2921 NW 106th Avenue
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August 3, 1998

Dr. Cary Sutton, Coordinator
Research and Evaluation
School Board of Broward County

Dear Dr. Sutton:

As we discussed, I am attaching a copy of my dissertation for your review. I am in the process of transforming the paper into a journal article for anticipated publication. I will send you a copy of the completed article.

I am also interested in sharing my research through appropriate School Board publications. I would appreciate any advice you could offer in this area.

Thank you for all of your assistance.

Sincerely,

[Signature]

Steven J. Montes, Ed.D.
Peters Elementary School
ON-SITE TECHNOLOGY COORDINATORS AND THEIR IMPACT ON THE

ACHIEVEMENT OF TECHNOLOGY STANDARDS

IN BROWARD COUNTY, FLORIDA, PUBLIC SCHOOLS

by

Steven J. Montes

A Dissertation Submitted To The Faculty Of

The College Of Education

In Partial Fulfillment Of The Requirements For The Degree Of

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Florida Atlantic University

Boca Raton, Florida

August 1998
ON-SITE TECHNOLOGY COORDINATORS AND THEIR IMPACT ON THE ACHIEVEMENT OF TECHNOLOGY STANDARDS IN BROWARD COUNTY, FLORIDA, PUBLIC SCHOOLS

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Steven J. Montes

This dissertation was prepared under the direction of the candidate's dissertation coadvisors, Dr. Patricia Maslin-Ostrowski, Department of Educational Leadership, and Dr. John D. Morris, Department of Educational Technology and Research, and has been approved by the members of his supervisory committee. It was submitted to the faculty of the College of Education and was accepted in partial fulfillment of the requirements for the degree of Doctor of Education.

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ABSTRACT

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Title: On-Site Technology Coordinators and Their Impact on the Achievement of Technology Standards in Broward County, Florida, Public Schools

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Studying the relationship between the achievement of technology standards and the availability of on-site support will help educational leaders prepare and modify individual and district-wide technology plans in the years ahead. There are many factors influencing success rates in attaining these standards, including the availability of hardware and software, the adequacy of the equipment, and the amount of training provided to teachers.
influence the achievement of technology standards in the sample. This indicated that schools in this study had access to hardware, software, training, and other resources at a level equal to each other. Broward County policymakers seemed to have succeeded with their efforts to ensure that all schools had access to the funds and other resources needed to meet the locally established standards of technology.
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Chapter I: Introduction

Computer skills and the ability to use other related technologies to improve learning and performance can be considered essential elements to be incorporated into the curriculum of schools. The Secretary of Labor’s Commission on Achieving Necessary Skills (SCANS) (U.S. Department of Labor, 1991) concluded that those graduates unable to use technology in the workplace “face the bleak prospects of dead-end work interrupted only by periods of unemployment” (p. xv). The National Governors’ Association (1996) issued a brief that acknowledged the potential of technology in education. It called for policymakers and educators to work together with parents, business leaders, and communities to ensure that all schools have access to technology and that they use it to support high quality instruction. In 1995 Secretary of Education Dick Riley summarized in an action plan what technology can do for American classrooms, teachers, and students:
It can help tailor instruction to the individual needs of the students; support teachers and their professional development; connect student learning with the real world; connect schools to the home and the community; and expand time for learning beyond the school day. (p. 6)

Many policymakers and community leaders believe that an investment in technology will result in greater student achievement in the nation's schools. Several states and districts have developed, or are in the process of developing, specific standards needed to accomplish this goal. For example, in Broward County, Florida, the focus of this study, both the school board and the superintendent are committed to the implementation of a comprehensive educational technology program throughout the district. The program includes the development of six specific technology standards of service: (a) hardware, (b) software, (c) training, (d) integration, (e) networking, and (f) on-site support. These standards were organized into five levels of increasingly more specific requirements (to be discussed in Chapter III). The goals of the Broward County School District are that all schools will ultimately reach the highest level of each standard and that through technology, the school system will advance each of its eight major system
priorities, including improving student achievement and school effectiveness (School Board of Broward County, (SBBC), 1997, http). This study was designed to explore the relationship between on-site technology support and the remaining five technology standards of service listed above.

The review of literature in Chapter II outlines several studies supporting the belief that technology improves student achievement. However, the nation's investment in technology-related hardware, software, and training, and the development of technology standards appears to not ensure the effective use of technology in the classrooms of America.

Jordan and Follman (1993) identified lack of computer use as a major obstacle to technology integration (to be defined in Chapter II). They indicated that a substantial number of teachers reported little or no use of computers for instructional purposes. One of the basic problems reported was that, in many cases, the computer was used to support traditional methods of teaching and learning, such as drill and practice; and its full potential was never realized. Schools surveyed reported that most computers were sitting in closets and were never put into circulation. Their research
also found that most teachers considered themselves less 
computer literate than their students.

This generally poor condition of computer integration 
was seen by some researchers as possibly related to the lack 
of technical support in the schools. For example, in a 
survey of technology usage in southeastern Louisiana, Baldwin 
(1994) found that 73% of the respondents, including teachers 
and administrators, indicated that lack of technical support 
personnel in the school, or in the district, was a major 
concern. In the same report, 97% of the respondents noted 
that a technology consultant in the school could have been 
somewhat helpful, or very helpful, with the integration of 
computer skills into the curriculum. Strudler's study (1995) 
conducted at three elementary schools suggested that "schools 
should consider staffing technology coordinators where the 
goal is integration throughout the curriculum by all 
teachers" (p. 252). Evans-Andris (1995), in her study 
examining barriers to computer integration in elementary 
schools, implied that schools committed to an integrated 
computer program should invest in a full-time coordinator for 
their schools.
Suggestions by researchers and by practitioners that technological support at the school level could aide in the ultimate integration of technology into the classrooms of America raises important questions about the role such support could actually play at the school level in the achievement of technology standards. This study investigated the relationship between these factors and will be discussed next.

Statement of Purpose

The primary purpose of this study was to explore the relationship between the standard of on-site support, the predictor variable, and the five technology standards of service, hardware, software, networking, training, and integration, the dependent variables. The study also investigated the relationships of school level and school socioeconomic status and the dependent variables. The study was conducted using information gathered from 190 public schools located in Broward County, a major metropolitan school system in southern Florida.

