CHAPTER I

INTRODUCTION

The computer revolution has reached the education system and classrooms at all levels of education throughout the United States. Computer technology is playing an increasingly important role as a managerial tool in the school system as well as an instructional aid in the classroom. As managerial tool, some administrators find the technology is helping them stretch limited resources and cushion the effect of rising educational expenditures (Dede, 1983). As an instructional aid, computer technology is challenging established methods of teaching in the classroom environment. Many believe that computer technology provides a new type of interactive medium that helps teachers manage instruction in more individualized ways, thus facilitating students' learning of important concepts (Papert, 1980; Taylor, 1980).

With decreasing cost of hardware and increasing availability of software, more schools have been able to buy computers for instructional purposes. This gradual increase in their availability has had a major impact on education. The leadership of schools, including school boards, administrators, and teacher and parent groups, has supported obtaining inexpensive computers for their schools (Winerip, 1983). Once the new technology is placed in the schools, however, a tremendous variation in the frequency and type of use becomes evident (Becker, 1982).
While computer usage in education has been beneficial, its implementation in schools has not been without problems. Some of the difficulties come from limited funding, inadequate software and/or training, poor attitudes toward computers, and lack of technical support from the school system.

The decisions that leaders make about the selection and use of technology are critical to improving school instruction. The leaders who make the ultimate decision to buy the new technology should have the knowledge and experience to address both the software and hardware needs for the school system. The decision of whether or not to implement computer technology is a complex one. However, one cannot assume that the new computer technology would be useful for all administrators or all the education programs.

Background

The 1980s brought more educational innovation but with no more successful implementation than found in the two previous decades, as computers became more affordable and acceptable as effective instructional and administrative tools. Educators quickly recognized the potential of computers, especially in the areas of scheduling, fiscal management, tracking students' progress, and maintaining records.

The computer as instructional tool lends itself well to the study of many subjects. It can present and store information, motivate and reward learners, diagnose and prescribe, provide drill and practice, and individualize instruction. These are only a few of its useful features with potential to enhance learning (Tolman & Allred, 1991).
However, some administrators, teachers, and students are learning about computer technology on their own and many are hesitant in approaching such changes. An educational computer training program is needed to prepare and help administrators understand computers and create favorable attitudes toward computer technology. Such favorable attitudes would facilitate a smooth transition toward more complete selection and implementation of the computer technology.

When administrators are prepared and have favorable attitudes toward computer technology, they are more likely to try to understand computer technology and gain some control over the way computer technology needs to be implemented. "Adoption of instructional computing is more likely to occur when the administrators hold attitudes and values favorable to instructional computing" (Anderson, Hansen, & Cloisonne, 1979, p. 24). In a study of faculty attitudes toward educational technology, Rohrlick (1972) reported a significant relationship between attitude and actual use in implementation of computer technology. Implementing computer technology requires considerable administrator training, special maintenance, curriculum adaptation, and scheduling adjustment.

New leadership plays an important role in implementation of computer technology. When combined with productive leadership, technology is an effective tool for school improvement (Mojkoske, 1986). A study conducted of 130 elementary schools concluded that schools whose principals were strong instructional leaders have strong computer curricula (McGee, 1986). Leaders, by nature of their leadership role, are provided with a distinctive opportunity to influence
the decision making of others (Watkins, 1986). There are approximately 100,000 educators responsible for the leadership of 2.3 million administrators and teachers in the United States. Consequently, the leaders within the education system are responsible for preparing our students to be able to function and to become effective citizens in this information society. One responsibility is to implement the computer technology into the classroom. According to surveys conducted in 1970 by the American Institutes for Research (AIR, cited in Bukoski & Korotkin, 1976), 34% of this nation's public secondary schools were using computers at that time to aid their administrative and/or instructional programs. Between 1983 and 1985, the number of computers in elementary and secondary schools quadrupled to more than 1,000,000 (Becker, 1986).

Nationally, American legislators are beginning to look to technology to help make the educational system more competitive with those of foreign cultures. Senator Edward Kennedy is one of several federal legislators introducing technology-based education legislation (Foster, 1988). Early in his administration, former President George Bush, the self-declared education president, raised great hopes for improvement in education. In 1990 former President Bush introduced America 2000, a proposal to revitalize the education process in this country (Borrell, 1992). Many states are also starting to consider the role technology should play in their legislative and regulatory agenda. For example, according to Baker (1990), in Arkansas, school reform was a hot-button issue in the 1990 governor race. Former Arkansas Governor Bill Clinton had made schools a top priority and initiated a number of reforms, thus
involving the state in seriously considering the role that technology should play in their legislative and regulatory agenda. The District of Columbia and 11 additional states since 1986 have required schools to integrate the use of computers into their curriculum (Foster, 1988).

In the state of Michigan, the board of education in 1990 adopted 14 goals entitled "Education: Where the Next Century Begins." One of the goals called for the development of a 5-year state technology plan for Michigan (Michigan Department of Education, 1992). In 1985, the computer/student ratio in Michigan was reported to be one computer for every 35 students. According to data collected by Michigan Department of Education (1990), in 1989 there was one computer for every 22 students in Michigan schools. According to a national survey of the number of computers in K-12 schools conducted in 1990 by Quality Education Data of Denver, Michigan's computer/student ratio in 1990 equaled the national average of 1:22. It is to reduce this current ratio to one computer for every 16 students, and satisfy the demand to implement computer technology that the "Classroom of Tomorrow" program was initiated. This program proposed the following as its initial goals: (a) to inspire Michigan students and teachers to utilize instructional technology and (b) to improve the skills of tomorrow's work force. This was to be accomplished through an accelerated distribution of computers across the state. There currently exist some experimental programs such as the "Classroom of Tomorrow" program throughout the country.

One example of a computer program in intensive use is the Harlem elementary school. It involves a 40-computer lab connected into a local area network that provides a database, word processor, and geography
software. This school is also involved in a telecommunications project with a school in London, England (Holden, 1989). One of the most extensive projects under way is Apple Computer's "Classrooms of Tomorrow" located in 24 classrooms throughout the country. Its emphasis is on high computer use. All students involved in the program have computers for both home and school use. These new programs make unique demands on educational leaders for the decisions they must make on implementing computer technology.

During the past several years, research has reflected a shift in the role of administrators to include that of instructional leadership (Johnson & Snyder, 1986). Eventually, one of the main characteristics of effective administrative leadership that consistently emerges from the research is strong instructional leadership (Davis & Thomas, 1989). Therefore, in order to implement computer technology, administrators must be involved in the development of instructional programs using computers (Miller, 1988). However, administrators and teachers themselves need to become part of a learning environment that includes computers.

The Purpose of the Study

The purpose of this study was to examine the role of administrators in selecting and implementing computer technology in Kalamazoo Public Schools by participating in Michigan's "Classroom of Tomorrow" program proposed by former Governor Blanchard in his 1989 state of the state message. The main focus of the "Classroom of Tomorrow" program was on placing computer technology into the hands of teachers
and students who characteristically do not have the opportunity to use computer technology for daily instruction and instructional learning. This program was to inspire Michigan students and teachers to use computer technology and to improve the learning skills of tomorrow's work force. The idea undergirding the program was to place approximately 10,000 computers in Michigan public schools by the fall of 1990.

Recently Kalamazoo Public Schools participated in Michigan's "Classroom of Tomorrow" program. They received 170 computers of various types (i.e., Apple, IBM, etc.) for teachers to integrate into their classrooms. To date, there are no reports or research studies that discuss the success or lack of success of the processes used to select and implement the computers in the different schools in Kalamazoo. This study examined those processes of selection and implementation by both administrators and teachers. The following questions were developed to guide this study.

Research Questions

1. What is the level of participation of administrators and teachers with regard to selection and implementation of computer technology?

2. What is the relationship, if any, between in-school training activities and out-school training activities of selection and implementation processes by administrators and teachers?

3. What is the percentage of administrators and teachers consulting with the intermediate school district (ISD) and regional educational media centers (REMCs) in the processes of selection and implementation of computer technology?
4. What is the percentage of amount of input into the processes of selection and implementation of computer technology by administrators and teachers?

5. What is the satisfaction level of administrators and teachers with regard to the following: (a) quality and amount of software selected, (b) quality and amount of hardware selected, (c) use of educational technology, and (d) administration support?

6. What is the effect of the "Classroom of Tomorrow" program on schools?

Clarification of Terms

Classroom of Tomorrow: The main focus of the "Classroom of Tomorrow" program was to place computer technology into the hands of teachers and students who characteristically do not have the opportunity to use computer technology for daily instruction and instructional learning (Blanchard, 1989). The Michigan plan was to put 10,000 computers in classrooms across the state.

Implementation: In a report to the Michigan Legislature in January 1990, the implementation plan for the "Classroom of Tomorrow" program must meet the needs of all Michigan students and teachers. This plan includes the following: facilities, staffing, training, security, maintenance, and strategic planning.

In-school training activities: Examples of questions of in-school training are as follows:

1. In what kind of in-school training activities, such as teachers' support group, did teachers participate?
2. Did they receive any computer literature about what computers were available to them?

3. Did administrators and teachers get any training within their school?

4. Did administrators and teachers share or use any references from students' parents, students, teachers, or organizations in the community?

**Out-school training activities:** Examples of out-school training include:

1. Did administrators and teachers participate in any summer workshops or after or during school training workshops?

2. Did administrators and teachers get the opportunity to go to conferences?

3. Did administrators and teachers consult with a computer specialist or did administrators and teachers get a stipend which allowed them to investigate on their own.

**Selection:** On what basis were computers selected? Was there any committee for decision making? Who decided what choices do teachers have and what kind of computers teachers will receive? According to Faflick (1983), "choosing a computer, like selecting a spouse, can be a daunting undertaking" (p. 37). Purchasing hardware and software is a major decision.

**Success:** According to Michigan Department of Education (1990), to ensure the success of the "Classroom of Tomorrow" program, the committee identified several essential components which must occur, either concurrently or as a direct result of the efforts of this program.
Included are (a) strategic planning, (b) teacher education, (c) curriculum integration, (d) regional coordination and technical assistance, and (e) partnerships with business and industry. The success of computer technology implementation depends on a number of factors, including planning, leadership, facilities, staffing, security, maintenance, training, and the role of administrators in the use of the technology.

**Hardware:** Hardware in this study is interpreted as: "(1) machines and media; physical equipment as opposed to computer programs or methods of use; and mechanical, magnetic, electrical, or electronic devices" (O'Brien, 1988, p. 7).

**Software:** For purposes of this study software will be understood as "computer programs and procedures concerned with the operation of an information system" (O'Brien, 1988, p. 15).

**Assumptions**

When conducting this study, the first assumption was that participants answered the questions on the questionnaires selected as honestly as they could. The second assumption was also made that there is no difference in the level of participation of administrators and teachers with regard to selection and implementation of the computer technology. The third assumption was that selection and implementation of computer technology is not influenced by the location of training; that means it does not matter to administrators and teachers whether they have training in their school or somewhere else out of their school. The result of the training won’t affect the selection and implementation of computer technology.
Organization of the Study

In Chapter I, an introduction to the problem studied, background of the problem, the purpose of the study, explanation of terms, research questions, definition of terms, and assumptions of the study were presented. A review of selected literature on the "Classroom of Tomorrow," computer usage by administrators, computer technology implementation, successful computer implementation, decision-making process, and the role of administrators are presented in Chapter II. In Chapter III, the methodology and research design are discussed. Chapter IV presents the study's findings. Conclusions and recommendations of the study are presented in Chapter V.
CHAPTER II

REVIEW OF THE LITERATURE

This study examined the roles of administrators and teachers in selecting and implementing computer technology in Kalamazoo Public Schools, Kalamazoo, Michigan, by participating in Michigan's "Classroom of Tomorrow" program proposed by former Governor Blanchard in his 1989 state of the state message. The main focus of the "Classroom of Tomorrow" program was on placing computer technology into the hands of teachers and students who characteristically do not have the opportunity to use computer technology for daily instruction and instructional learning (Blanchard, 1989).

This section contains a review of related literature in the following areas: (a) "Classroom of Tomorrow" program, (b) role of administrators, (c) implementation of computer technology, (d) selection of computer technology, (e) administrators' and teachers' training, and (f) successful computer implementation.

"Classrooms of Tomorrow"

Former Governor Blanchard, in his 1989 state of the state message, proposed the "Classrooms of Tomorrow" program with the following comments:

In our schools there are no clocks or bells that ring every 50 minutes, no longer requiring students to turn on and off from subject to subject. Videodisks, computers and modems are as commonplace as blackboards, desks and notebooks were
in the past. Seated at their own computer, students learn at their own pace, encouraged to explore and question, experiment and analyze" (p. Fiii).

He proposed $50 million to allow the state of Michigan to dramatically increase the number of computers in classrooms. The Department of Education was directed by the Governor and the Legislature to develop guidelines and recommendations for the "Classroom of Tomorrow" program.

The main focus of the "Classroom of Tomorrow" program was to place computer technology into the hands of teachers and students who characteristically do not have the opportunity to use computer technology for daily instruction and instructional learning. This program was to inspire Michigan students and teachers to use computer technology and to improve the learning skills of tomorrow's work force. The idea undergirding the program was to place approximately 10,000 computers in Michigan public schools (Blanchard, 1989). In the fall of 1990, Kalamazoo Public Schools participated in Michigan's "Classroom of Tomorrow" program. In this process they received 170 computers of various types (i.e., Apple, IBM, etc.). Elementary schools received 126, middle schools received 16, the high schools received 26, and community education center received 2 computers for teachers to integrate into their classrooms. To date, there are no reports or research studies that discuss the success or lack of success of the processes used in the selection and the implementation, and the effect of computer technology on schools in Kalamazoo.
Role of Administrators

In today's society computer technology can improve school productivity by reducing time to process data to generate reports and information, and by making it easier to access and understand. Administrators are responsible for managing their school system function. This includes supervising, solving problems, and making decisions.

The computer can also be an important tool for school administration and for instructional use. Indeed, a 1987 survey by Electronic Learning (Barbour, 1987) showed that 71% of school administrators use computers for some management tasks. The most common use noted in the study was for word processing; but attendance, budgeting, inventory management, and test scoring also rated highly.

Because the computer is an important educational and administrative tool, the better the administrators understand and use the tool, the better a computer can provide an administrator with quality information to serve as a basis for decision making (Hoover & Gould, 1982).

According to Kearsley (1990), in order for administrators to be productive in their function they need to understand, learn, and use computer technology and become proficient with computer applications such as word processing, spreadsheets, database, and telecommunications, as well as mastering one of the integrated software packages available. As the administrator performs these functions, he or she needs information and facts on which decisions and actions can be based.
Administrators need to be able to use computer technology in database and management information, personnel records, scheduling, registration, budgeting, attendance accounting, testing, grading, reporting, library circulation and cataloging, payroll, inventory, food services, counseling, and transportation (Spuck & Bozeman, 1988; Williams, 1984).