Significance of Problem

There are many benefits that can arise from the use of technology in classroom instruction and in student learning.
Some benefits included increased student achievement levels (Salerno, 1995), increased problem solving and communication skills (Alexander, 1993), a significant increase in student writing ability (Zellermayer, Salomon, Globerson, & Givon, 1991), and a dramatic increase in levels of motivation when technology is used in learning (Silvin-Kachala & Bialo, 1994). Yet, as Jordan and Follman (1993) pointed out, most educators were not making use of this resource:

To the extent that tools and resources define a society, we have clearly moved from the Industrial Age to the Information Age. Computers have become tools of choice and information has become a valuable resource. Technology, the catalyst for this transition, is affecting every facet of society that deals with the generation, storage, or transmission of information. Technology increasingly affects our work, politics, and entertainment. Ironically, computers and associated technologies have had only a limited impact on society's most information-rich institution: education. (p. ix)

Computers were found to be present in U.S. classrooms with the potential to be utilized by teachers. A recent study conducted by the Office of Technology Assessment (OTA), (U.S. Congress, 1995) found that even though computer hardware has been present in the classrooms of America for years, the nation's 2.8 million teachers are making minimal use of this technology.
relationship between these two factors could assist schools in the development of more effective technology plans to meet the needs of the various student populations. Further, understanding the relationship between school level and the achievement of technology standards could also lead to greater integration of technology in the schools.

**Research Questions**

This study was designed to answer the following questions:

1. In the sample, was there a difference in the reported levels of technology standards of service—hardware, software, training, integration, and networking—based on the predictor variable, on-site support?

2. In the sample, was there a difference in the reported levels of technology standards of service based on the predictor variable, socioeconomic status?

3. In the sample, was there a difference in the reported levels of technology standards of service based on the predictor variable, school level?
Hypotheses

This study tested the following hypotheses:

1. $H_0$: On-site technology support does not significantly affect ($p < .01$) the achievement of hardware standards in public schools, grades kindergarten (k) through 12.

2. $H_0$: On-site technology support does not significantly affect ($p < .01$) the achievement of software standards in public schools, grades k through 12.

3. $H_0$: On-site technology support does not significantly affect ($p < .01$) the achievement of training standards in public schools, grades k through 12.

4. $H_0$: On-site technology support does not significantly affect ($p < .01$) the achievement of integration standards in public schools, K grades k through 12.

5. $H_0$: On-site technology support does not significantly affect ($p < .01$) the achievement of networking standards in public schools, grades k through 12.

6. $H_0$: Socioeconomic status does not significantly affect ($p < .01$) the achievement of technology standards in public schools, grades k through 12.
7. H₀: School level does not significantly affect \( p < .01 \) the achievement of technology standards in public schools, grades k through 12.

**Limitations**

The recorded levels of hardware, software, training, integration, and networking, the dependent variables, and of on-site support, the predictor variable, were compiled from self-reported information for each school in the sample. The source of the self-reported information was a locally designed matrix-reporting instrument, which identified 5 levels of requirements to be met for each of the technology standards listed above. Schools in the sample were required by district mandate to utilize specific procedures for recording the technology levels as reported in this study (discussed in Chapter III). Thus, the information collected should be valid.

In addition, the number of computer-literate teachers at each school location was not investigated. It is possible that this factor could have influenced the achieved levels of technology at each school. However, in that the standards identified on the matrix were written in general terms, the influence of this factor should be minimized. As a result,
the findings reported should provide the reader with useful information.

This study based socioeconomic status on free and reduced-price lunch statistics. Conclusions concerning socioeconomic status and the achievement of technology standards should be limited to the definition provided for socioeconomic status in this study. The results may not be able to be generalized to other populations utilizing other definitions.

**Delimitations**

The research sample \((N = 190)\) was a single school district within the state of Florida. School districts in Florida are organized countywide. Many school districts around the nation contain fewer schools and may not be structured on a countywide system. In addition, teams of educators in the district wrote the specific technology standards outlined in this study, including the role of the on-site technology specialist. Therefore, the results may not be able to be generalized to all schools in the United States.
Assumptions

1. This study was conducted under the terms of the following assumptions: The locally designed matrix-reporting instrument was valid and reliable.

2. Participation in a free or reduced-price lunch program was an accurate indicator of socioeconomic status.

Definitions

Free and Reduced-Price Lunch: The National School Lunch Program is a federally assisted meal program. Children from families with incomes at or below 130% of the poverty level are eligible for free meals. Those between 130% and 185% of the poverty level are eligible for reduced-price meals, for which the students can be charged no more than 40 cents (U.S. Department of Agriculture, 1997).

Instructional Technology Initiative Funds: State of Florida funding initiative assisting schools in the acquisition of technology and technology training. Specific amounts are provided to each school based on the number of students enrolled.

School Advisory Council: Mandated for each school in the state of Florida by the Florida Legislature. The advisory council members must include the school’s principal and an
appropriately balanced number of teachers, education support employees, parents and other business and community citizens.

**School Improvement Plan:** An annual comprehensive school-level plan of action (Florida Department of Education [FDOE] 1997, http).

**School Improvement Team:** Broward County identifies the School Advisory Council as the School Improvement Team. The role of the School Improvement Team is to facilitate the development and monitor the progress of the School Improvement Plan.

The review of literature reveals research pertinent to several technology-related issues. These issues include a discussion of the relationships between on-site support, socioeconomic status, and school level and the status of technology integration and student achievement in schools across America.
Chapter II: Review of Literature

The 1991 SCANS report (U.S. Department of Labor) indicated that understanding and utilizing computer technology had become as basic to a person's ability to navigate through society as the traditional skills of reading, writing, and arithmetic. However, the literature indicated that efforts to integrate this technology into the day-to-day learning and teaching experience have fallen short of anticipated goals. Evans-Andris (1996) determined that even though computing in the classroom may have facilitated integrated, active learning, it remained elusive in most schools.

The focus of this study was on the relationship between on-site technology support and how it may or may not have influenced the achievement of technology standards at the school level. The review of literature covers the following topics: (a) technological hardware in schools, (b) technology integration in the classroom, (c) technology and student achievement, (d) teacher attitudes related to technology integration, (e) local, state, and federal initiatives.
concerned with technology standards, (f) the relationship between on-site support and technology integration, and (g) socioeconomic status and school level and technology integration.

Technological Hardware in Schools

The OTA report, (U.S. Congress, 1995) indicated that by the Spring of 1995 schools purchased close to 6 million computers for instructional purposes—about 1 for every 9 students. The report indicated that schools nationwide were committed to introducing technology into the classroom. However, it was also noted that even though the United States led the world in the sheer number of instructional computers in schools, many were older machines that could not support CD-ROM-sized databases, network integrated systems, support modems, or access complex software (FDOE, 1997, http). This was especially true in elementary schools. Figures 1 and 2 represent the most current, official data gathered during the research phase of this project. However, technology is changing at a tremendous pace. The newest Apple Power Macintosh (Mac) and G3 computers as well as Pentium-driven computers could not be represented in the data as a result of their very recent release into the market.
Figure 1. Inventory of school computers in United States.