However, there is also consideration which must be paid to the type of computer selected. In a 1987 survey by Electronic Learning (Barbour 1987) showed that the machine of choice for administrative use in most schools was the IBM or IBM-compatible computers. The Apple Macintosh was chosen as friendly and the most frequently used. Also it was noted in the same study on software use that no clear software leaders emerged, but integrated packages such as Microsoft Works or Lotus 1,2,3 were the most frequent choices (Barbour, 1987). It would seem that the responsibilities of an administrator may influence the computer skills and knowledge needed to select hardware and software to help in implementing computer technology for the "Classroom of Tomorrow" program. Knezevich (1975) defined 16 important functions in school administration: (1) anticipating, (2) orienting, (3) programming, (4) organizing, (5) staffing, (6) researching, (7) leading, (8) executing, (9) changing, (10) diagnosing-analyzing conflict, (11) deciding-resolving, (12) coordinating, (13) communicating, (14) politicking, (15) controlling, and (16) appraising. Some of these functions are related to integration of computer technology into the school system.
As computers are an important tool for administrators, the more knowledge and skills on the use of computers the more the computer can help to provide an administrator with quality information (Hoover & Gould, 1982). School administrators often must produce reports to show information and to keep track of student performance, school maintenance, and to assess and report performance by using different computer applications. For years, administrators had been frustrated by the difficulty of getting fast, accurate answers to their many questions. With the advanced development of software application designed for teacher and administrative use in schools the use of computer technology has shifted from the availability of the information to administrators to selection and generation of different types of reports. According to Marshall (1982b), "information is a basic requirement for good decision making" (p. 6). Administrators must have knowledge and information on computer technology so it will help them decide what type of hardware and software is needed by their schools.

Uninformed administrators are vulnerable to mistakes that affect the implementation and maintenance of their program (Martin & Heller, 1984). In a study conducted in May of 1984 involving 138 school principals from a large urban school district, it was indicated that there is a significant need to develop computer competency in order to utilize the potential of computer technology (Montague & King, 1985). Another research study indicated a need for administrators to become literate in the utilization of computer technology as an instructional strategy. In a study conducted on the needs assessment of 312 administrators (Jarchow & Hunter, 1983), it was indicated that 70% of the
respondents lacked computer competency. Furthermore, a survey of 422 principals conducted by Price and Stephens (1984) found that most principals suffer from microcomputer inexperience and lack of literacy related to using the computer as an instructional tool.

Implementation of Computer Technology

According to Gillman (1988/1989), implementation embodies the developmental context where decisions are made about strategies that represent the means for gaining desired ends. Several subdivisions, such as analysis, logistics, and administration represent the resolution, strategic, and executive modes, respectively. According to Gillman, the analysis dissects the relationships between the outputs of the system and resources/conditions required to achieve them. It also establishes the criteria of accomplishment. Second, logistics is the planning, design, coordination of the diffusion strategies, which include organizational and professional development; provision of support personnel; and procurement of materials, equipment, and facilities. Third, administration includes leadership of the decision-making cycle associated with development and management of the intervention and transformation procedures.

Clearly, as Bond and Himmler (1985) observed in the field, ambiguity in the implementation process is linked to ambiguity concerning educational computer goals. Planning, as such, then becomes the rationalization of the adoption decision. This means that innovation bogs down in the implementation stage and little integration of the innovation into the educational program will ever take place.
Microcomputer implementation, like most change involving social systems, seemingly does not proceed in a series of sequential steps. Neither can the process be imposed unilaterally. Those who would hope to direct such development must plan strategies that influence operations at all organizational levels within the system. They must also influence the level of support in the external environment.

Development is a comprehensive process that culminates in adoption of the effective use of the technology. Clearly, leadership must be applied and energy exerted continuously through the six successive developmental stages identified by Winner (1983): awareness, interest, evaluation, trial, adoption, and integration. Awareness is the critical first stage in the implementation process. Then, interest must be maintained through the initial period of discomfort associated with lack of knowledge until teachers move on to the exploratory and experimental stages. If these first two stages are enforced, evaluation and trial take place in the best heuristic manner. It has been found that only then do teachers show interest in more permanent computer access for students and that curriculum development actually commences, finally culminating in adoption and integration of the technology (Winner, 1983).

The components of a conceptual planning model for microcomputer integration have been partially validated through research. They include a supported task force, district assessment and goal setting, a coordinating committee for applications (courseware selection), staff in-service training, and process evaluation (Metschke, 1986).

Among the impediments to effective planning for computer education, the following appear to be most important: lack of control of
hardware decisions, unavailability of high quality educational software, lack of adequate computer-based curricula, and lack of appropriate training for program implements (Linn & Fisher, 1984).

Most of the research literature has not so far addressed the comparative advantages of the various microcomputer diffusion-linkage strategies. It is hoped that the basis for major problem-solving strategies is implicit in the issues discussed here, because there is no cookbook approach to educational administration and leadership. By definition, contingency management theory rests on the existence of a communication structure within an organization that provides the necessary inputs for decision-making. It is the challenge of administration to take the available information and exert the necessary leadership to meet contingencies and find satisfactory solutions.

In administration the participation of the principal as change leader, particularly at the elementary level, and as manager of implementation strategies appears to be critical (Elliott, 1983/1984) to the maintenance of effort over the 3-to-4-year period required to pass through all implementation stages. Further, it has been determined that the chief motivation for the introduction and utilization of microcomputers at the elementary level comes from administrative initiative (Wilson, 1982).

It might be noted here that the teacher hiring practices of many principals, whether guided by policy or not, were generally found faulty in not emphasizing the criteria of training or experience in microcomputer use (Schimmizzi, 1983; Zartman, 1984). This has resulted in a lack of improvement in the technological literacy level of school faculties.
Based on the goals and objectives of the Michigan Department of Education (1992) technology plan, administrators must develop a process for simultaneous activity in three areas: staff training, purchasing hardware, and developing courseware.

In a report to the Michigan Legislature in January 1990, the implementation plan for the "Classroom of Tomorrow" program must meet the needs of all Michigan students and teachers. However, implementation of computer technology can only proceed with skillful administration of resources and computer technology. The more knowledge administrators have about the computer and its applications, the more they will be able to make appropriate decisions regarding the implementation. Leithwood and Montgomery (1982) noted that one of the greatest obstacles to program improvement stems from the principal's own lack of knowledge, skill, and motivation.

Selection of Computer Technology

Selecting a computer is one of the most difficult decisions an administrator can make. This investment of time and money creates high public interest in the decision and carries enormous consequences with the choice. According to Faflick (1983), "choosing a computer, like selecting a spouse, can be a daunting undertaking" (p. 37). Purchasing hardware and software is a major decision. According to S. Frankel (1982), "too often, however, the micro appears before anyone has thought about how to use them or even which brand to buy" (p. 17). Administrators who have experience and familiarity with computer technology recognize that selecting the most appropriate model depends
on how the microcomputer will be used.

During the past years, computer manufacturers have targeted their promotional programs to reach a new audience—schools. Different types of computer hardware models are available. Capacity for memory, different speed, size of disk drive, capacity of hard disk drives, type of monitor, type of printer, type of scanners, compact desk multimedia, speed of modem, and type of keyboard entail choices which must be made. While most computers perform the same tasks, they use different computer software.

Since 1980 computer technology has become more available and powerful. In addition, different software for educational and administrative use is available. However, there are several reasons why computers haven't made a good impact on learning. Researchers site a lack of equipment, hardware, appropriate educational software, poor teacher training, a lack of consensus on how to use this new technology, a lack of standardization, a lack of state regulations and funding, and a lack of familiarity with instructional computing at top levels (Gayeski, 1989). The term "top level" is being used here to describe those individuals of a school district, department of education, and board members associated with allocating resources, determining policies, and decision making of implementing computer technology in the school system.

Administrators must address many basic considerations in selecting and implementing computer technology as an instructional tool. Because of their position as administrators, they are involved in decision making related to selecting and implementing hardware, software,
teacher training, staff training, classroom curriculum, and the location(s) of equipment and the use of it.

Administrators and Teacher Training

As a result of implementing computer technology for instructional purposes, many administrators and teachers are now confronted with the need to improve their degree of knowledge and familiarity with instructional computing. There is a need for administrative training that reflects the realities of the workplace. Unfortunately, the past 30 years have produced few real improvements in training administrators. The training programs have been directed mainly to concerns other than those related to instructional strategies. Most preservice training excludes any in-depth study of curriculum or instruction (Murphy & Hallinger, 1987).

Maddux (1988) stated that a crisis has seemed to occur in educational computing as a result of a trend that has placed administrators who are not scholars in charge of making scholarly decisions. She pointed the finger at the training administrators have received by claiming that universities have not changed with the times. It is time for programs that train administrators to include technological literacy as a means for addressing contemporary issues in education (Handler, 1987). Administrators need more and better training as technology continues to alter the instructional methodologies within a changing educational environment (Kurshan, 1986).
Successful Computer Implementation

The success of computer technology implementation depends on a number of factors, including planning, leadership, facilities, staffing, security, maintenance, training, and role of the administrators in the use of the technology and the design of the software.

According to Michigan Department of Education (1990), to ensure the success of the "Classroom of Tomorrow" program, the committee has identified several essential components which must occur, either concurrently or as a direct result of the efforts of this program: (a) strategic planning, (b) teacher education, (c) curriculum integration, (d) regional coordination and technical assistance, and (e) partnerships with business and industry.

According to Branscum (1992), every state, every school district, and every school should develop a plan in consultation with teachers, students, parents, and school administrators to integrate computers and related technology into the curriculum. Each teacher should have a computer and adequate training to use it effectively.

Technology holds great promise for the education system. Administrators, teachers, and students need to have access to the computer equipment, and they need the power to change their environment and the educational system. Citizens, parents, and business people have that power if they can muster the collective will to press educators and legislators for change. It will not be easy. Change comes slowly to a school system beset by so many problems.
Summary

The computer is a powerful tool in society, changing the way people live, work, and learn. To prepare young people both to enter the job market and to take their place in society, schools must address the issue of computer use in the education system. Moreover, the computer has potential for assisting the learning process. This chapter has presented a review some of the relevant literature to "Classroom of Tomorrow" program. The main focus of this program was to place computers into the hands of teachers and students for daily instruction and instructional learning. Based on the goals and objectives of Michigan Department of Education (1992) Technology Plan, administrators and teachers must develop a process for simultaneous activity in three areas: staff training, purchasing hardware, and developing courseware. Selecting and implementing computer technology in schools demands specialized knowledge, planning, and training skills which are necessary for understanding use of computer technology in instructional learning. Selecting a computer is one of the most difficult decisions an administrator can make. According to Faflick (1983), "choosing a computer, like selecting a spouse, can be a daunting undertaking" (p. 37). Administrators who have experience and familiarity with computer technology recognize that selecting the most appropriate model depends on how the microcomputer will be used. The success of computer technology implementation depends on a number of factors, including planning, leadership, facilities, staffing, security, maintenance, training, role of the administrators in the use of the technology, and the design of the software.
Organization of the Study

The review of selected literature on the "Classroom of Tomorrow," computer program role of administrators and teachers in the selection and implementation of computer technology, training, and successful computer implementation have been presented in Chapter II. In Chapter III, the methodology and research design are discussed. The findings of the study are presented in Chapter IV. Conclusions and recommendations of the study are presented in Chapter V.
CHAPTER III

METHODOLOGY AND RESEARCH DESIGN

The purpose of this study was to examine the roles of administrators and teachers in selecting and implementing computer technology in Kalamazoo Public Schools, Kalamazoo, Michigan. Recently Kalamazoo Public Schools participated in Michigan's "Classroom of Tomorrow" program. They received 170 computers of various types (i.e., Apple, IBM, etc.). Elementary teachers received 126, middle schools received 16, high school teachers received 26, and the community education center received 2 computers for teachers to integrate into their classrooms. To date, there are no reports or research study on the success or lack of success of the processes used to select and implement the computers in the different schools in Kalamazoo.

This study was designed to investigate (a) the process(es) used to select and implement computer technology, (b) the role of administrators and teachers in the process(es) used to select and implement computer technology in the schools selected for study, and (c) the effect of the "Classroom of Tomorrow" program. This chapter presents a detailed description of the study that was developed and the discussion of methods and procedures used to test the hypotheses.
Overview of the Study

The purpose of this chapter is to discuss the (a) research questions, (b) sample, (c) research setting, (d) variables, (e) instrumentation, (f) procedures of data collection, and (g) data analysis.

Research Questions

This study used a survey research design. The researcher investigated the following set of questions:

1. What is the level of participation of administrators and teachers with regard to selection and implementation of computer technology?

2. What is the relationship, if any between in-school training activities and out-school training activities of selection and implementation processes by administrators and teachers?

3. What is the percentage of administrators and teachers consulting with the intermediate school district (ISD) and regional educational media centers (REMCs) in the processes of selection and implementation of computer technology?

4. What is the percentage of amount of input into the processes of selection and implementation of computer technology by administrators and teachers?

5. What is the satisfaction level of administrators and teachers with regard to the following: (a) quality and amount of software selected, (b) quality and amount of hardware selected, (c) use of educational technology, and (d) administration support?
6. What is the effect of the "Classroom of Tomorrow" program on schools?

Sample Population

The population for this study included all 18 elementary school principals and 126 elementary school teachers who participated in the "Classroom of Tomorrow" program and received a computer to be used in Kalamazoo Public Schools. Since the study took the target population, randomization was not necessary. A target population, according to Borg and Gall (1983), is formed by all members of the population to be studied. The involvement of the population allowed the generalization of the findings to be more accurate and precise. The larger the sample, the smaller the standard of error (Ary, Jacobs, & Razavieh, 1985).

Research Setting

The context for this study was one school district in Kalamazoo County in Michigan, specifically Kalamazoo Public Schools. The focus of this study was on the 18 elementary schools within the Kalamazoo Public Schools District. Elementary schools were selected because they had more participants in the program than the middle or high schools. From the 170 computers received for the "Classroom of Tomorrow" program to the Kalamazoo Public Schools District, 126 computers went to elementary schools. Table 1 shows the number of computers distributed to schools and description in terms of its kind, PC2, IBM, or Macintosh (Mac).
The results are presented in Table 1. In this table, findings show that out of the 126 computers selected, only one Macintosh computer and one IBM computer were selected; 124 computers were Apple II GS, with no hard disk drive for storage information.

Variables

As described in Chapters I and II, the role of administrators and teachers as defined by the participation level in selection and implementation of computer technology is one set of variables which was examined in this study. The other set of variables included in-school training activities and out-school training activities for selection and implementation of computer technology. The other issue which was examined related to actions and decisions made by the school administrators and teachers effecting the total impact of the "Classroom of Tomorrow" program.

For the purpose of this study, the role of administrators and teachers was defined by (a) level of participation and (b) the amount of input into the process activities of the selection and implementation. The level of participation for the administrators and teachers was measured by a researcher-developed questionnaire using a Likert-type scale (1 = not at all significant, 2 = somewhat significant, 3 = fairly significant, and 4 = very significant). The in-school training activities and out-school training activities of selection and implementation processes by administrators and teachers were measured by the questionnaire using a Likert-type scale (1 = not at all useful, 2 = somewhat useful, 3 = fairly useful, and 4 = very useful). The Likert scale was used.
<table>
<thead>
<tr>
<th>School</th>
<th>Apple II GS</th>
<th>Mac</th>
<th>IBM</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arcadia</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Chime Street</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Edison</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Greenwood</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Indian Prairie</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Lakewood</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Lincoln</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Martin L. King</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Milwood</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Northeastern</td>
<td>15</td>
<td>0</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>Northglade</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Oakwood</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Parkwood-Upjohn</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Spring Valley</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Washington</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Winchell</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Woods Lake</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Woodward</td>
<td>13</td>
<td>1</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>124</strong></td>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
<td><strong>126</strong></td>
</tr>
</tbody>
</table>
because it is believed to be a more widely known and more easily understood way of measuring attitudes or opinions (Shaw & Wright, 1967).

Instrumentation

For this study, a survey research design was used. Survey research is probably the single most widely used research type in educational research. Wiersma (1991) categorized them into two types, longitudinal and cross-sectional. Cross-sectional surveys involve data collection at only one point in time. Longitudinal surveys involve the collection of data over time and at specified points in time. This study used a cross-sectional survey instead of the longitudinal method. The cross-sectional designs have some logistical advantages over the longitudinal designs. Data collection is not spread over an extended time period and a potentially difficult follow-up of individuals is not necessary. The researcher developed a questionnaire for all 126 teachers and 18 principals of the elementary schools' population. It should also be noted that the questionnaire was developed to be usable within the "Classroom of Tomorrow" program in the state of Michigan only.

Development

In attempting to develop the actual questionnaire, experts were interviewed in order to develop the items on the questionnaire. The first expert to be interviewed was Dr. Deb Small from the Department of Education at Lansing. The second individual was Kelly Sweet at Kalamazoo Public School Administration Building, an expert in the area of working with the elementary teachers. The third expert was Dr. Howard
Poole, the director of Computer and Media Services at Western Michigan University. The fourth group of experts was a group of teachers from Loy Norrix High School and Central High School; those teachers were recipients and participants in the "Classroom of Tomorrow" program. The researcher also referred to the questionnaire used by the National Education Association "Computers in the Classroom" survey of 1982 and Western Michigan University Faculty/Staff Computing Questionnaire of 1989. From these interviews, potential items were outlined from the issues highlighted by experts.

The researcher developed the survey questionnaire to collect data in the following areas: (a) the process(es) used to select and implement computer technology, (b) the role of the administrators in the process(es) used to select and implement computer technology in the schools selected for study, and (c) the effect of the "Classroom of Tomorrow" program on schools. Once the questionnaire was finalized, it was sent to the printers and proofs were obtained. As the forms were received, the ambiguity and the suitability of the questionnaire were cross-checked.

Questionnaire Format

The development process resulted in the following parts with respective parts' items (Appendices C and D): Part 1: the level of participation of administrators and teachers with regard to selection and implementation of computer technology; Part 2: the process used to select and implement computer technology for "Classroom of Tomorrow" program; Part 3: type of selection and implementation process for
the "Classroom of Tomorrow" program; Part 4: the perceived level of effect for the "Classroom of Tomorrow" program in Kalamazoo; Part 5: professional background information from the participant in "Classroom of Tomorrow" program; and Part 6: additional comments from the participant in "Classroom of Tomorrow" program.

Pilot Study

The purpose of the pilot study was to validate the questionnaire items. Babbie (1973) stated that clarity and representatives of items are of importance. The field study provides an opportunity in the categories of the variables to assess the appropriateness and practicality of the data collection instruments and methods, and checks the reliability of the questionnaire (Ary et al., 1985; Borg & Gall, 1983). The Human Subjects Institutional Review Board at Western Michigan University, Kalamazoo, gave the approval (Appendix H) and the field testing commenced. The pilot study was carried out in two high schools located in Kalamazoo between February 11, 1993, and March 5, 1993. Fifteen administrators and teachers participated in the pilot study. After completing the questionnaire, the pilot group was requested to offer suggestions which would improve the quality of the questionnaire. As a result of the pilot test, participants' comments were used as guidelines for improving the final questionnaire. The researcher followed these results and suggestions; some of the questions were reworded and some were deleted from the questionnaire. The researcher developed one questionnaire for administrators (Appendix C) and one for teachers (Appendix D).
Data Collection Procedures

The Kalamazoo elementary schools were identified as the site for this research. An updated list from Kalamazoo Public Schools was used to prepare a mailing list for the questionnaire. Each of the schools was contacted for permission to conduct the study.

An initial mailing was completed which included a cover letter to Superintendent Dr. Frank Rapley explaining the research project for approval (Appendix A). A cover letter describing the nature of the study and assuring the confidentiality of the information given was also included in the questionnaire package as well as a stamped self-addressed envelope for return to the investigator (Appendix B). On March 10, 1993, the investigator, in person, placed in the 18 elementary schools' mailboxes at the administration building located at 1220 Howard Street in Kalamazoo the questionnaire package for all 18 full-time school administrators and to 126 full-time teachers working in the elementary schools in the Kalamazoo Public Schools (KPS) system. Two weeks following the mailing of the questionnaire, 10 questionnaires from administrators and 35 questionnaires from teachers had been returned. After 4 weeks a reminder was sent out (Appendix G), 2 weeks later the final response rate was 14 from administrators and 73 from teachers. The data collection was completed by the end of May 1993.

Data Analysis

Data collected from the researcher developed questionnaires were analyzed using the Western Michigan University VAX system. All
procedures were done by using the Statistical Package for Social Sciences (SPSS), Release 9.1 (SPSS, Inc., 1990). Statistical analyses were conducted on the data obtained from the questionnaire. An analysis of variance (ANOVA) was originally considered as the primary statistical method to examine the relationship, if any, between the variables. However, due to the fact that the number of respondents in each cell was less than 5, the researcher could not use ANOVA test nor chi-square test (Ary et al., 1985). The t test of independent means was determined to be the appropriate statistical test.

In the analysis of the demographic data of the administrators and teachers, the frequencies of given responses were computed to provide descriptive characteristics of the respondents as follows: (a) sex, (b) age, (c) years of experience, and (d) highest degree.

Two null hypotheses were formulated from research Question 1 and four null hypotheses were formulated from research Question 2. The statistical approach used to test the hypotheses mentioned was the t test for independent means. An alpha level of .05 was set for the rejection of the null hypotheses. Finally, the data from research Questions 3, 4, 5, and 6 were analyzed using descriptive statistics to classify and summarize the data.

Summary

Chapter III has included a description of methods and procedures used in the study. The first section described the overview of the study, the problem, and the research questions. In the second section, the sample and the research setting were described. The third section dealt
with the dependent variables, instrumentation, development, and instrument format. The description of the questionnaire and its validity and reliability were in the fourth section. In addition, the pilot test results, data collection procedures and time schedule were presented. In the fifth section, data analysis was discussed in relationship to the problem of this study. Chapter IV contains the findings of this study of the data in which the research hypotheses to be tested and statistical approaches are explained.
CHAPTER IV

RESULTS

The purpose of this study was to examine the roles of administrators and teachers in selecting and implementing computer technology in elementary schools in the Kalamazoo Public Schools elementary level "Classroom of Tomorrow" program.

Discussed in this chapter are the findings of the research process as described in Chapter III. First, demographic characteristics of the respondents are described in the first section of this chapter. These characteristics include gender, age, experience in education, and their highest degree completed. Analysis of data are presented in the second section with reference to the research questions. In order to test the six null hypotheses formulated from research Questions 1 and 2, the t-test analysis was used. For research Questions 3, 4, 5, and 6, data were analyzed using descriptive statistics to classify and summarize the data. Finally, findings are summarized.

The study used one school district in Kalamazoo County, Michigan, specifically Kalamazoo Public Schools. The focus of this study was on elementary schools within the district. The population for this study included all 18 elementary school principals and 126 elementary school teachers who participated in the "Classroom of Tomorrow" program and received a computer to be used in Kalamazoo Public Schools.
Data collected from the researcher-developed questionnaire were analyzed using the Western Michigan University VAX system. All procedures were done by using the Statistical Package for Social Sciences (SPSS, Inc., 1990). Statistical analyses were conducted on the data obtained from the questionnaire.

Data Analysis and Findings

This study used a survey research design. Wiersma (1991) categorized them into two types, cross-sectional and longitudinal. This study used the cross-sectional survey instead of the longitudinal method. The cross-sectional designs have some logistical advantages over the longitudinal designs. Data collection is not spread over an extended time period and a potentially difficult follow-up of individuals is not necessary, as it is in a panel study. The results of the analysis and interpretation of data were used to investigate the following research questions:

1. What is the level of participation of administrators and teachers with regard to selection and implementation of computer technology?

2. What is the relationship, if any, between in-school training activities and out-school training activities of selection and implementation processes by administrators and teachers?

3. What is the percentage of administrators and teachers consulting with the intermediate school district (ISD) and regional educational media centers (REMCs) in the processes of selection and implementation of computer technology?

4. What is the percentage of amount of input into the processes of selection and implementation of computer technology by
administrators and teachers?

5. What is the satisfaction level of administrators and teachers with regard to the following: (a) quality and amount of software selected, (b) quality and amount of hardware selected, (c) use of educational technology, and (d) administration support?

6. What is the effect of the "Classroom of Tomorrow" program on schools?

Respondents

Response Rate

The Questionnaire(s) of "Classroom of Tomorrow" program (CoT) were distributed to 18 full-time school administrators and to 126 full-time teachers working at the elementary school level in the Kalamazoo Public Schools (KPS) system. An updated list from Kalamazoo Public Schools was used to prepare a mailing list for the questionnaires. Two weeks following the mailing of the questionnaire packages, 10 administrators (55.5%) and 35 teachers (27.7%) had returned their questionnaires. After 4 weeks a reminder was sent out; 2 weeks later a total of 14 (77.77%) questionnaires had been returned from administrators and 73 (57.93%) from teachers. Two teachers reported not having time available to fill out the questionnaires but did return the questionnaires unanswered. They were dropped out of the sample; the final total number of teacher respondents was 71, a 56.34% return rate. The final total number of administrator respondents was 14, a 77.77% return rate.
Characteristics of the Participants

Demographic data were collected on four characteristics of subjects who completed the questionnaire. Questions 13 and 14 located in Part VI of the survey (see Appendix C) asked respondents to provide data on: (a) sex, (b) age, (c) years of experience, and (d) highest degree (baccalaureate, master's, doctoral, or specialist). The demographic characteristics of the subjects are reported for descriptive purposes to alert readers to their possible influence on the findings of the study.

Demographic Data

Respondents (administrators and teachers) were asked to indicate their sex. The answers to this question were analyzed to determine the percentage of male and female respondents. These data are summarized in Table 2.

Table 2
Sex of Respondents: Administrators and Teachers

<table>
<thead>
<tr>
<th></th>
<th>Administrators</th>
<th></th>
<th>Teachers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Male</td>
<td>7</td>
<td>50.0</td>
<td>9</td>
<td>12.7</td>
</tr>
<tr>
<td>Female</td>
<td>6</td>
<td>42.9</td>
<td>58</td>
<td>81.7</td>
</tr>
</tbody>
</table>

Note. Missing = 1 (7.1%) administrator and 4 (5.6%) teachers.
As Table 2 indicates, the percentage of female administrators is 43%. The percentage of male administrators is 50%. It is noted that one of the respondents did not complete this item. The percentage of female teachers is 81.7%. The percentage of male teachers is 12.7%. In comparing the male and female teachers, the number of female teacher respondents was more than the number of male teacher respondents.

Age of Administrators and Teachers

The ages of respondent administrators and teachers were analyzed to determine the percentage of respondents. These data are summarized in Table 3.

Table 3
Age of Respondents: Administrators and Teachers

<table>
<thead>
<tr>
<th>Age</th>
<th>Administrators</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Less than 25</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>26-35</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>36-45</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>46-55</td>
<td>8</td>
<td>58</td>
</tr>
<tr>
<td>More than 56</td>
<td>2</td>
<td>14</td>
</tr>
</tbody>
</table>

Note. Missing = 1 (7%) administrator and 5 (7%) teachers.
Table 3 indicates the distribution of respondents arranged by age. Fifty-eight percent of the administrators fall between 46 and 55 years old; 32% of the teachers fall into the categories of 36-45 and 46-55 years old. The majority of administrators are over the age of 46. There are as many teachers below the age of 36 as above.

Years of Experience of Administrators and Teachers

The administrators and teachers were also asked to indicate the duration of their years of experience in education. The questions were analyzed to determine the percentage in each category of years of experience in education. These data are summarized in Table 4.

Table 4
Number of Years of Experience of Administrators and Teachers

<table>
<thead>
<tr>
<th>Experience</th>
<th>Administrators</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Less than 4</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>5-9</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>10-14</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>15-19</td>
<td>1</td>
<td>7.1</td>
</tr>
<tr>
<td>20-24</td>
<td>5</td>
<td>35.5</td>
</tr>
<tr>
<td>25-29</td>
<td>5</td>
<td>35.5</td>
</tr>
<tr>
<td>30-34</td>
<td>1</td>
<td>7.1</td>
</tr>
<tr>
<td>More than 35</td>
<td>2</td>
<td>14.2</td>
</tr>
</tbody>
</table>

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From findings in Table 4, data show that 9.8% of the teachers had less than 4 years of experience in education, while 14.0% of the teachers indicated that they have 5 to 9 years of experience in education. On the other hand, one administrator (7.1%) and 14 teachers (19.6%) have 10 to 14 years of experience in education. There were 71% of the administrators with between 20 and 29 years of experience. Teachers, on the other hand, are fairly evenly distributed in years of experience. Overall data indicated this is a veteran group of administrators and teachers; however, the teachers indicated somewhat less experience in education than administrators.

Highest Degree Completed

Administrators and teachers were asked to indicate the highest degree completed. These data are summarized in Table 5 by percentage of respondents who completed each degree.