Older, less powerful computers include primarily Apple II+, IIC, and IIe. Intermediate computers include the Apple IIgs and IBM XT8088. More powerful computers include the Mac 6800, Mac II, Mac LC, and IBM 386 and 486. Adapted from Teachers and Technology: Making the Connection (p. 95), U.S. Congress, Office of Technology Assessment, 1995, Washington, DC: U.S. Government Printing Office.
The findings by the OTA (U.S. Congress, 1995) were supported by other research projects. Honey and Henriquez (1993) indicated that schools in their sample were well-endowed with computers and were technology-rich environments. Jordan and Follman (1993) found that nationwide, during the 1980s, computer growth had a "50-fold increase in our schools" (p. ix). Burnett (1994) indicated that 99% of all schools across the country provided students with some access to computers.

In addition, other technology-related hardware was found to be present in the classrooms. A 1995 nationwide survey by Quality Education Data found that in schools connected to cable, 85% of the educators responding used computers, laser discs or CD-ROMs in their classrooms. However, contradictory to the majority of findings, Baldwin (1994) indicated that teachers in her study reported that the greatest impediment to technology integration was lack of hardware in the classroom.

Technology Integration in the Classroom

The review of the literature resulted in a general definition of technology integration. This definition included, but was not limited to, teachers utilizing videos
for presentations in their classrooms; the use of computers for basic-skills practice; the use of word-processing and other generic programs for developing computer-specific skills; desktop publishing and multimedia presentations used in learning and instruction; computer simulations utilized for developing mathematical or scientific reasoning; information gathering from databases on CD-ROM or networks, including the Internet; and communication using electronic mail.

In 1993 Becker reported that a constantly changing view of what was expected to be taught and to be learned in classrooms, with regard to technology, helped to create this general definition of technology integration. For example, in 1984 it was first thought that students needed basic programming skills, with programs such as BASIC and LOGO. Teachers were expected to expand on this concept and to teach children the language of the computer and to have them think about programming skills. In 1986 teachers were expected to utilize the computer for drill and practice of separately taught skills. In 1988 it was determined that students needed to use the computer as a tool for generic applications, such as word processing. In the early part of
the next decade, teachers were encouraged to teach using database programs and simulators. They were also expected to utilize multimedia presentations in their classrooms and were encouraged to have students do the same. In the second half of this decade, teachers were asked to encourage learning through telecommunications, including Internet use (Becker, 1993).

The OTA (U.S. Congress, 1995) further reported that the schoolteachers were using technology for instruction in much more traditional ways than those suggested above. For example, the OTA report indicated that the most common activities for elementary students were “drills in basic skills and instructional games” (p. 103). Moursund (1995) found that in many schools most teachers and students still used the computers as expensive flash cards or electronic worksheets. Moursund also indicated that the productivity side of computer use in the general curriculum was “neglected and underdeveloped” (p. 6).

Several research studies indicated that a variety of methods were in place in many classrooms that fostered the use of technology in teaching and in learning. For example, Honey and Henriquez (1993) reported that elementary, middle,
and high school teachers responding to their survey (n = 550) indicated that 44.8% of the teachers in their schools used computers in their classrooms. Activities included the use of word-processing programs in the development of writing skills, games and simulations, problem-solving tasks, and drill and practice exercises. Bauder and Mullick (1993) found that 74% of teachers surveyed (N = 325) reported that they use computers for instruction where instruction was defined as the use of computers for teaching and learning, not as a management or productivity tool. With regard to other technologies, Russell and Curtin (1993) reported that about half, 51%, of all teachers surveyed said they had used television or video technology in their teaching during a one-month period.

However, according to the OTA report, "There are few reliable data about how much [italics added] the 4 million-plus computers in schools are actually being used; the only estimates are rough ones" (U.S. Congress, 1995, p. 101). The problem, as reported, may have come from the fact that computer use varied greatly depending on the source. For example, in elementary schools, technology coordinators indicated computers were used about one and three-quarter
hours per week, per student. The students themselves reported much less frequent use, approximately 24 minutes per week in the fifth grade. Sabatino (1993) reported that the average student spent 11.9 minutes per day on computers. Even though it was acknowledged that the study's reporting procedures for time on computers had limitations, it was concluded that more work was needed to integrate technology into the learning environment.

The OTA report (U.S. Congress, 1995) indicated that when computer-using teachers were defined as those teachers who sometimes used computers with their students, 75% of the fifth-grade teachers and about half of the eighth- and eleventh-grade teachers questioned fit the definition. When computer-using teachers were defined as those who clearly required most or all students to do work on the computer, then approximately 50% of fifth-grade teachers, 33% of eighth-grade teachers, and 20% of eleventh-grade teachers qualified as computer-users. Thus, the percentage of teachers classified as computer using was quite variable and became smaller as definitions of use became more stringent. It became apparent that a standard definition for computer-user could benefit researchers exploring this question.
A survey by the U.S. Department of Commerce, Bureau of the Census (1993) reported that student use of computers at school increased from 42.7% in 1989 to 59.0% in 1993 (see Figure 3). This could be interpreted to mean that the general perception of those surveyed felt that computers were, indeed, being used at school. However, specific details concerning how the surveyed population believed the computers were being used were not revealed in this report.

The literature indicated that the extent to which technology was being integrated into the classroom varied according to the reporting source. The literature also indicated that the integration process was confusing and frustrating to many teachers. Means, Blando, Olson, and Middleton (1993) emphasized that integration of technology into the curriculum was important; and efforts needed to continue in this area. Sheingold (1991) effectively summarized the issue, "Technology is not likely to have a qualitative impact on education unless it is deeply integrated into the purposes and activities of the classroom" (p. 20).
Technology and Student Achievement

Salerno (1995) investigated whether the mathematics achievement of at-risk students who used computer-assisted instruction (CAI) differed significantly from the achievement of at-risk students who used other methods of instruction. Salerno found that at-risk students achieved significantly ($p < .05$) higher scores after spending time on CAI. Kulik, Kulik, and Bangert-Drowns (1985) found that elementary students who used CAI outperformed those students who did not. This was especially true for disadvantaged and low-ability students.