Table 5

<table>
<thead>
<tr>
<th>Degree completed</th>
<th>Administrators</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Baccalaureate</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Master's</td>
<td>8</td>
<td>57</td>
</tr>
<tr>
<td>Specialist</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Doctoral</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>
As shown in Table 5, just over one-half of the administrator respondents (57%) have completed their master's degree; 49% of the teacher respondents have completed their master's degree. Twenty-one percent of administrator respondents and 43.4% of teacher respondents have completed their baccalaureate degree. One of each administrator and teacher respondents have completed their doctoral degree, while 15% of administrator respondents and 5.6% of teacher respondents completed their specialist degree.

The four previous tables (Tables 2-5) provide a composite profile of administrator and teacher respondents. All administrators with the exception of one have 20 years or more experience in education. Teachers, however, have had somewhat less experience, the majority (56.0%) have less than 19 years of experience in education. For the highest degree completed, the majority of administrators indicated they completed their master's degree. Whereas, half of the teacher respondents have their master's degree and half have their baccalaureate degree. Only one administrator and one teacher indicated they completed their doctoral degree. Overall administrators have more experience than teachers, and administrators have attained a higher education degree than teachers.

Test of Hypotheses

Six research questions examined the roles of both administrators and teachers in the selection and implementation of computer technology. From the first research question two null hypotheses were formulated: There are no differences in the mean scores of selection and
implementation activities for administrators and teachers. From the second research question, four null hypotheses were used to test the difference, if any, between in-school training activities and out-school training activities of selection and implementation processes by administrators and teachers.

**Level of Participation in Selection and Implementation**

**Research Question 1:** What is the level of participation of administrators and teachers with regard to selection and implementation of the computer technology?

**Null Hypothesis 1A (administrators):** There is no difference between the mean scores of selection and implementation activities for administrators.

**Null Hypothesis 1B (teachers):** There is no difference between the mean scores of selection and implementation activities for teachers.

In order to test the null hypotheses, the sum score of Items 1 and 2 in Part 1 from the survey, which measured the role of administrators and teachers in selection and implementation of the computer technology in their schools, was analyzed using the t test. The results are presented in Table 6 for the 14 administrators and 71 teachers who responded to Items 1 and 2.

In Table 6, the means, standard deviation, and t-test findings are reported for the variable level of participation of administrators and teachers in the selection and implementation of computers. Administrators' obtained probability level is greater than the .05 alpha level. Therefore, the null hypothesis was not rejected at the .05 alpha level. These

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Table 6
Comparison Between Selection and Implementation Activities by Administrators and Teachers

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>df</th>
<th>t</th>
<th>tcv</th>
<th>2-tailed prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrators' role in:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selection</td>
<td>14</td>
<td>2.64</td>
<td>1.15</td>
<td>14</td>
<td>0.81</td>
<td>2.16</td>
<td>.435</td>
</tr>
<tr>
<td>Implementation</td>
<td>14</td>
<td>2.50</td>
<td>1.22</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers' role in:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selection</td>
<td>71</td>
<td>1.81</td>
<td>1.04</td>
<td>70</td>
<td>-2.07</td>
<td>1.98</td>
<td>.042*</td>
</tr>
<tr>
<td>Implementation</td>
<td>71</td>
<td>2.02</td>
<td>1.05</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>71</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05.

findings did not detect any difference (p < .05) between the mean score of administrators' roles played in the selection and implementation of the computer technology. Consequently, the null hypothesis that there is no difference in the mean scores between administrators' role in the selection and implementation was not rejected. Teachers' obtained probability level is smaller than the .05 alpha level. Therefore, the null hypothesis was rejected at the .05 alpha level. For teachers these findings show that there is a difference in the role that teachers play in the selection and implementation of computer technology. Consequently, the null hypothesis that there is no difference in the mean scores between the
teachers' role in the selection and the teachers' role in the implementa-
tion was rejected.

In-School and Out-School Training Activities

Research Question 2: What is the relationship, if any, between in-
school training activities and out-school training activities of selection
and implementation processes used by administrators and teachers?

Null Hypothesis 2A (administrators): There is no difference be-
tween mean score for in-school training activities and out-school training
activities of selection processes by administrators.

Null Hypothesis 2B (administrators): There is no difference be-
tween mean score for in-school training activities and out-school training
activities of implementation processes by administrators.

Null Hypothesis 2C (teachers): There is no difference between
mean score for in-school training activities and out-school training activi-
ties of selection processes by teachers.

Null Hypothesis 2D (teachers): There is no difference between
mean score for in-school training activities and out-school training activi-
ties of implementation processes by teachers.

Examples of questions from the questionnaire are as follows:

1. "How and where training was provided for them?"

2. "What kind of computer training was available for them in the
   in-school training?"

3. "Was there any outside training such as in summer, after
   school, or during school hours training workshop?"
4. "Were there any conferences in which they could participate?"

5. "Were there computer specialists to offer in-school training or workshops?"

6. "Were stipends or academic training classes offered?"

Examples of questions related to out-school training are:

1. "Was there any computer literature or reference material around?"

2. "Was there a student/parent/community or teacher support group?"

3. "Was there any consultation with computer consultants or with the teachers and students who already use computers?"

In order to test these hypotheses, the sum score of Items 1 in Part 1 and Items A-P in Part 2, Question 3, from the survey (see Appendix C) for administrators and teachers (see Appendix D) which measured in-school training activities and out-school training activities of selection of computer technology, was analyzed using the $t$ test. The results are presented in Tables 7 and 8 for the 14 administrators and 71 teachers.

Table 7 shows the mean, standard deviation, and $t$-test findings for the variable in-school training activities and out-school training activities of selection and implementation processes by administrators. The results are as follows:

For null Hypothesis 2A (selection), the administrators' obtained probability level is greater than the .05 alpha level. Therefore, the null hypothesis was not rejected at .05 alpha level. These findings show that there is no difference in mean score for in-school training activities.
Table 7
Comparison of In/Out-School Training Activities of Selection and Implementation Processes by Administrators

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>df</th>
<th>t</th>
<th>tcv</th>
<th>2-tailed prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Selection</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-school training</td>
<td>14</td>
<td>2.71</td>
<td>0.99</td>
<td>13</td>
<td>0.43</td>
<td>2.16</td>
<td>.671</td>
</tr>
<tr>
<td>Out-school training</td>
<td>14</td>
<td>2.64</td>
<td>1.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Implementation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-school training</td>
<td>11</td>
<td>2.27</td>
<td>0.90</td>
<td>10</td>
<td>-0.56</td>
<td>2.22</td>
<td>.588</td>
</tr>
<tr>
<td>Out-school training</td>
<td>11</td>
<td>2.36</td>
<td>0.92</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05.

and out-school training activities of selection processes by administrators.

For null Hypothesis 2B (implementation) the administrators' obtained probability level is greater than the .05 alpha level. Therefore, the null hypothesis was not rejected at .05 alpha level. These findings show that there is no difference in mean score for in-school training activities and out-school training activities of implementation processes by administrators.

Table 8 shows the mean, standard deviation, and t-test findings for the variable in-school training activities and out-school training activities.
Table 8
Comparison of In/Out-School Training Activities of Selection and Implementation Processes by Teachers

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>df</th>
<th>t</th>
<th>tcv</th>
<th>2-tailed prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Selection</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-school training</td>
<td>71</td>
<td>0.77</td>
<td>1.04</td>
<td>55</td>
<td>0.32</td>
<td>2.16</td>
<td>.749</td>
</tr>
<tr>
<td>Out-school training</td>
<td>71</td>
<td>0.90</td>
<td>1.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>71</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Implementation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-school training</td>
<td>60</td>
<td>2.36</td>
<td>0.63</td>
<td>60</td>
<td>1.60</td>
<td>2.20</td>
<td>.115</td>
</tr>
<tr>
<td>Out-school training</td>
<td>60</td>
<td>2.20</td>
<td>0.86</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05.

activities of selection and implementation processes by teachers.

For null Hypothesis 2C (selection), the teachers' obtained probability level is greater than the .05 alpha level. Therefore, the null hypothesis was not rejected at .05 alpha level. These findings show that there is no difference in mean score for in-school training activities and out-school training activities of selection processes by teachers.

For null Hypothesis 2D (implementation), the teachers' obtained probability level is greater than the .05 alpha level. Therefore, the null hypothesis was not rejected at .05 alpha level. These findings show that there is no difference in mean score for in-school training activities.
and out-school training activities of implementation processes by teachers.

Consulting With ISD and REMCs

Research Question 3: What is the percentage of administrators and teachers consulting with the intermediate school district (ISD) and regional educational media centers (REMCs) in the processes of selection and implementation of computer technology?

Responses to items in Part III, Question 6, from the administrators' questionnaire (see Appendix C), responses to Part III, Question 11 from the teachers' questionnaire (see Appendix D) were analyzed for this research question. For both administrators and teachers, the percentage of respondents consulting with regional educational media centers (REMCs) and percentage of respondent consulting with the intermediate school district (ISD) is presented in Table 9.

Table 9
Percentage of Administrators and Teachers Who Consulted With ISD and REMCs

<table>
<thead>
<tr>
<th></th>
<th>Administrators</th>
<th></th>
<th>Teachers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Yes</td>
<td>No</td>
<td>N</td>
</tr>
<tr>
<td>ISD</td>
<td>14</td>
<td>35.7</td>
<td>64.3</td>
<td>71</td>
</tr>
<tr>
<td>REMCs</td>
<td>14</td>
<td>28.6</td>
<td>71.4</td>
<td>71</td>
</tr>
</tbody>
</table>

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Only 35% of administrators responded that they consulted with ISD. Even fewer (28%) administrators responded they had consulted with REMCs. Teachers were less inclined to consult with either ISD or REMCs; 11% responded that they had any consultation with either agency.

The Amount of Input by Activity for Administrators

Research Question 4A (administrators): What is the percentage of the amount of input into the processes of selection and implementation of computer technology by administrators?

Examples of questions from the questionnaire which provided data for this question are as follows:

1. "Were hardware and software brought in for preview and evaluation?"

2. "Were administrators and teachers encouraged to select based on their needs of hardware/software?"

3. Does the school district currently have a school improvement process?"

4. "Does the school district have a computer technology consultant or specialist?"

5. "How did the amount of input into the implementation processes of computer technology reflect the goals, objectives, and procedures to assure that a quality selection of computers was made?"

6."Was there a regular systematic plan for the selection of hardware and software?"
7. "Were administrators aware (informed) of any training in computer use provided by the school district?"

8. "Did administrators participate in any structured computer orientation sessions before implementing computers in your school?"

Items A, B, J, and I in Part III, Question 7 from administrators' questionnaire (see Appendix C) measured the amount of input into the selection processes by administrators. Items E, F, M, O, and Q in Part III, Question 7 from administrators' questionnaire (see Appendix C) measured the amount of input into the processes of implementation by administrators. Table 10 represents the amount of input activities.

The results are percentages presented in Table 10. This table shows the findings for the amount of input into the selection processes by administrators. Only 21% of the administrators reported using preview and evaluation to select software and hardware, and only 28% of administrators were encouraged to select their needs of technology. A high percentage of administrators responded that their school district does have a school improvement process.

In addition, 50% of the administrators reported that the school district has a technology consultant and a technology specialist. On the amount of input into the implementation processes by administrators, 50% of the administrators reported that they don't know if there is a school policy reflecting goals and objectives of the selection, while 35% of the administrators responded that there was no regular systematic plan for selection of hardware and software. However, 64% of the administrators reported that they were aware (informed) of a training
Table 10
The Amount of Input by Activities for Administrators in the Selection and Implementation Processes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Missing</th>
<th>%</th>
<th>Don't know</th>
<th>%</th>
<th>Yes</th>
<th>%</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Selection</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preview and evaluation</td>
<td>1</td>
<td>7.1</td>
<td>1</td>
<td>7.1</td>
<td>3</td>
<td>21.4</td>
<td>9</td>
<td>64.3</td>
</tr>
<tr>
<td>Encouraged to select</td>
<td>1</td>
<td>7.1</td>
<td>2</td>
<td>14.3</td>
<td>4</td>
<td>28.6</td>
<td>7</td>
<td>50.0</td>
</tr>
<tr>
<td>District improvement</td>
<td>1</td>
<td>7.1</td>
<td>1</td>
<td>7.1</td>
<td>12</td>
<td>85.7</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Technology consultant</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>14.3</td>
<td>7</td>
<td>50.0</td>
<td>5</td>
<td>35.7</td>
</tr>
<tr>
<td>Technology specialist</td>
<td>1</td>
<td>7.1</td>
<td>1</td>
<td>7.1</td>
<td>7</td>
<td>50.0</td>
<td>5</td>
<td>35.7</td>
</tr>
<tr>
<td><strong>Implementation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goals, objective, policy</td>
<td>0</td>
<td>0.0</td>
<td>7</td>
<td>50.0</td>
<td>2</td>
<td>14.3</td>
<td>5</td>
<td>35.7</td>
</tr>
<tr>
<td>Selection plan</td>
<td>0</td>
<td>0.0</td>
<td>4</td>
<td>28.6</td>
<td>5</td>
<td>35.7</td>
<td>5</td>
<td>35.7</td>
</tr>
<tr>
<td>Informed for training</td>
<td>1</td>
<td>7.1</td>
<td>1</td>
<td>7.1</td>
<td>9</td>
<td>64.3</td>
<td>3</td>
<td>21.4</td>
</tr>
<tr>
<td>Orientation sessions</td>
<td>1</td>
<td>7.1</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>14.3</td>
<td>11</td>
<td>78.6</td>
</tr>
</tbody>
</table>

program. Data indicated that 78% of administrator respondents did not participate in an orientation session.

The Amount of Input by Activity for Teachers

Research Question 4B (teachers): What is the percentage of the amount of input into the processes of selection and implementation of computer technology by teachers?
This research question examined the amount of input by activities that teachers had into the processes of selection and implementation of computer technology.

Examples of questions from the questionnaire are as follows:

1. "Were teachers encouraged by superiors to use computers in classrooms?"

2. "Were teachers provided with training in computer use by their school district?"

3. "Was there any school improvement process, technology component, computer technology committee, or computer training program seriously considered by teachers?"

4. "Were teachers' suggestions or decisions considered?"

5. "Did teachers work with a committee on a regular basis to plan implementation?"

6. "Are the teachers comfortable in using the computer they received in their classroom?"

First, Items C, D, G, and I in Part III, Question 8, from the teachers' questionnaire (see Appendix D) measured the amount of input into the processes of selection; and second, Items H, K, N, P. and R measured the implementation processes by teachers' responses. These items are presented in Table 11.

In Table 11, findings for the variable the amount of input by activity for teachers are presented. For example, 59% of teachers reported that they were encouraged by superiors to use computers in their classroom, while 63% of teacher respondents mentioned that training was provided for them. Only 38% of the teachers reported that their school
Table 11
The Amount of Input by Activity for Teachers in the Selection and Implementation Processes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Missing %</th>
<th>Don't know %</th>
<th>Yes %</th>
<th>No %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Selection</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encourage by superiors</td>
<td>1</td>
<td>1.4</td>
<td>4</td>
<td>5.6</td>
</tr>
<tr>
<td>Training was provided</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Technology component</td>
<td>2</td>
<td>2.8</td>
<td>17</td>
<td>23.9</td>
</tr>
<tr>
<td>Training program</td>
<td>1</td>
<td>1.4</td>
<td>34</td>
<td>47.9</td>
</tr>
<tr>
<td>Technology committee</td>
<td>7</td>
<td>9.8</td>
<td>33</td>
<td>46.5</td>
</tr>
<tr>
<td><strong>Implementation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggestion considered</td>
<td>3</td>
<td>4.2</td>
<td>19</td>
<td>26.8</td>
</tr>
<tr>
<td>Participate in decision</td>
<td>1</td>
<td>1.4</td>
<td>4</td>
<td>5.6</td>
</tr>
<tr>
<td>Work w/committee</td>
<td>0</td>
<td>0.0</td>
<td>5</td>
<td>7.0</td>
</tr>
<tr>
<td>Comfort with computer</td>
<td>2</td>
<td>2.8</td>
<td>3</td>
<td>4.2</td>
</tr>
</tbody>
</table>

has a technology component, while 12% of the teachers said that their school district has a training program. Only 15% of the teachers mentioned that their school district has a technology committee. The findings for the variable amount of input into the implementation processes by teachers showed that 23% of the teachers mentioned that their suggestions were considered, while 80% of the teachers reported that neither did they participate in computer decision distribution nor did they work with the committee during the implementation plan. However,
71% of the teachers were comfortable in using the computer they received.

**Level of Satisfaction for Administrators and Teachers**

**Research Question 5:** What is the satisfaction level of administrators and teachers with regard to the following: (a) quality and amount of software selected, (b) quality and amount of hardware selected, (c) use of educational technology, and (d) administration support?

In order to answer research Question 5, the percentages of Items A through F in Part III from the administrators' questionnaire (see Appendix C) and from the teachers' questionnaire (see Appendix D) measured the satisfaction level with the quality and amount of software selected, hardware selected, the administrative support, and use of educational technology in their schools. The results are presented in Table 12 for administrators and teachers.

**Amount of Software**

The results are percentages presented in Table 12. In this table are findings for the variable of satisfaction with amount of software selected by administrators and teachers. Most administrators (85%) were either somewhat satisfied or fairly satisfied with the amount of software. Only 1 administrator (7%) was very satisfied with the amount of software. On the other hand, teachers were less satisfied than administrators. Fifty percent of teachers reported that they were either somewhat satisfied or fairly satisfied with the amount of software, while
38% of the teachers reported that they were not at all satisfied with the amount of software.

**Quality of Software**

The results are percentages presented in Table 12. In this table are findings for both administrators and teachers who responded to questions regarding the quality of software selected. Most administrators (71%) were either somewhat satisfied or fairly satisfied with the quality of software, while 28% of the administrators were very satisfied with the quality of the software. Teachers, on the other hand, were not as satisfied as the administrators with the quality of software. While only 66% of the teachers reported that they were either somewhat satisfied or fairly satisfied with the quality of software, 18% of the teachers reported that they were not at all satisfied.

**Amount of Hardware**

The results are percentages presented in Table 12. In this table are findings for both administrators and teachers who responded to questions regarding the amount of hardware selected. Most administrators (85%) were either somewhat satisfied or fairly satisfied with the amount of hardware. Only 1 administrator (7%) was very satisfied with the amount of hardware. Teachers again were less satisfied than the administrators. There were 46% of the teachers who reported that they were either somewhat satisfied or fairly satisfied with the amount of hardware. However, 32% of the teachers reported that they were not
Table 12
Summary of Frequency and Percentages of Satisfaction for Administrators and Teachers

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Not at all satisfied</th>
<th>Somewhat satisfied</th>
<th>Fairly satisfied</th>
<th>Very satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Amount of software</td>
<td>Administrators</td>
<td>1 7.1</td>
<td>7 50.0</td>
<td>5 35.7</td>
<td>1 7.1</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>25 35.2</td>
<td>27 38.0</td>
<td>9 12.7</td>
<td>8 11.3</td>
</tr>
<tr>
<td>Quality of software</td>
<td>Administrators</td>
<td>0 0.0</td>
<td>6 42.9</td>
<td>4 28.6</td>
<td>4 28.6</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>13 18.3</td>
<td>29 40.8</td>
<td>18 25.4</td>
<td>7 9.9</td>
</tr>
<tr>
<td>Amount of hardware</td>
<td>Administrators</td>
<td>1 7.1</td>
<td>7 50.0</td>
<td>5 35.7</td>
<td>1 7.1</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>23 32.4</td>
<td>19 26.8</td>
<td>14 19.7</td>
<td>10 14.1</td>
</tr>
<tr>
<td>Quality of hardware</td>
<td>Administrators</td>
<td>4 28.6</td>
<td>2 14.3</td>
<td>5 35.7</td>
<td>3 21.4</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>15 21.1</td>
<td>27 38.0</td>
<td>14 19.7</td>
<td>10 14.1</td>
</tr>
<tr>
<td>Use of technology</td>
<td>Administrators</td>
<td>8 57.1</td>
<td>6 42.9</td>
<td>0 0.0</td>
<td>0 0.0</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>39 54.9</td>
<td>14 19.7</td>
<td>9 12.7</td>
<td>3 4.2</td>
</tr>
<tr>
<td>Administration support</td>
<td>Administrators</td>
<td>7 50.0</td>
<td>2 14.3</td>
<td>2 14.3</td>
<td>1 7.1</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>33 46.5</td>
<td>18 25.4</td>
<td>10 14.1</td>
<td>4 5.6</td>
</tr>
</tbody>
</table>

Note. Nonresponse data to select items by administrators and teachers are not included.
at all satisfied with the amount of hardware, while 14% of the teachers reported that they were very satisfied.

Quality of Hardware

The results are percentages presented in Table 12. Both administrators and teachers responded to the question regarding the quality of hardware selected. Most administrators (50%) were either somewhat satisfied or fairly satisfied with the quality of hardware, while 21% of administrators were very satisfied with the quality of hardware. Twenty-eight percent of the administrators were not at all satisfied. Teachers, on the other hand, were not as satisfied as the administrators with the quality of hardware. Only 57% of the teachers reported that they were either somewhat satisfied or fairly satisfied with the quality of hardware. While 21% of teachers reported that they were not at all satisfied, there were 14% of teachers who reported they were very satisfied.

The Use of Technology

The results are percentages presented in Table 12. In this table findings are presented for the variable level of satisfaction for administrators and teachers with the use of computer technology. The data indicate that 42% of the administrators are somewhat satisfied with the use of technology. There were 57% of the administrators and 54% of the teachers who were not at all satisfied with the use of technology. Only 32% of the teachers reported that they were either somewhat
satisfied or fairly satisfied with the use of technology, while only 4.2% of the teachers reported they were very satisfied.

**Administration Support**

The results are percentages presented in Table 12. In this table, findings are presented for the variable the satisfaction for administrators and teachers with the administration support. For example, 50% of the administrators and 46% of the teachers were not at all satisfied with the administration support. Most administrators (28%) were either somewhat satisfied or fairly satisfied with the administration support, while 50% of the administrators were very satisfied with the administration support. Teachers, on the other hand, were not as satisfied as the administrators with administration support. While only 39% of the teachers reported that they were either somewhat satisfied or fairly satisfied with administration support, 46% of the teachers reported that they were not at all satisfied with administration support.

**Effect of "Classroom of Tomorrow" Program**

**Research Question 6:** What is the effect of the "Classroom of Tomorrow" program on your school for both administrators and teachers?

**Motivation**

The results are percentages presented in Table 13. In this table, findings for both administrators and teachers are given for the variable of the effect of computer technology on motivation. For example, 71% of
Table 13
The Effect of the "Classroom of Tomorrow" Program on Schools for Administrators and Teachers

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Negative effect</th>
<th>Positive effect</th>
<th>No effect</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Motivation</td>
<td>Administrators</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>0</td>
<td>0.0</td>
<td>6</td>
<td>8.5</td>
</tr>
<tr>
<td>Self-confidence</td>
<td>Administrators</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>0</td>
<td>0.0</td>
<td>8</td>
<td>11.3</td>
</tr>
<tr>
<td>Social behavior</td>
<td>Administrators</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>21.3</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>0</td>
<td>0.0</td>
<td>13</td>
<td>18.3</td>
</tr>
<tr>
<td>Subject interest</td>
<td>Administrators</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>0</td>
<td>0.0</td>
<td>8</td>
<td>11.3</td>
</tr>
<tr>
<td>Attention span</td>
<td>Administrators</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>1</td>
<td>1.4</td>
<td>7</td>
<td>9.9</td>
</tr>
<tr>
<td>Variable</td>
<td>Group</td>
<td>Negative effect</td>
<td>Positive effect</td>
<td>No effect</td>
<td>Don't know</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>-----------</td>
<td>------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Self-discipline</td>
<td>Administrators</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>0</td>
<td>0.0</td>
<td>12</td>
<td>16.9</td>
</tr>
<tr>
<td>Cognitive learning</td>
<td>Administrators</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>14.2</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>0</td>
<td>0.0</td>
<td>9</td>
<td>12.7</td>
</tr>
<tr>
<td>Performance</td>
<td>Administrators</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>14.2</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>0</td>
<td>0.0</td>
<td>9</td>
<td>12.7</td>
</tr>
<tr>
<td>Achievement</td>
<td>Administrators</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>0</td>
<td>0.0</td>
<td>12</td>
<td>16.9</td>
</tr>
<tr>
<td>Status among peers</td>
<td>Administrators</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>21.3</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>0</td>
<td>0.0</td>
<td>10</td>
<td>14.3</td>
</tr>
</tbody>
</table>

Note. N = 14 for administrators and N = 71 for teachers. Nonresponse data are not included for administrators or teachers.
the administrators and 71% of the teachers responded that there is a positive effect on motivation, while 1 administrator (7.1%) and 18.3% of the teachers reported that they don’t know if there is any effect on motivation. Only 8.5% of the teachers mentioned that there is no effect for motivation.

**Self-Confidence**

The results are percentages presented in Table 13. In this table, findings for both administrators and teachers are given for the variable of the effect of computer technology on self-confidence. Data indicated that 1 administrator (7%) and 11% of the teachers responded with no effect on self-confidence. There were 56% of the administrators and 57% of the teachers who reported that there is a positive effect on self-confidence, while only 2 administrators (14%) and 28% of the teachers reported that they don't know if there is any effect on self-confidence.

**Social Behavior**

The results are percentages presented in Table 13. In this table, findings for both administrators and teachers are given for of the variable of the effect of computer technology on social behavior. Thirty-five percent of the administrators and 45% of the teachers who responded indicated that there is a positive effect on social behavior. There were 21% of the administrators and 18% of the teachers who responded reported that there is no effect on social behavior. However, 21% of
the administrators and 33% of the teachers who responded reported that they don’t know if there is any effect on social behavior.

Subject Interest

The results are percentages presented in Table 13. In this table, the findings for both administrators and teachers are given for the variable of the effect of computer technology on subject interest. Fifty-six percent of the administrators and 53% of the teachers who responded indicated that there is a positive effect on subject interest, while 11% of the teachers reported that there is no effect on subject interest. There were 21% of the administrators and 31% of the teachers who responded reported that they don’t know if there is any effect on subject interest.

Attention Span

The results are percentages presented in Table 13. In this table, findings for both administrators and teachers are given for the variable of the effect of computer technology on attention span. For example, only 1 administrator (7.1%) and 1 teacher (9.9%) reported that there is a positive effect on subject interest. Thirty-five percent of the administrators and 52% of the teachers who responded indicated that there is positive effect on attention span. While 35% of the administrators and 32% of the teachers who responded reported that they don’t know if there is any effect on attention span. Only 1 teacher (1.4%) reported that it has a negative effect at all.
**Self-Discipline**

The results are percentages presented in Table 13. In this table, findings for both administrators and teachers are given for the variable of the effect of computer technology on self-discipline. For example, only 1 administrator (7.1%) and 16% of the teachers reported that there is no effect on self-discipline. Forty-two percent of both administrators and teachers responding indicated that there is a positive effect on self-discipline. There were 28% of the administrators and 35% of the teachers who responded reported that they don't know if there is any effect on self-discipline.

**Cognitive Learning**

The results are percentages presented in Table 13. In this table, findings for both administrators and teachers are given for the variable of the effect of computer technology on subject interest. For example, 14% of the administrators and 12% of the teachers reported that there is no effect on cognitive learning. Forty-two percent of the administrators and 49% of the teachers who responded indicated that there is a positive effect on cognitive learning. There were 21% of the administrators and 35% of the teachers who responded reported that they don't know if there is any effect on cognitive learning.

**Performance**

The results are percentages presented in Table 13. In this table, findings for both administrators and teachers are given for the variable of
the effect of computer technology on performance. For example, 14% of the administrators and 12% of the teachers who responded indicated that there is no effect on performance. Forty-two percent of the administrators and 39% of the teachers who responded indicated that there is a positive effect on performance. Twenty-one percent of the administrators and 40% of the teachers reported that they don't know if there is any effect on performance.

**Achievement**

The results are percentages presented in Table 13. In this table, findings for both administrators and teachers are given for the variable of the effect of computer technology on achievement. One administrator (7%) and 16% of the teachers indicated that there is a positive effect on subject interest. Fifty-six percent of the administrators and 38% of the teachers reported that there is a positive effect on subject interest. However, 14% of the administrators and 40% of the teachers reported that they don't know if there is any effect on achievement.

**Status Among Peers**

The results are percentages presented in Table 13. In this table, findings for both administrators and teachers are given for the variable of the effect of computer technology on status among peers. For example, 21% of the administrators and 14% of the teachers reported that there is no effect on status among peers. There were 41% of the administrators and 40% of the teachers who indicated that there is a positive effect on status among peers. While 14% of the administrators and
32% of the teachers reported that they don’t know if there is any effect on status among peers.