The Office of Research and Evaluation of the Austin Independent School District (Sabatino, 1993) conducted research by restructuring the classroom learning environment by using technology as a catalyst for change. The Elementary Technology Demonstration Schools program was intended to demonstrate the effectiveness of technology in accelerating the learning of low-achieving students and by enhancing the education of high-achievers. The majority of the teachers in the project, 81%, believed that the addition of technology into the learning environment allowed them more time to provide individualized instruction to students, thus
increasing achievement scores. Also, 2 out of 3 teachers thought that technology facilitated effective evaluation of students. Additionally, during the first 3 years of the program, the percentage of students who passed a grade three writing test increased an average of 13.3% compared with 6% for the district. Further, minority and disadvantaged students in the demonstration schools performed as well or better in relation to district minority and economically disadvantaged students. Sabatino further indicate that the number of students who failed a section of a Texas assessment test decreased at the demonstration schools. However, it was also reported that several teachers resisted the changing environment believing that increased computer use caused students to miss out on science and on social studies units created by them.

There are other positive effects reported when students utilized technology in their learning. For example, Lehrer, Erikson, and Connell (1992) retested the knowledge of ninth-grade students on the Civil War a year after they studied the conflict. It was found that students who developed hypermedia presentations to demonstrate their knowledge of the subject recalled more Civil War facts and had more
elaborated concepts of the material than those students who utilized more traditional approaches.

Teacher Attitudes Related to Technology Integration

Some research supported the concept that classroom teachers could not have realized integration of technology into the classroom curriculum without their concentrated efforts. Sheingold (1991) concluded:

It is now well understood that the challenge of integrating technology into schools and classrooms is much more human than it is technological. What's more, it is not fundamentally about helping people to operate machines. Rather, it is about helping people, primarily teachers, integrate these technologies into their teaching as tools of a profession that is being redefined through the incorporation process. (p. 1)

Marcinkiewicz (1993-1994) found in his study of 170 elementary school teachers that although the average pupil-to-computer ratio in public schools continued to improve, teachers were increasingly dissatisfied with computers. They reported that they were disappointed that breakthroughs in educational technology did not meet their expectations. Half the teachers in the study reported not using the computer at all for teaching. Marcinkiewicz concluded that full integration of computers into the educational system was still a distant goal.
Jordan and Pollman (1993) reported that while computers were considered one of the expected trappings of the classroom and that schools have exhibited an insatiable appetite for hardware, the integration of the computer in the curriculum was still more promise than reality. Further, their research found that the mere possession of technology did not guarantee productive use in the classroom. "Many computers sit idle, shrouded in dust covers" (p. ix).

Becker's (1993) research into the instructional uses of computers by teachers found that the advice of so-called experts in educational technology, identifying what teachers should do with computers, was constantly changing. This changing philosophy caused teachers to be unclear of the direction they were expected to follow with regard to technological integration. According to Fulton (1993), even when teachers understood the appropriateness of educational technology in the classroom and were willing to learn, they took as many as five or six years to become sufficiently comfortable with computers to use them effectively in their classrooms.

Burnett (1994) suggested that computers were present in many schools but were not being used for any clear purpose.
It was revealed that educators who wished to bring computers into their classrooms must first clarify the role of computers as a pedagogical tool. Redinger's (1996) analysis of select South Carolina public schools found that the involvement of all stakeholders, including teachers, in the decision-making process (shared decision-making) aimed at securing technology, positively influenced the implementation and utilization of technology at the school level. Further, she reported that successful technology plans included input from all levels.

The question of computer utilization in the classroom appeared more dependent on human behaviors than on technological issues:

Past technologies have been promoted as 'the answer' for education. Today, these views are generally tempered by an understanding that it is not the technology alone, rather the ways in which those features are used in human environments that shape its impact. (Sheingold, 1991, p. 18)

Teachers need direction and support to integrate technology effectively into the curriculum. Organizing specific technology standards combined with on-site technology support at the school level could provide this assistance.
Technology Standards: Local, State, and Federal Initiatives

Local school districts, states, and the federal government have recognized the importance of introducing technology as part of the core curriculum. Basic computer skills were identified and expected to be taught by teachers and mastered by the students in many districts.

The SCANS report (U.S. Department of Labor, 1991) identified the level of technology-related skills required to enter employment. The research identified five competencies that were at the heart of job-performance. Those competencies included: (a) identifies, organizes, plans, and allocates resources; (b) works with others, teaches others new skills; (c) acquires and uses information, uses computers to process information; (d) understands complex relationships and improves or designs systems; and (e) works with a variety of technologies and understands overall intent and proper procedures for setup and operation of equipment. The SCANS report found these skills so essential to learning that “The know-how defined by SCANS should be the responsibility of teachers in every curricular and extra-curricular area. These skills should be developed in the five core courses” (p. 22). The report’s Executive Summary indicated “The
message to us was universal: good jobs will increasingly depend on people who can put knowledge to work" (p. xv).

The review of literature gleaned from the Internet revealed that a number of states and local districts have developed, or are in the process of developing, technology standards and frameworks (Putnam Valley Schools, 1997, http). For example, Alaska, in 1994 and 1995, adopted the Content Standards for Alaska Students, which contained a short list of one-sentence standards for various subjects, including technology. The Alaska 2000 Technology Standards included five performance standards and several performance indicators for each standard. In June 1996 the Illinois State Board of Education released preliminary drafts of the Illinois academic standards listing state goals and academic standards for each goal, including technology. Massachusetts developed science and technology strands and learning standards to be used in classrooms throughout the state. In Michigan, technology became part of the Core Curriculum Content Standards. Utah developed the Information Technology Core Curriculum, identifying the basic technological skills necessary at each grade level.
Finally, in Florida, where the sample was drawn, a comprehensive plan for the procurement and utilization of computer hardware, software, training, and networking was developed and put into place for use by each of its 67 school districts. Florida’s Department of Education, Office of Educational Technology (OET) was responsible for coordinating the state’s efforts in this area. The OET provides leadership, technical assistance, and support to public education and telecommunications entities in the effective use of educational technology and distance learning to improve student performance. The OET consists of two sections, Instructional Technology and Telecommunications and Distance Learning. The OET’s responsibilities include offering technical assistance to school districts in developing and implementing technology plans; serving as a resource to review, evaluate and recommend appropriate and cost effective applications of technology for FDOE initiatives; developing and maintaining a central clearinghouse for information about technology training statewide; providing program information and technical assistance for distance learning planning and implementation; and providing technical assistance to districts in distance

Higher education and private and nonprofit sectors were also identified as important contributors in this effort. Technology for All Americans: A Rationale and Structure for the Study of Technology (Satchwell & Dugger, 1996), was a project funded by the National Science Foundation and the National Aeronautics and Space Administration, where the objective was to develop a national rationale and structure for technology education. The ultimate goal of the project was to offer those educators and policymakers interested in technology education as an essential core subject, a clear vision for what it meant to be technologically prepared, how this preparation can be achieved at a national level, and why it was important for the nation. A national commission was established to pursue this goal. One of the major accomplishments of the commission was the agreement of a definition for the concept of technology. This definition guided the development of the rationale and structure of the project, "Technology is human innovation in action. This involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities."
The second phase of the project, set to be completed in 1999, will attempt to establish standards for what every child should know and should be able to do related to technology. Means, Blando, Olson, and Middleton (1993) reviewed a U.S. Department of Education, Office of Educational Research and Improvement, sponsored study of social and organizational factors affecting technology and school reform. Their review revealed that there were difficulties in establishing standards that could be attributed to both top-down educational innovations (state planning) and classroom initiated, bottom-up reform measures. However, planning design aside, the study indicated that technology reform in schools should begin with clear instructional goals. The report suggested that the organization of district and school instructional goals related to technology played an important part in the success or failure rate of technology implementation in the schools studied. The report also indicated that technology adoption goals for the schools were initially conceived at the district level. It was reported that the motivation for district efforts to adopt technology included: (a) the belief that the use of technology, mainly
computer-based, supported the development of the thinking processes of the students; (b) the belief that computer-based technologies could stimulate student motivation for learning in low socioeconomic students, thus promoting equity for students less likely to experience computer technology at home; (c) the need to prepare students for the world of work; and (d) the need to support change in the school structure.

The review of the U.S. Department of Education’s report by Means et al. (1993) also revealed that several features were required for successful technology integration to take place in the schools: (a) schools and districts needed to jointly develop goals and identify technology’s place in fulfilling them; (b) schools needed to provide adequate access to technology in regular classes; (c) technical support needed to be readily available and nonjudgmental for all instructional staff; (d) districts needed to provide professional growth opportunities in technology, as well as recognition and rewards for exemplary technology use; (e) mechanisms for teacher choice in what technology to integrate into their curriculum and how to use it needed to be identified and developed; (f) opportunities needed to be provided for teachers to work together; and (g) increased
support time for teachers to learn to use technology and
design technology-supported learning activities. In
addition, it was determined that the justification for state
planning and activity was particularly strong if technology
was considered an integral part of reform. States utilized
technical resources and had leverage in equipment and
software purchases that could be hard for schools to
duplicate.

Kentucky's initiative was aggressive in this area. The
Kentucky Education Reform Act, passed in 1990, mandated a
complete restructuring of the Kentucky educational system in
the areas of finance, governance, and curriculum. One
component of the curriculum restructuring included a
comprehensive technology initiative that supported
instruction and communication (Mazur, 1995). The Council for
Educational Technology, under law, was charged to develop a
5-year master plan for educational technology. The Kentucky
Education Technology System (KETS) was designed to assist
Kentucky schools in their efforts to (a) improve learning and
teaching and the ability to meet the needs of individual
students while increasing student achievement, (b) improve
curriculum delivery to help meet the need for educational
equity across the state, (c) improve the delivery of professional development, (d) improve the efficiency and productivity of administrators, and (e) encourage development by the private sector and acquisition by districts of technology and applications appropriate for education.

Mazur (1995) reported that the KETS was an extensive plan for statewide technology implementation that included specifications of hardware, recommendations for instructional uses of technology, and software specifications. Initial implementation required extensive foundation work, including the development of standards for the amount and kinds of technology needed prior to the delivery of goods and services.

Mazur (1995) also reported that schools making the most progress in achieving the standards outlined in KETS implemented technology that was consistent with the school’s technology plan, organized technology planning committees that represented all stakeholders, and developed plans for technology and professional development that were consistent with the school’s Transformation Plan. In addition, it was found that classroom instruction was a major factor in differentiating schools that were high implementers of
educational technology from those considered low implementers. This indicated that the role of the teacher in the classroom was "instrumental in the effective integration of technology into the curriculum" (Mazur, 1995, p. xi).

Several doctoral studies have investigated this topic. McWilliams (1996) developed a conceptual model for technology planning which resulted in the achievement of technology standards. The model was intended to be used by administrators in public schools in the development of technology plans. Following a review of the literature and the collected writings of experts, a model was created. McWilliams concluded from his study that successful technology plan blueprints included a useful theory of developmental psychology, an integrated systems design methodology, a useful theory of organizational behavior—-and sticking to it, and an effective evaluation methodology. Further, he noted successful integration of technology and the achievement of standards could be better met if all the stakeholders became involved, not only in the development of the conceptual plan but also in the actual implementation process itself. The study revealed that precise plans were
necessary to achieve technology standards at the school and at district levels.

Cramton-Johnson (1996) studied how the use of laser disk technology in the science curriculum of one California school district complied with or detracted from the implementation of policy statements reflected in national standards, the California Science Framework, and in task force reports. One conclusion of this study was that the use of laser disk technology enhanced the curriculum, ensuring equal access for all students. Equal access was one of the goals of the aforementioned technology policy statements.

The Relationship Between On-Site Support and Technology Integration

On-site support may very well provide the necessary assistance for teachers to begin a more concentrated effort to integrate technology into the classroom curriculum.

Evans-Andris (1996) reported:

Schools will enhance integrative computer programs by employing computer coordinators as resource facilitators, using their expertise to identify and access technical resources and coordinate strategies of computer integration with classroom teachers rather than for them. (p. 159)
Stearns et al. (1991) evaluated several technology schools in California and found that the presence of on-site assistance with technology was critical for successful integration of the computer into the classroom curriculum. The report found that moving technical assistance personnel from a central site to the schools during the technology implementation process was important in making curricula and instructional improvements. The presence of coordinators motivated more teachers to try many varied types of technology in their teaching, helped them to feel more confident to the point where several assisted other teachers with technology integration, and helped more teachers share applications of their new skills at workshops and conferences.

In addition, Stearns et al. (1991) pointed out that the amount of time teachers used technology for productivity in the classroom increased from an average of six hours per week during the 1988-1989 school year to nine hours per week during the 1989-1990 school year. Further, only 5% of the teachers indicated that they still did not use technology for productivity purposes compared with 19% the year before. Teachers at the schools reported a marked increase in their
personal knowledge of technology (the average increase rose from 3.5 hours per week to almost six hours). Finally, the vast majority of teachers used technology in conjunction with whole-class instruction as opposed to individual or small group instruction.

Research on implementation of innovations in schools has shown that on-site assistance contributes to effective implementation of new ideas. Schofield (1995) indicated that teachers consistently reported that having a person at the school site who helped them answer questions concerning the mechanics of educational technologies allowed them to consider going further with technology in their classrooms. Robey, Wholey, and DeMeyer-Harris (1991) reported on the status of special education teachers and their use of technology in the classroom. They found that an increase in the availability of technical assistance and appropriate training for special education staff resulted in increased use of computer technology by special education students.