Summary

In this chapter, the response characteristics, the demographic characteristics of the subjects, data analysis, and findings have been presented. The t test and frequency were used to answer the six research questions. The findings of this study show that Hypothesis 1A from Question 1 was rejected. However, Hypothesis 1B from Question 1 was not rejected. These findings indicate that there is no difference for selection and implementation for administrators. However, there is difference between selection and implementation for teachers. The null Hypotheses 2A, 2B, 2C, and 2D were not rejected. These findings show that there is no difference in mean scores for in-school training activities and out-school training activities of the selection processes by administrators and teachers. Each of the descriptive research questions first posed in Chapter II was addressed in this chapter, with appropriate tables and references to appendices for clarification. A discussion of the implication of the findings is presented in Chapter V; a summary of the study, conclusions, and recommendations for further research are presented.
CHAPTER V

DISCUSSION AND CONCLUSIONS

The purpose of this study was to examine the level of participation of administrators and teachers in the process used to select and implement computer technology in Kalamazoo Public Elementary Schools and the effect of the "Classroom of Tomorrow" program on their schools. An attempt has been made in this chapter to synthesize the different aspects of the research study. The rationale for the research is reviewed, followed by a discussion of the procedures for data collection and their limitations. The research findings and interpretation of the findings are summarized. Also, implications of the findings and recommendations for further research derived from the present study are discussed.

Rationale for Research

The "Classroom of Tomorrow" program was proposed by former Governor Blanchard in his 1989 state of the state message. The main focus of the "Classroom of Tomorrow" program was on placing computer technology into the hands of teachers and students who characteristically do not have the opportunity to use computer technology for daily instruction and instructional learning. This program was to inspire Michigan students and teachers to use computer technology and to improve the learning skills of tomorrow's work force. The idea
undergirding the program was to place approximately 10,000 computers in Michigan public schools by the fall of 1990. In 1990 Kalamazoo Public Schools participated in Michigan's "Classroom of Tomorrow" program. They received 170 computers of various types (i.e., Apple, IBM, etc.) for teachers to integrate into their classrooms. To date, there are no reports or studies done on the success or lack of success of the processes used to select and implement the computers in the different schools in Kalamazoo. Based on the goals and objectives of the Michigan Department of Education technology plan, administrators must develop a process for simultaneous activity in three areas: staff training, purchasing hardware, and developing courseware.

A review of the literature was completed which evaluated literature related to the roles of administrators and teachers and the process used in selecting and implementing computer technology. No clear directions were identified from the review of related literature. Some researchers reported the importance of the role administrators and teachers play in selection and implementation; others found important the process used by administrators and teachers in selecting and implementation computer technology (Hoover & Gould, 1982; Kearsley, 1990).

Research hypotheses were formulated expecting significant differences. In Chapter III, methods and procedures used to test the six hypotheses were discussed. The research questions were derived from the research statement which sought to determine the roles of the administrators and teachers in the process used in selecting and implementing computer technology in Kalamazoo Public Elementary Schools.
and the effect of "Classroom of Tomorrow" program (measured by a survey questionnaire developed by the researcher in 1993).

The design of the study was a survey design and involved the participation of 18 administrators and 126 teachers from Kalamazoo Public Elementary Schools. The total number of administrator respondents was 14, a 77% return rate; and the total number of teacher responses was 71, a 56% return rate.

The following research questions were studied:

1. What is the level of participation of administrators and teachers with regard to selection and implementation of computer technology?

2. What is the relationship, if any, between in-school training activities and out-school training activities of selection and implementation processes by administrators and teachers?

3. What is the percentage of administrators and teachers consulting with the intermediate school district (ISD) and regional educational media centers (REMCs) in the processes of selection and implementation of computer technology?

4. What is the percentage of amount of input into the processes of selection and implementation of computer technology by administrators and teachers?

5. What is the satisfaction level of administrators and teachers with regard to the following: (a) quality and amount of software selected, (b) quality and amount of hardware selected, (c) use of educational technology, and (d) administration support.

6. What is the effect of the "Classroom of Tomorrow" program on schools?
From the first two research questions, the researcher developed six null hypotheses. The six hypotheses were tested in null form at .05 level of significance using a \( t \) test. The remaining four research questions were analyzed using descriptive analysis.

**Research Question 1:** What is the level of participation of administrators and teachers with regard to selection and implementation of the computer technology?

**Null Hypothesis 1A:** There is no difference between the mean scores of participation in the selection and implementation for administrators.

**Null Hypothesis 1B:** There is no difference between the mean scores of participation in the selection and implementation for teachers.

**Research Question 2:** What is the relationship, if any, between in-school training activities and out-school training activities of selection and implementation processes by administrators and teachers.

**Hypothesis 2A:** There is no difference between mean scores for in-school training activities and out-school training activities of selection processes by administrators.

**Hypothesis 2B:** There is no difference between mean scores for in-school training activities and out-school training activities of implementation processes by administrators.

**Hypothesis 2C:** There is no difference between mean scores for in-school training activities and out-school training activities of selection processes by teachers.

**Hypothesis 2D:** There is no difference between mean scores for in-school training activities and out-school training activities of
implementation processes by teachers.

**Research Question 3A**: What is the percentage of administrators consulting with ISD and REMCs in the processes of selection and implementation of computer technology?

**Research Question 3B**: What is the percentage of teachers consulting with ISD and REMCs in the processes of selection and implementation of computer technology?

**Research Question 4A**: What is the percentage of the amount of input into the processes of selection and implementation of computer technology by administrators?

**Research Question 4B**: What is the percentage of the amount of input into the processes of selection and implementation of computer technology by teachers?

**Research Question 5**: What is the satisfaction level of administrators and teachers with regard to the following: (a) quality and amount of software selected, (b) quality and amount of hardware selected, (c) use of educational technology, and (d) administration support?

**Research Question 6**: What is the effect of the "Classroom of Tomorrow" program on schools?

**Discussion**

**Administrators' and Teachers' Participation in the Selection and Implementation**

**Hypothesis 1A**: There is no difference between the mean scores of participation in the selection and implementation for administrators.
The results of the t test indicated that the null hypothesis derived from research Question 1 is not rejected. Administrators' obtained probability level is greater than the .05 alpha level. Therefore, the null hypothesis was not rejected at the .05 alpha level. These findings show that there is no difference \( p < .05 \) between the role played by administrators in the selection and implementation of computer technology. This indicates that administrators are involved both in selection and in implementation. The literature emphasized the relationship between the role administrators played in the selection and implementation of the computer technology. According to Marshall (1982b), "information is a basic requirement for good decision making" (p. 6). Administrators must have knowledge and information on computer technology so that it will help them decide what type of hardware and software is needed by their schools. The uninformed administrators are vulnerable to mistakes that affect the implementation and maintenance of their programs (Martin & Heller, 1984). Leaders, by nature of their leadership role, are provided with a distinctive opportunity to influence the decision making of others (Watkins, 1986). As computers are an important tool for administrators, the more knowledge and skills on the use of computer the more the computer can help to provide an administrator with quality information (Hoover & Gould, 1982). Therefore, in order to implement computer technology, administrators must be involved in the development of instructional programs using computers (Miller, 1988).

**Hypothesis 1B:** There is no difference between the mean scores of participation in the selection and implementation for teachers.
The observed obtained probability level is smaller than the .05 alpha level. Therefore, the null hypothesis was not rejected at the .05 alpha level. For teachers these findings show that there is a difference in the role teachers played in the selection and implementation of the computer technology.

Findings in this study indicate that there is a difference between the mean level of teachers' participation in the selection and implementation of the computer technology. This indicates that teachers are involved more with implementation than in selection. This is confirmed in the literature. In a study conducted in May 1984 involving 138 school principals from a large urban school district, it was indicated that there is a significant need to develop computer competencies in order to utilize the potential of computer technology (Montague & King, 1985). However, administrators and teachers themselves need to become part of a learning environment that includes computers.

Administrators' Selection and Implementation Role
In-School/Out-School Training

Hypothesis 2A: There is no difference between mean scores for in-school training activities and out-school training activities of selection processes by administrators.

The obtained probability level is greater than the .05 alpha level. Therefore, the null hypothesis was not rejected at the .05 alpha level. These findings show that there is no difference in mean scores for in-school training activities and out-school training activities of selection processes by administrators. It could be concluded from this that
in-school and out-school training does not influence selection. The literature did not report research studies based on the interrelation between in-school training activities and out-school training activities of selection and implementation processes by administrators. In-school and out-school training consists of staff development programs and professional growth programs, such as any summer workshop, after or during school workshop, conferences about computer usage in education, stipend, academic training, computer literature, support from teachers and students who use computers, community members, computer consultant, the parent of the student, and reference materials. As the selection process continues, consulting with computer specialists will bring up points that had not been considered, attending computer manufactures seminars, conferences, and product demonstrations increase familiarity with different products on the market and, therefore, will help in selecting and implementing computer technology (McLeod, 1991).

**Hypothesis 2B:** There is no difference between mean scores for in-school training activities and out-school training activities of implementation processes by administrators.

The obtained probability level is greater than the .05 alpha level. Therefore, the null hypothesis was not rejected at the .05 alpha level. These findings show no significant differences between in-training activities and out-training activities of implementation processes by administrators. One could conclude from this that in-school and out-school training does not influence implementation. Implementing computer technology requires a lot of administrator training, special maintenance, curriculum adaptation, and scheduling adjustment.
Technology is an effective tool for school improvement when combined with productive leadership (Mojkoske, 1986).

**Teachers' Selection and Implementation Role in In-School/Out-School Training**

**Hypothesis 2C:** There is no difference between mean scores for in-school training activities and out-school training activities of selection processes by teachers.

The teachers obtained probability level is greater than the .05 alpha level. Therefore, the null hypothesis was not rejected at the .05 alpha level. These findings show that there is no difference in mean scores for in-school training activities and out-school training activities of selection processes by teachers. One could conclude from this that in-school and out-school training does not influence selection. Because the computer is an important educational and administrative tool, the better the administrators and teachers understand and use the tool, the better a computer can provide an administrator with quality information to serve as a basis for decision making (Hoover & Gould, 1982). According to Kearsley (1990), in order for administrators and teachers to be productive in their functions they need to understand, learn, and use computer technology; become proficient with computer applications such as word processing, spreadsheets, databases, and telecommunications; and master one of the integrated software packages available.

**Hypothesis 2D:** There is no difference between mean scores for in-school training activities and out-school training activities of implementation processes by teachers.
The teachers' obtained probability level is greater than the .05 alpha level. Therefore, the null hypothesis was not rejected at the .05 alpha level. Findings indicated that there is no difference in mean scores for in-school training activities and out-school training activities of implementation processes by teachers. One could conclude from this that in-school and out-school training does not influence implementation.

From the four previous hypotheses of research Question 2, findings concluded that it does not matter to administrators and teachers whether they have training in-school or out-school. The process of selection and implementation of computer technology is not influenced by the location of training. As a result of selection and implementing of computer technology for instructional purposes, many administrators and teachers are now confronted with the need to improve their degree of knowledge and familiarity with instructional computing. Administrators and teachers need more and better training as technology continues to alter the instructional methodologies within a changing educational environment (Kurshan, 1986). It would seem that the responsibilities of an administrator may influence the computer skills and knowledge needed to select hardware and software to help in implementing computer technology for the "Classroom of Tomorrow" program.

**Percentage of Administrators and Teachers Who Consulted With ISD and REMCs**

**Research Question 3:** What is the percentage of administrators and teachers consulting with ISD and REMCs in the processes of selection and implementation of computer technology?
The third research question was addressed through descriptive analyses in the form of tables to classify and summarize the data. The results of the findings for administrators and teachers given the opportunity to work with regional educational media centers (REMCs) and the intermediate school district (ISD), showed that they did not use these resources.

Consulting with Michigan regional centers such ISD and REMCs can play a central and important role in the process of selecting and implementing computer technology by providing demonstrations of new equipment and software and providing technical assistance and training to administrators and teachers. Michigan regional centers can play a central management role in assisting school districts and schools with the use of technology. This is being done through assistance in hardware evaluation and acquisition, software evaluation and acquisition, and planning and staff training. Poor communication between ISD and REMCs and school districts would contribute to distrust and misunderstanding. This would most certainly serve to discourage interest in selecting and implementing computer technology. Regional educational media centers (REMCs) and intermediate school districts (ISD) were responsible for formalizing agreements with the vendors and developing an equipment and software catalog. School systems will need to engage in strategic planning and this planning should be specific and long term.
Amount of Input by Activity for Selection and Implementation by Administrators

Research Question 4A: What is the percentage of amount of input into the processes of selection and implementation of computer technology by administrators?

For the Selection

From the findings neither hardware nor software was brought for previewing and evaluation and there was no encouragement from the school district for administrators in the selection activities. With the exception of some use of technology consultants and specialists, the findings show that administrators are not taking advantage of selection activities. The majority of administrators responded that their school district does have a district improvement plan. Such plan initiatives promote an awareness among staff and community of the schools' commitment to preparing students for life and work in the information age. Establishing demonstration sites will give board members, principals, and teachers the opportunity to see computers in operation and experiment with them (Swalm, 1983). To be able to select the right hardware and software, school districts should provide some kind of workshop or a program to give information for administrators and teachers on what kinds of hardware and software are available for them to select from; then administrators and teachers will have a good view of the capability and the future instructional use of the selected hardware and software in their schools. Technology consultants could play a role in explaining the use of computer technology in education and help...
teachers and administrators locate resources of the right software available for them to select from, and how administrators and teachers could evaluate and choose an educational software package. Also they could explain the copyright policies. Schools should have a written policy on adherence to copyright law posted wherever there is a computer (Kearsley, 1990).

For the Implementation

From the findings, 50% of the administrators don’t know the goals, objectives, and policies for computer selection and implementation. Sixty-four percent of the administrators were informed about training; 78% of the respondents said there were no orientation sessions on the use of computers. In personal conversations, teachers indicated that training was available for only one time just for 2 hours at Central High School after the school day. Without adequate training on the use of computers, administrators and teachers will not be able to use this technology to the fullest extent possible. Even administrators and teachers who have experience need comprehensive training. While some administrators and teachers may be able to teach themselves from the manuals provided and by experimentation, most administrators and teachers need a formal training workshop on the use of computers. Training workshops should be more than one day, and there should be some follow-up for that workshop. Grupe (1984) designed a training project which would last as much as 10 days, hands-on workshop, and orientation to preview and evaluate hardware and software. Lilly (1986) and Sloan and Halaris (1983) agreed with Grupe that well planned
implementation efforts should facilitate and guide learning in an educational setting.

An important aspect of a selection and implementation program is the inclusion of extensive computer training for both administrators and teachers. Researchers suggest that this training should include as much hands-on practice as possible (Comerford & Carlson, 1985; Jones & Wall, 1985; Poppenhagen & McArdle, 1982).

Amount of Input by Activity for Selection and Implementation by Teachers

Research Question 4B: What is the percentage of amount of input into the processes of selection and implementation of computer technology by teachers?

For the Selection

From the findings, teachers were encouraged by superiors in the selection process. Also, training was provided for them, but 47% of teachers did not participate in the training program. Hands-on experience helps and having computers available for home experimentation by teachers and principals has been effective (Swalm, 1983). None of them knew if there was a technology committee. Participating in a training program or a workshop will help administrators and teachers to be computer literate and provide them with knowledge and experience to select hardware or software. Participating in a technology committee will help them exchange views and opinions on the availability of
hardware and software, as well as information on how/where they could get help when they need help.

For the Implementation

Data indicate that 45% of respondents said that their suggestions were considered. By involving teachers early in the process and encouraging them to use the system, this meant that those most instrumental in implementing computer technology will be "on board" as key decisions are made (McLeod, 1991). Also, data show that 80% of the teachers did participate in decisions and they did work with committees to implement new technology. Teachers involved in school and district task force and committee work extend their opportunities for interaction with teachers beyond their immediate groups of co-workers. The extent to which teachers interact with one another is strongly related to the amount of educational change that occurs at the teacher level (Fullan, 1982).

The components of a conceptual planning model for microcomputer integration have been partially validated through the research. They include a supported task force, district assessment and goal setting, a coordinating committee for applications (courseware selection), staff in-service training, and process evaluation (Metschke, 1986). Among the impediments to effective planning for computer education, the following appear to be most important: lack of control of hardware decisions, unavailability of high quality educational software, lack of adequate computer-based curricula, and lack of appropriate training for program implements (Linn & Fisher, 1984).
The Satisfaction Level of Administrators and Teachers

Research Question 5: What is the satisfaction level of administrators and teachers with regard to the following: (a) quality and amount of software selected, (b) quality and amount of hardware selected, (c) use of educational technology, and (d) administration support?

The fifth research question addressed the satisfaction level of administrators and teachers with regard to the quality and amount of software and hardware selected and use of educational technology, as well as administration support. Descriptive analyses in the form of tables to classify and summarize the data were used to answer this question.

Satisfaction Level With Quality and Amount of Software Selected

Data indicate that both administrators and teachers were somewhat satisfied with the quality and amount of software selected. The capabilities of the software selected for educational use determine what types of hardware were selected or vice versa. Lack of teacher training, lack of quality software, and insufficient amounts of hardware selected and implemented in schools are the most commonly reported problems. A shortage of quality software affects the amount of time and effort teachers and students can spend on working on projects using the computer. Selecting software and hardware is one of the most difficult decisions an administrator can make. This investment of time and money creates high public interest in the decision and carries enormous consequences with the choice. According to Faflick (1983), "choosing a
computer, like selecting a spouse, can be a daunting undertaking" (p. 37). Purchasing hardware and software is a major decision. Administrators who have experience and familiarity with computer technology recognize that selecting the most appropriate model depends on how the microcomputer will be used.

**Satisfaction Level With Quality and Amount of Hardware Selected**

From the findings, the researcher concluded that neither administrators nor teachers were satisfied with quality and amount of hardware selected for them.

Ediger (1988) and Hannafin, Dalton, and Hooper (1987) argued that there is a sufficient amount of computers available in the schools. For Hannafin et al., the real problem is the beliefs of school personnel about computers. For Ediger (along with Livingston, 1986, and Naiman, 1987), the real problems are inadequate software; Hannafin et al. contended that the idea that there is an inadequate supply of well-designed software is a myth. Grossnickle, Laird, Cutter, and Tefft (1982) argued that while teachers say that they lack time or software, the real problem is their unwillingness to change their established routines. Nationally, one of the reasons technological inequities continue to exist is lack of funding for equipment (Gayeski, 1989). This lack of funding has resulted in a lack of equipment and software. A shortage of hardware also affects the amount of time a student can work on a computer and in how many classrooms computers are available.
Satisfaction Level With Use of Educational Technology

From the findings, administrators and teachers are not at all satisfied with the use of computer technology in their schools. One may conclude from this finding that there is a long way to go for administrators and teachers to achieve the level where one could find successful implementation and use of computer technology in the school system.

According to S. Frankel (1982), "too often, however, the micro appears before anyone has thought about how to use or even which brand to buy" (p. 17). During the past years, computer manufacturers have targeted their promotional programs to reach a new audience—schools. Different types of computer hardware models are available. Capacity for memory, different speeds, size of disk drive, capacity of hard disk drives, type of monitor, type of printer, type of scanners, compact desk multimedia, speed of modem, and type of keyboard, entail choices which must be made. While most computers perform the same tasks, they use different computer software.

Satisfaction Level With Administration Support

Data indicate that neither administrators nor teachers are satisfied with the administration support. The conclusion from this finding is that computer selection and implementation begins with support. This support must begin and continue at the top level. This support makes a significant difference in the process of selection and implementing computer technology. Slovacek and Dolence (1985) found that a successful computer implementation effort is effective user training and
administration support. Administrators at all levels have the opportunity to create new and alternative education methods with the advent of computer technology. Since 1980 computer technology has become more available and powerful. In addition, different software for educational and administrative use is available. However, there are several reasons why computers haven't made a good impact on learning. Researchers cite a lack of equipment, hardware, appropriate educational software, poor teacher training, a lack of consensus on how to use this new technology, a lack of standardization, a lack of state regulations and funding, and a lack of familiarity with instructional computing at top levels (Gayeski, 1989). Administrators and teachers should be capable enough to know how to purchase equipment by knowing the technical aspects of hardware and software before making any buying decisions (Crawford, 1985). As noted by Benjamin (cited in Updegrove (1986), "planning isn't strategic if it does not explicitly take into account changes in and new opportunities being presented by information" (p. 12).

What Is the Effect of Computer Technology on Your School for Administrators and Teachers

Research Question 6: What is the effect of the "Classroom of Tomorrow" program on schools? The sixth research question was addressed through descriptive analyses in the form of tables to classify and summarize the data.

Because so little is known about the effect of computer technology on schools, administrators and teachers were asked whether they
thought computer technology had a negative effect, no effect, or positive effect, or whether they simply don't know what, if any, effect it had. Nearly all responding teachers said they thought computer technology had a positive effect on student motivation (reported by 71% of the responding administrators and teachers). In only two categories (social behavior and attention span) did less than a majority of those administrators responding indicate that computer technology had a positive effect on students, while teachers responded equally between positive effect and don't know. Computers will ultimately have their greatest impact on education, and that impact may be very different from what some experts expect (Zachmann, 1991).

There is mounting evidence from research that computer applications can help improve student achievement (Roblyer, 1988). As a result, perhaps a more effective and competitive American educational system can evolve from the appropriate use of technology. Educators must recognize situations where computer use would be effective, then make their utilization more efficient (Cheever, 1986). Technology holds great promise for the education system. Administrators, teachers, and students need to have access to computer equipment, and they need the power to change their environment and the educational system. But that power is available if citizens, parents, and business people can muster the collective will to press educators and legislators for change. It will not be easy. Change comes slowly to a school system beset by so many problems.
The Nature of Limitations

It should be noted that there are nearly always limitations in a research study such as this one. Limitations in instrumentation and sampling characteristics are evident in this study. The study limitations included the potential difficulty inherent in the mailed questionnaire survey research design and the danger of misinterpretation of directions. The sample size for administrators was much smaller than the teachers' sample.

Recommendations for Future Research

This study has elicited ideas for several future research efforts. For instance, it would be potentially helpful to conduct research with the same questionnaire, but with different samples. First, one could perform a state-wide study of the role of administrators in selecting and implementing computer technology using a sample equal to the number of participants used in this study but with a different school district and attempt to discover any differences between different school districts. Another research possibility would be to gather information about what kind of use is being made of the computers selected through the "Classroom of Tomorrow" program. Research on REMCs and ISDs and their role with schools' technology would be helpful. Research on why the teachers were left out of the selection process could be enlightening. Comparison could also be made between the attitude of male and female administrators and teachers in terms of computer technology. Future
research could also measure the perceived importance of the use of computer technology in education today.

Conclusion

The purpose of this study was to examine the role of administrators and teachers in the selection and implementation process of computer technology. The findings indicated that administrators were involved in the selection and in the implementation. However, teachers reported they were not involved in the selection and in the implementation, rather they felt they were left out in the participation in the selection and implementation process. The researcher concluded from the study that it does not matter for both administrators and teachers where the training takes place. There is no difference between in-school training and out-school training. From the literature, it is clear that training will increase the computer skills and knowledge needed to select hardware and software to help in implementing computer technology for the "Classroom of Tomorrow" program.

The study found that administrators and teachers did not use services from the Intermediate School Districts (ISDs) and Regional Education Media Centers (REMCs). One possible resource for administrators and teachers would be consulting with regional centers such as ISD and REMCs. These centers can play a central and important role in the process of selecting and implementing computer technology by providing demonstrations of new equipment and software, and also providing technical assistance and training to administrators and teachers.
Findings from this study also indicate that there is a lack of planning for selection and implementation of computer technology. It is suggested that a technology plan where administrators, teachers, students, and parents will help their school as a whole develop a long-range plan for technology. Participation in the technology committee could help them exchange views and opinions on the availability of hardware and software, and provide information on how/where they could get help when they need it.

Findings from the study suggest that neither hardware nor software were obtained for previewing and evaluation and that there was no encouragement from the school district administration in the selection activities. With the exception of some use of technology consultants and specialists, the findings of the study suggest that administrators did not take advantage of selection activities. To be able to select the right hardware and software, school districts should provide some form of workshop or a program to give information to administrators and teachers on the kinds of hardware and software that are available for them to select from. Participation in workshops will give administrators and teachers a good view of the capability and the future instructional use of computer hardware and software. Technology consultants could play a role in explaining the use of computer technology in education and help teachers and administrators locate resources for the right software. Administrators and teachers could evaluate and choose an educational software package with appropriate support from technology consultants. Without adequate training on the use of computers, administrators and teachers will not be able to use this technology to the
fullest extent possible. Even administrators and teachers who have experience need comprehensive training. While some administrators and teachers may be able to teach themselves from the manuals provided and by experimentation, most administrators and teachers need a formal training workshop on the use of computers. An important aspect of the selection and implementation program is the inclusion of extensive computer training for both administrators and teachers. Participating in a training program or a workshop will help administrators and teachers to be computer literate and provide them with knowledge and experience to select hardware or software.

Data from the study suggests that both administrators and teachers were somewhat satisfied with the quality and amount of software selected. The capabilities of the software selected for educational use determine what types of hardware were selected or vice versa. Lack of teacher training, lack of quality software, and insufficient amounts of hardware selected and implemented in schools are the most commonly reported problems. A shortage of quality software affects the amount of time and effort teachers and students can spend on working on projects using computers. Selecting software and hardware is one of the most difficult decisions an administrator can make. This investment of time and money creates high public interest in the decision and carries enormous consequences with the choice.

The researcher concluded from the results of the study that neither administrators nor teachers were satisfied with quality and amount of hardware selected for them. There was no funding to provide adequate software; there was no provision for follow-up. This lack of funding has
resulted in a lack of equipment and software. A shortage of hardware also affects the amount of time a student can work on a computer and in how many classrooms computers are available.

Neither administrators nor teachers were satisfied with administration support. This support makes a significant difference in the process of selection and implementing computer technology. Technology holds great promise for the education system. Administrators, teachers, and students need to have access to the computer equipment; and they need the power to change their environment and the educational system. But people have that power if they can muster the collective will as citizens, parents, and business people to press educators and legislators for change.
Appendix A

Letter of Introduction
March 10, 1993

Dr. Frank Rapley, Superintendent
Kalamazoo Public Schools
Administration Building
1220 Howard
Kalamazoo, Michigan 49008

Dear Dr. Rapley:

Mr. Ahmad Alobiedat, a doctoral student in the Department of Educational Leadership, is engaged in research on the role of administrators in implementing computer technology in public schools. He has identified Kalamazoo Public Schools as the site for his research study. For your information, attached is the copy of the letter and the survey which will go to all principals and teachers involved in the "Classroom of Tomorrow" Project. Thank you for your cooperation in this research. Your willingness to support to this project will yield results important to our profession.

Many thanks for all your cooperation.

Sincerely, yours,

Ahmad Alobiedat
Doctoral student of Educational Leadership

Patrick Jenlink, Ed.D.
Chair of Committee

Enclosures
Appendix B

Cover Letter to Participants
March 10, 1993

To: Elementary School Teacher
    Kalamazoo Public School

From: Ahmad Alobiedat
    Dr. Patrick Jenlink

RE: Enclosed Survey

Dear Colleague:

I'm a doctoral student engaged in a study of the role of administrators in implementing computer technology in the Kalamazoo Public Schools. The results from this study will benefit our profession and provide for future use an example of successful processes that could be used to select and implement computers in different public and private K-12 schools.

As part of this research, I'm mailing the enclosed survey to all elementary teachers from Kalamazoo Public Schools who received computers in the "Classroom of Tomorrow" program. Since there are only a limited number of Kalamazoo Public Schools teachers being asked to respond, your response will be a vital, valuable part of this study. You need not identify yourself on the form.

Would you please take a few moments to complete the survey and return it within five working days.

Instructions

1. Read each statement carefully.
2. Please answer every item.
3. Please place a check mark or circle at the correct choice.
4. You need not identify yourself on the form.
5. Return to the Office of Educational Leadership in the enclosed envelope

Your participation in this study is appreciated and will be promptly acknowledged.
Appendix C
Survey Instrument for Administrators
SURVEY QUESTIONNAIRE
Administrator

Please answer the questions by circling the choice that best applies to you, or by filling in the information requested. Feel free to any provide additional information to clarify your choice.

PART I Role Process

Please Circle ONE for each of the following questions (1 and 2).