Evans-Andris’ study (1996) indicated that successful integration of computers in schools might depend on the efforts of computer coordinators. She found that to integrate computers effectively, users needed access to
technical expertise and support; and in many schools, these services were provided by computer coordinators. Her study reported that many schools responded well to the demand for someone to deliver computer instruction, as well as to manage software and hardware issues, by establishing the position of computer coordinator. In many instances, the coordinator’s position came about by the efforts of concerned teachers who promoted technology in their individual schools. These informal coordinators assisted teachers in many areas including helping them with integrating computers into their classroom curriculums, equipment management, resource coordination, training, and more. The computer coordinator held a position of technology leadership and was expected to play a critical role in the implementation process.

In addition, it was gleaned from Evans-Andris’ study (1996) that computer coordinators played a significant role in the development of an effective, integrative computer program in elementary schools. Coordinators participating in the study acknowledged that computer instruction and the promotion of computing were their primary responsibilities. Other tasks performed included faculty training, technical repair, software selection, lab scheduling and management,
and computer-related curriculum development. These were considered mostly those chores classroom teachers found difficult to fit into their schedules. Specific findings of this extensive study indicated that full-time resource coordination was more effective than part-time coordination; schools enhanced integrative computer programs by employing computer coordinators; and computer coordinators, full- or part-time, must not be solely responsible for computer integration to be effective in the school setting. Despite the apparent importance of this position, few studies have specifically examined the changing role of the computer coordinator in elementary schools.

Quinlan (1996) reported that the implementation of computer technology in one Midwest school district seemed more successful in schools that had a key individual, or group of individuals, coordinating and supporting the use of technology by teachers. In this study, district and school technology plans were examined covering a 10-year period. Quinlan found that initiatives from the national, state, and local levels facilitated technology implementation in the district. Strudler (1995-1996) reporting in a 10-year follow-up study of three elementary schools, stated,
Socioeconomic Status and Technology Integration

The socioeconomic status of schools may have influenced the integration process and may have hindered the ability of teachers to achieve mandated technology standards. The literature was extremely limited with regard to socioeconomic status and the achievement of schoolwide standards. A report by the National Center for Educational Statistics (1995b) suggested that lower wealth districts appeared to be investing a larger percentage of their spending on core instruction rather than in needed areas, such as school construction and the purchase of instructional equipment (hardware).

It was also noted that per-student education expenditures were associated with higher community socioeconomic status as measured by the value of owner-occupied housing. The amount of local support for public education rose with wealth and socioeconomic status. This supports the research of Anderson, Welch, and Harris (1984), where it was reported that access to computers by disadvantaged students was limited by widespread patterns of inequitable distribution of computer equipment within and across schools.
An accurate measurement of socioeconomic status is sometimes critical to research, especially when related to schools. However, it is difficult to find a widely accepted definition in the literature. When viewing the strength of the relationship between socioeconomic status and academic achievement, White (1982) maintained that his review of the literature raised a concern. It was very easy to find a strong correlation, a moderate correlation, and a very weak correlation, between socioeconomic status and achievement. He felt that a plausible explanation for these variations might have been in the number of ways socioeconomic status was defined.

A school's socioeconomic status is sometimes defined by quoting the percentage of its student population participating in the free and reduced price-lunch program (Back to School, 1997). McDonald (1991) utilized participation in a free or reduced price-lunch program as the basis for socioeconomic status in his dissertation on science achievement and student characteristics. The report by the National Center for Educational Statistics (1995b) defined socioeconomic status in two ways: (a) value of owner-occupied housing, and (b) the cost-adjusted median household income.
Fotheringham and Creal (1980) examined home, socioeconomic status, and process variables as predictors of school achievement, measured by Metropolitan Achievement Test scores. In their study, the father's schooling, the mother's schooling, family income, and the father's occupation determined socioeconomic status. Resulting correlations were reported as low, average, or high socioeconomic status.

The literature revealed that there were concerns associated with finding a common socioeconomic status variable definition and that this was an important area for future research. The significance between socioeconomic status and the achievement of technology standards has not yet received the attention of researchers.

**Summary**

The review of literature concerned with the importance and the current status of technology, the role of technology support personnel in the achievement of technology standards, and the influence of socioeconomic status on the integration of technology can be summarized in a series of general statements related to each of the characteristics investigated in this study.
Hardware and software were found to be increasing in numbers (Honey & Henriquez, 1993; Jordan & Follman, 1993; Burnett, 1994) but generally underutilized in a majority of schools. Numerous schools reported that many of their computers were older and obsolete. This was especially true in elementary schools (U.S. Department of Labor, 1991).

The concept of computer integration was difficult to define as a result of constantly changing views of what was expected to be taught and to be learned in the classroom (Becker, 1993). Teachers played a critical role in advancing any integration of technology into the curriculum, however it was defined (Sheingold, 1991).

Research in the area of technology standards indicated that effective planning and clear goals generally led to improved technology integration at the school level (McWilliams, 1996; Cramton-Johnson, 1996). Local, state, and federal initiatives made it necessary for schools to write clearly defined plans with specific goals outlined for achieving successful technological integration in classrooms (Putnam Valley Schools, 1997, http). The literature supported the development of technology standards at the national, state, and local levels to further the
implementation of technology into the curriculum. The research found that the development of plans leading to computer integration was critical to the successful use of technology in the schools (Mazur, 1995; Means et al., 1993).

The research revealed that the technology available in the classroom had a positive effect on student achievement. Teachers reported gains in student test scores when computers were utilized to support the curriculum (Sabatino, 1993; Salerno, 1995). The literature indicated teachers were willing to learn how to use technology to enhance the curriculum (Marcinkiewicz, 1993-1994; Becker, 1993).

However, training was considered a lengthy process, adding to reduced levels of integration (Fulton, 1993). Teachers were frustrated that technology did not achieve expected levels of integration in their classrooms (Burnett, 1994). On-site support was recognized as being a factor in the successful integration of technology into the curriculum (Evans-Andris, 1996; Stearns et al., 1991; Schofield, 1995; Robey et al., 1991; Quinlan, 1996; Strudler, 1995-1996; Messmer, 1996; Whiting, 1996; & Williams, 1995).

The review of literature revealed that there were concerns related to the varying definitions of socioeconomic
status. The effects of socioeconomic status on the achievement of technology standards, as well as the integration of technology into the curriculum, have yet to be adequately investigated (White, 1982). Research was found to be needed in this area to help identify causes leading to the reported lack of integration of technology in schools. A need exists for specific research to be conducted in many of the areas reviewed in the literature. Ever-changing technology presents new challenges in education. This study was designed to address some of these issues.
Chapter III: Design of the Study

This research study was designed to investigate the relationship between the predictor variable of on-site support and the dependent variables of hardware, software, training, integration, and networking in kindergarten through twelfth grade public schools (N=190) of a large, urban school system in the state of Florida. The relationships between the socioeconomic status of the schools and of the school level and the dependent variables were also investigated.

This research was conducted using archival data obtained, with permission, from the Broward County School System in southern Florida. The data reviewed came from information submitted to the School Board of Broward County by the individual schools for the 1996-1997 school year and located in archival records. One hundred percent of the schools in the sample provided data for this investigation.

Setting and Population

Florida's Constitution requires that individual counties organize school districts. As a result, there are 67 school districts located within the state. The sample included all
public schools in Broward County, Florida, during the 1996-1997 school year. The Broward County School System is one of the largest in the nation. There are over 100 elementary schools, more than 30 middle schools, and over 35 high schools and vocational centers present in the district (SBBC, 1997, http). Class sizes and other pertinent data are reflected in Table 1. The district represents a varied ethnic population with students coming from over 100 countries. The schools are organized into three areas: (a) north, (b) south, and (c) central. They are governed by a five-member school board and one superintendent.

Broward County was incorporated in 1915. Its county seat is located in the city of Fort Lauderdale. The 1990 census indicated a population of 1,255,488, a median age of 37.7, an unemployment rate of 6.8%, and in 1993, a median household income of $31,289.
### Table 1

**Characteristics: Broward County School System**

<table>
<thead>
<tr>
<th>School Level</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>119</td>
</tr>
<tr>
<td>Middle</td>
<td>32</td>
</tr>
<tr>
<td>High</td>
<td>22</td>
</tr>
<tr>
<td>Vocational Centers</td>
<td>15</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>190</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student Body</th>
<th>Student to Teacher Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>49%</td>
</tr>
<tr>
<td>African-American</td>
<td>35%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>13%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

*Note. Adapted from "Our Mission, Priorities and Beliefs,” Broward County Public Schools, 1997, http.*
Figure 4 represents a comparison of the percent in poverty of 5- to 17-year-old children in Florida counties having median household incomes between $31,000 and $34,000. Broward County was average (16.9%) when compared with the other counties reported (Floyd, Irwin, & Evans, 1997).

Broward County’s graduation rate was 68% during the reported school year, with 8,000 graduates. There were 20,266 full- and part-time employees with 11,125 instructional personnel. The county’s multicultural and multiethnic population came from 106 countries, speaking 63 languages. More than 240,000 adults attended adult and community education. The student population included more than 24,000 students with special needs, including 5,600 gifted students. A prekindergarten population of 1,260 was present with special programs in place for learning readiness. Finally, more than 11,000 school-age children were in after-school child-care programs at 112 school sites.
Figure 4. A comparison of the percent in poverty of 5- to 17-year-old children in select Florida counties. Estimates are based on a model which combined population, federal income tax returns, food stamp participation, and the 1990 decennial census. Adapted from, 1997 Florida Statistical Abstract (pp. 196-197), by S. S. Floyd, E. M. Irwin, and D. A. Evans, 1997, University of Florida: Warrington College of Business Administration.
Data Collection

In 1991, the Florida Legislature committed itself and the state of Florida to long-term systemic change in education. The legislation, entitled Blueprint 2000 (FDOE, 1995-1996), called for the development of Florida’s System of School Improvement and Accountability to be based on the state’s eight education goals: (a) readiness to start school, (b) graduation rate and readiness for postsecondary education and employment, (c) student performance, (d) learning environment, (e) school safety and environment, (f) teachers and staff, (g) adult literacy, and (h) parental involvement. The Blueprint 2000 statute established School Advisory Councils (Broward County’s School Improvement Teams function as the state defined School Advisory Councils) at each of the state’s 2,650 schools. The councils assisted the schools with the development of annual School Improvement Plans based on a needs assessment that addressed where their school stood in relation to the state’s eight goals. These plans, developed using state guidelines, were submitted to the state for approval (FDOE, 1997, http).

During the 1996-1997 school year, following the organization of School Improvement Teams, all schools in
Broward County had to complete and submit to the Broward County School Board their 1997-1998 School Improvement Plans. Section III of the plan, 1997-1998 Strategic Plan for Technology, called for schools to conduct a needs assessment of six technology-related standards.

School Improvement Teams were directed to coordinate data collection efforts. Needs assessments were completed utilizing a locally designed matrix-reporting instrument entitled Technology Standards of Service (see Appendix A). The matrix identified six main standards to be considered when surveying the school site. The standards included (a) hardware, (b) software, (c) training, (d) integration, (e) networking, and (f) on-site support. The current study's predictor variable, on-site support, was one of the six standards reported on the checklist.

School technology teams rated their school's level of achievement based on the matrix Levels 1 through 5. Guidelines for completing the matrix made it clear that all the requirements of a level needed to be met in order to be reported as completed. For example, a school identified at Level 3 in on-site support would have completed all the requirements listed for the first three levels. Results of
<table>
<thead>
<tr>
<th>Level</th>
<th>No.</th>
<th>Specific Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>01A</td>
<td>School has one or more staff members who are available for assistance with technology</td>
</tr>
<tr>
<td>2</td>
<td>02A</td>
<td>School staff team is available for assistance with technology</td>
</tr>
<tr>
<td>3</td>
<td>03A</td>
<td>School has [a] staff team with expertise to support technology at this level</td>
</tr>
<tr>
<td></td>
<td>03B</td>
<td>One part-time staff member is responsible for technology</td>
</tr>
<tr>
<td>4</td>
<td>04A</td>
<td>School has one part-time teacher to support technology curriculum integration</td>
</tr>
<tr>
<td></td>
<td>04B</td>
<td>School has one part-time staff member to support the technology infrastructure at the school</td>
</tr>
<tr>
<td>5</td>
<td>05A</td>
<td>School has [a] full-time technology resource teacher who provides assistance with technology integration and training</td>
</tr>
<tr>
<td></td>
<td>05B</td>
<td>School has [a] full time technologist to provide support for infrastructure and to manage the local network functions and services</td>
</tr>
</tbody>
</table>

Note. From the "Technology Standards of Service" matrix reporting instrument, 1996, School Board of Broward County, Florida.
Data identifying the socioeconomic status of each school were also obtained from archival records (Back to School, 1997). The income levels of each school were reported as the number of students who received a free or reduced-price lunch. For the purposes of this study, socioeconomic status was assigned three levels:

1 = Low socioeconomic status: 75% or more of the students at the school received a free or reduced-price lunch.