01. How significant of a role did you play as an administrator in the process used to select computer technology?

Not at all significant Some what significant Fairly significant Very significant
1 2 3 4

02. How significant of a role did you play as an administrator in the process used to implement computer technology?

Not at all significant Some what significant Fairly significant Very significant
1 2 3 4

PART II

The process used to select and implement computer technology for the "Classroom of Tomorrow" program

03. Of the following, what process activities used to select computer technology were useful to you?

Not at all Some what useful Fairly useful Very useful
1 2 3 4

a. Summer workshop(s)  1 2 3 4
b. After school workshop(s)  1 2 3 4
c. During school day workshop(s)  1 2 3 4
d. Support group of teachers using technology  1 2 3 4
e. Computer literature  1 2 3 4
f. In service training  1 2 3 4
g. References materials  1 2 3 4
h. Travel to conferences  1 2 3 4
i. Students parents support  1 2 3 4
j. Computer specialist/technology  1 2 3 4
k. Stipend for training  1 2 3 4
l. Academic class (Training)  1 2 3 4
m. Technology consultant  1 2 3 4
n. Students who use computers  1 2 3 4
o. Teachers who use computers  1 2 3 4
p. Community groups  1 2 3 4
q. Others for (please specify)

04. Of the following, what process activities used to implement computer technology were useful to you?

Not at all Some what useful Fairly useful Very useful
1 2 3 4

a. Summer workshop(s)  1 2 3 4
b. After school workshop(s)  1 2 3 4
c. During school day workshop(s)  1 2 3 4
d. Support group of teachers using technology  1 2 3 4
e. Computer literature  1 2 3 4
f. In service training  1 2 3 4
g. References materials  1 2 3 4
h. Travel to conferences  1 2 3 4
i. Students parents support  1 2 3 4
j. Computer specialist/technology  1 2 3 4
k. Stipend for training  1 2 3 4
l. Academic class (Training)  1 2 3 4
m. Technology consultant  1 2 3 4
n. Students who use computers  1 2 3 4
o. Teachers who use computers  1 2 3 4
p. Community groups  1 2 3 4
q. Others for (please specify)
PART III
Type of Selection and Implementation Process

05. When teachers need assistance in computer operation who is available to help them in their classroom? (Check all that apply.)

- Self-help
- Librarian staff
- Another teacher
- Resource staff
- Office staff
- Technology specialist
- Students in classroom
- Don’t know
- Other, please specify ________________________________

06. As an administrator when you participated in selecting and implementing the “Classroom of Tomorrow” program, were you given an opportunity to work with:

(Check yes OR no for each.)

a. Intermediate school districts (ISDs)       yes       no
b. Regional educational media centers (REMCs) yes       no

07. Respond to the following items concerning the selection and implementation of computer technology?

Please Check ONE for each question

<table>
<thead>
<tr>
<th>Item</th>
<th>Don’t know</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a policy in place that reflects the goals, objectives</td>
<td></td>
<td>1</td>
<td>2</td>
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<tr>
<td>and procedures to assure that a quality selection of computers was</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>made</td>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>There is no regular systematic plan for the selection</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>of hardware and software</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My suggestions for purchase of materials were seriously considered</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I participated in the decision about where or how</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>computers distributed</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Hardware and software were brought in for preview and evaluation</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Administrators and teachers are encouraged to select</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>based on their needs of hardware/software</td>
<td></td>
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<tr>
<td>I did work with a committee on a regular basis to plan implementation</td>
<td></td>
<td>1</td>
<td>2</td>
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<tr>
<td>I’m encouraged by my superiors to use computers in my classroom</td>
<td></td>
<td></td>
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<tr>
<td>Are you comfortable in using computer you received in your</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>classroom</td>
<td></td>
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<tr>
<td>Were you aware (informed) of any training in computer use provided</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>for you by your school district</td>
<td></td>
<td></td>
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<tr>
<td>Have you been provided training in computer use by your school</td>
<td></td>
<td>1</td>
<td>2</td>
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<tr>
<td>district</td>
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<tr>
<td>Did you participate in any structured computer orientation</td>
<td></td>
<td>1</td>
<td>2</td>
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<tr>
<td>sessions before implementing computers in your school...</td>
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<tr>
<td>Does the school district currently have a school</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>improvement process?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes to question (M), does the school improvement process</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>have a technology component</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Does the school district have a computer technology consultant</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Does the school district have a computer training program</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Does the school district have a computer technology specialist</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Does the school district have a computer technology committee</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
<td></td>
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</tbody>
</table>
08. Please estimate the average number of hours of computer training that will have been made available to you?
(A)________

09. How interested are you in taking a course to learn how to use a computer for instructional purposes?
(Check ONE.)
   a. ___ Not very interested
   b. ___ Very interested
   c. ___ Undecided
   d. ___ Moderately interested
   e. ___ Somewhat interested

PART IV Success

10. How well satisfied are you about the following subjects?
   Please Circle ONE for each question
   Not at all satisfied  Some what satisfied  Fairly satisfied  Very satisfied
   a. Quality of computer software selected  1  2  3  4
   b. Amount of computer software selected  1  2  3  4
   c. Quality of computer hardware selected  1  2  3  4
   d. Amount of computer hardware selected  1  2  3  4
   e. Administrative support  1  2  3  4
   f. Present state of your school in terms use of educational technology  1  2  3  4
   g. Other, please specify ________________

11. Which of the following phrases BEST describes your instructional purpose for using computers in the classroom?
   (Check ALL that apply.)
   a. ___ Foster awareness of the computer
   b. ___ Teach basic computer skills
   c. ___ Teach computer programming skills
   d. ___ Develop skills in another subject
   e. ___ Reward outstanding student performance
   f. ___ Enrich learning activity for high ability students
   g. ___ Other (please specify) ________________

12. What effect has computer technology had on your school?
   Please Circle ONE for each question
   Negative effect  No effect  Positive effect  Don’t know
   a. Motivation  1  2  3  4
   b. Self confidence  1  2  3  4
   c. Social behavior  1  2  3  4
   d. Subject interest  1  2  3  4
   e. Attention span  1  2  3  4
   f. Self-discipline  1  2  3  4
   g. Cognitive learning  1  2  3  4
   h. Performance  1  2  3  4
   i. Achievement  1  2  3  4
   j. Status among peers  1  2  3  4
   k. Other, please specify ________________

PART VI
Professional background information
To help us interpret the results of this survey, we'd also like some information about your background
13. Your sex: Male ___ Female ___
14. Indicate your: Age ___ Experience years in education ___
15. Indicate the year you have completed your highest degree?
   a. Bachelor's degree: 19__  c. Master degree: 19__
   b. Specialist degree: 19__  d. Doctor's degree: 19__
16. Additional comments: Please use space below to make any comments concerning the topics addressed by this survey.
Appendix D

Survey Instrument for Teachers
SURVEY QUESTIONNAIRE
Teacher

Please answer the questions by circling the choice that best applies to you, or by filling in the information requested. Feel free to provide additional information to clarify your choices.

PART I Role Process
Please Circle ONE for each of the following questions (1 and 2)

01. How significant of a role did play as a teacher in the process used to select computer technology?

<table>
<thead>
<tr>
<th>Not at all significant</th>
<th>Some what significant</th>
<th>Fairly significant</th>
<th>Very significant</th>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
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</table>

02. How significant of a role did play as teacher in the process used to implement computer technology?

<table>
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<th>Some what significant</th>
<th>Fairly significant</th>
<th>Very significant</th>
</tr>
</thead>
<tbody>
<tr>
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<td>4</td>
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PART II
The process used to select and implement computer technology for the "Classroom of Tomorrow" program?

03. Of the following, what process activities were used to select computer technology was useful for you?

<table>
<thead>
<tr>
<th>Process Activity</th>
<th>Not at all</th>
<th>Some useful</th>
<th>Fairly useful</th>
<th>Very useful</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Summer workshop(s)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b. After school workshop(s)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c. During school day workshop(s)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>d. Support group of teachers using technology</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>e. Computer literature</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>f. In service training</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>g. References materials</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>h. Travel to conferences</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>i. Students parents support</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>j. Computer specialist/technology</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>k. Stipend for training</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>l. Academic class (Training)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>m. Technology consultant</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>n. Students who use computers</td>
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<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>o. Teachers who use computers</td>
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<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>p. Community groups</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>q. Others (please specify)</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

04. Of the following, what process activities were used to implement computer technology was useful for you?

<table>
<thead>
<tr>
<th>Process Activity</th>
<th>Not at all</th>
<th>Some useful</th>
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<td>4</td>
</tr>
<tr>
<td>q. Others (please specify)</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
PART III Type of Selection and Implementation Process

05. The computer I received generally used by me?

   YES .................. Go to Q.09
   NO ................... Go to Q.08

06. The computer I received generally used by one of the following?

   (Check all that apply.)

   ______ Centralized lab
   ______ At Office
   ______ In classroom
   ______ Don't know

   ______ In the library
   ______ Boxed in the storage room
   ______ In the resource room
   ______ Other, please specify ________________

07. When you need assistance in computer who is available to help you in your classroom?

   (Check all that apply.)

   ______ Self-help
   ______ Another teacher
   ______ Office staff
   ______ Students in classroom
   ______ Librarian staff
   ______ Resource staff
   ______ Technology specialist
   ______ Don't know

   ______ Other, please specify ________________

08. Respond to the following items concerning the selection and implementation of computer technology?

   Please check ONE for each question

   Don't know   Yes   No

   a. There is a policy in place that reflects the goals, objectives and procedures to assure that a quality selection of computers was made.................................

   b. There is no regular systematic plan for the selection of hardware and software.................................

   c. My suggestions for purchase of materials were seriously considered...........................................................

   d. I participated in the decision about where or how computers distributed......................................................

   e. Hardware and software were brought in for preview and evaluation..........................................................

   f. Administrators and teachers are encouraged to select their needs of hardware/software.............................

   g. I did work with a committee on a regular basis to plan implementation........................................................

   h. I'm encouraged by my superiors to use computers in my classroom..........................................................

   i. Are you comfortable in using computer you received in your classroom ..........................................................

   j. Were you aware (informed) of any training in computer use provided for you by your school district............

   k. Have you been provided training in computer use by your school district..................................................

   l. Did you participate in any structured computer orientation sessions before implementing computers in your school...

   m. Does the the school district currently have a school improvement process?................................................

   n. If yes to question O, does the school improvement process have a technology component ................................

   o. Does the school district have a computer technology specialist..................................................................

   p. Does the school district have a computer training program .................................................................

   q. Does the school district have a computer technology specialist.................................................................

   r. Does the school district have a computer technology committee...............................................................
09. Please estimate the average number of hours of computer training that will have been made available to you?

(A) ______

10. How interested are you in taking a course to learn how to use a computer for instructional purposes? (Check ONE.)
   a. ____ Not very interested  d. ____ Very interested
   b. ____ Somewhat interested  e. ____ Undecided
   c. ____ Moderately interested

PART IV
11. As an administrator did participate in selecting and implementing the "Classroom of Tomorrow" program, have you been given an opportunity to work with:
   (Check yes OR no for each)
   a. Intermediate school districts (ISDs)   ____ YES ____ NO
   b. Regional educational media centers (REMCs)   ____ YES ____ NO

12. How well satisfied are you about the following subjects?
   Please Circle ONE for each question
   
   Not Satisfied  Some Satisfied  Fair Satisfied  Very Satisfied
   a. Quality of computer software selected 1 2 3 4
   b. Amount of computer software selected 1 2 3 4
   c. Quality of computer hardware selected 1 2 3 4
   d. Amount of computer hardware selected 1 2 3 4
   e. Administrative support 1 2 3 4
   f. Present state of your school in terms use of educational technology 1 2 3 4
   g. Other, please specify

13. Which of the following phrases BEST describe your instructional purpose for using computers in the classroom?
   (Check ALL that apply.)
   a. ____ Foster awareness of the computer
   b. ____ Teach basic computer skills
   c. ____ Teach computer programming skills
   d. ____ Develop skills in another subject
   e. ____ Reward outstanding student performance
   f. ____ Enrich learning activity for high ability students
   g. ____ Other (please specify)

14. What effect has computer technology had on your school?
   Please Circle ONE for each question
   
   Negative effect  No effect  Positive effect  Don't know
   a. Motivation 1 2 3 4
   b. Self confidence 1 2 3 4
   c. Social behavior 1 2 3 4
   d. Subject interest 1 2 3 4
   e. Attention span 1 2 3 4
   f. Self-discipline 1 2 3 4
   g. Cognitive learning 1 2 3 4
   h. Performance 1 2 3 4
   i. Achievement 1 2 3 4
   j. Status among peers 1 2 3 4
   k. Other, please specify
PART VI
Professional background information
To help us interpret the results of this survey, we’d also like some information about your background
15. Your sex: Male  Female
16. Indicate your: Age  Experience years in education
17. Indicate the year your have completed your highest degree?
   (Check one)
      a. Bachelor’s degree: 19  c. Master degree: 19
      b. Specialist degree: 19  d. Doctor’s degree: 19
18. Additional comments: Please use space below to make any comments concerning the topics addressed by this survey.

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________


Appendix E
List of 24 Schools
<table>
<thead>
<tr>
<th>School</th>
<th>Apple II GS</th>
<th>Mac</th>
<th>IBM</th>
<th>Total</th>
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<tr>
<td>Central</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>15</td>
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<tr>
<td>Chime Street</td>
<td>3</td>
<td></td>
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<tr>
<td>Community Education Center</td>
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<td>2</td>
<td>2</td>
<td></td>
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<td>Edison</td>
<td>12</td>
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<td>Woods Lake</td>
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<td><strong>11</strong></td>
<td><strong>10</strong></td>
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</table>
Appendix F

Follow-up Letter
April 20, 1993

To: Elementary school Teacher
   Kalamazoo Public Schools

From: Ahmad Alobiedat

RE: Reminder

Dear Colleague:

Two weeks ago, a survey was mailed to all elementary principals and teachers from the Kalamazoo Public Schools who received computers in the "Classroom of Tomorrow" program. If you have already responded and returned the survey thank you for your participation. If you haven't responded please take a few minutes to respond and return the survey. Since there are only a limited number of principal and teachers in the Kalamazoo Public Schools being asked to respond, your response will be a vital, valuable part of this study. Your willingness to respond to this questionnaire will yield results important to our profession.

If you need a new copy of the survey I will be glad to send you one if you will call WMU EDLD 387-3879 or 387-3885 and leave your name and school name. Many thanks for all your cooperation.

Sincerely yours

Ahmad Alobiedat
Doctoral student of Educational Leadership
Appendix G

Approval Letter From Human Subjects
Institutional Review Board
Date: March 17, 1993
To: Ahmad Alobiedat
From: M. Michele Burnette, Chair
Re: HSIRB Project Number 93-03-12

This letter will serve as confirmation that your research project entitled "Role of leaders in selecting and implementing computer technology in schools" has been approved under the exempt category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the approval application.

You must seek reapproval for any changes in this design. You must also seek reapproval if the project extends beyond the termination date.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: March 17, 1994

xc: Jenlink, EL
BIBLIOGRAPHY


Murphy, J., & Hallinger, P. (1987). New directions in the professional development of school administrators: A synthesis and suggestions...
for improvement. In J. Murphy & P. Hallinger (Eds.), Approaches to administrative training in education (pp. 245-273). Albany: State University of New York Press.


Watkins, P. (1986). *A critical review of leadership concepts and research: The implications for educational administrators*. Victoria,
Australia: Deakin University. (ERIC Document Reproduction Service No. ED 283 132)