2 = Average socioeconomic status: 25% to 74.99% of the students at the school received a free or reduced-price lunch.

3 = High socioeconomic status level: fewer than 25% of the students at the school received a free or reduced-price lunch.

**Statistical Analysis**

Product moment correlation coefficients (r) were obtained to determine the extent of the relationship between the predictor variables of on-site support, socioeconomic status, and school level and the dependent variables of hardware, software, training, integration, and networking. Correlations were considered to be statistically significant when the p values were less than .01 (2-tailed). Bonferroni multiple comparison adjustments (p < .01/7) were used to test all hypotheses. The statistical analyses were performed
utilizing SPSS Informational Analysis Software (SPSS, 1996) in the Academic Computing Laboratory at Florida Atlantic University, Boca Raton, Florida.

**Reliability of Data**

School Improvement Plans, including Section III Status Checklists, were reviewed and approved by all School Improvement Teams. The teams included, at the minimum, a school administrator, a teacher representative, and a parent adviser. Some teams included business partners as well. These independent observers ultimately agreed on the scores recorded and helped to ensure the reliability of the data, interobserver reliability.

In addition, the School Improvement Plans became a matter of public record and were expected to be as accurate as possible. School districts were expected to comply with the state's request for accurate data by assisting the schools with data collection. The development of the matrix-reporting instrument and of the Status Checklists helped to satisfy this requirement. These procedures helped to ensure that the data reported in this study were reliable.

The results and findings of this study are presented in Chapter IV. The Results section reviews the statistical
analysis of the data. The Summary of Findings section explores the impact of the predictor variables of on-site support, socioeconomic status, and school level, on the dependent variables of hardware, software, training, integration, and networking.
Chapter IV: Results and Findings

This chapter is concerned with the statistical analysis of the data collected, as well as the report of and the discussion of the findings. The degree of association between on-site support, socioeconomic status, and school level with hardware, software, training, integration, and networking were tested using correlation analysis.
Chapter IV: Results and Findings

This chapter is concerned with the statistical analysis of the data collected, as well as the report of and the discussion of the findings. The degree of association between on-site support, socioeconomic status, and school level with hardware, software, training, integration, and networking were tested using correlation analysis. Bonferroni multiple comparison adjustments ($p < .01/7$) were used to test all hypotheses. Each hypothesis was stated in null form and was tested for significance at the .01 level.

The Discussion of Findings reports on the implications of the statistical analysis, of the predictor variables, and of the dependent variables.

Results

Analysis of Data

On-site support was significantly correlated with all five dependent variables. It exhibited the highest positive correlation with software ($r = .563$). On-site support had the lowest positive correlation with networking ($r = .315$). Pertinent data are presented in Table 3.
Socioeconomic status was not significantly correlated with any of the dependent variables. The highest correlation was with software ($r = .187, p = .014$).

School level was not significantly correlated with any of the dependent variables. The highest correlation was with networking ($r = .022, p = .765$).

Tests of the Hypotheses

This study tested the following hypotheses:

**Hypothesis 1**

On-site technology support does not significantly affect ($p < .01$) the achievement of hardware standards in public schools, grades k through 12.

Conclusion: On-site support was significantly correlated ($p < .01$) with hardware ($r = .338$); therefore, null Hypothesis 1 is rejected.

**Hypothesis 2**

On-site technology support does not significantly affect ($p < .01$) the achievement of software standards in public schools, grades k through 12.

Conclusion: On-site support was significantly correlated with software ($r = .563$); therefore, null Hypothesis 2 is rejected.
Table 3

Product Moment Correlation Coefficients

<table>
<thead>
<tr>
<th>Standard</th>
<th>On-Site Support</th>
<th>Socioeconomic Status</th>
<th>School Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td>p</td>
<td>r</td>
</tr>
<tr>
<td>Software</td>
<td>.563*</td>
<td>.000</td>
<td>0.187</td>
</tr>
<tr>
<td>Training</td>
<td>.451*</td>
<td>.000</td>
<td>0.050</td>
</tr>
<tr>
<td>Integration</td>
<td>.432*</td>
<td>.000</td>
<td>0.146</td>
</tr>
<tr>
<td>Hardware</td>
<td>.338*</td>
<td>.000</td>
<td>0.052</td>
</tr>
<tr>
<td>Networking</td>
<td>.315*</td>
<td>.000</td>
<td>0.145</td>
</tr>
</tbody>
</table>

Note. Correlations were calculated with the SPSS Statistical Analysis Program. SPSS did not display calculated p scores beyond .000. As a result, exact p scores are not reported here.

* p < .01.

** p < .05.
Hypothesis 3

On-site technology support does not significantly affect (p < .01) the achievement of training standards in public schools, grades k through 12.

Conclusion: On-site support was significantly correlated with training (r = .451); therefore, null Hypothesis 3 is rejected.

Hypothesis 4

On-site technology support does not significantly affect (p < .01) the achievement of integration standards in public schools, grades k through 12.

Conclusion: On-site support was significantly correlated with integration (r = .432); therefore, null Hypothesis 4 is rejected.

Hypothesis 5

On-site technology support does not significantly affect (p < .01) the achievement of networking standards in public schools, grades k through 12.

Conclusion: On-site support was significantly correlated with networking (r = .315); therefore, null Hypothesis 5 is rejected.
Hypothesis 6

Socioeconomic status does not significantly affect \( (p < .01) \) the achievement of technology standards in public schools, grades K through 12.

Conclusion: Socioeconomic status was not significantly correlated with any of the dependent variables; therefore, null Hypothesis 6 is accepted.

Hypothesis 7

School level does not significantly affect \( (p < .01) \) the achievement of technology standards in public schools, grades K through 12.

Conclusion: School level was not significantly correlated with any of the dependent variables; therefore, null Hypothesis 7 is accepted.

Descriptive Statistics

Table 4 contains the descriptive statistics for all eight variables. The frequency distributions listed for support, hardware, software, training, integration, and networking reflect the schools’ responses as recorded on the status checklists.
Discussion of Findings

The following section reviews and discusses the relationships between the predictor variables on-site support, socioeconomic status, and school level and each of the dependent variables, hardware, software, training, integration, and networking.

Technology-Related Hardware

In the sample (N = 190), the findings indicated that as levels of on-site support increased, greater gains were achieved in the amount and kinds of hardware available for use by both students and teachers. The Technology Standards of Service matrix reporting instrument clearly identified the specific hardware types being utilized at the individual schools, according to level.

As outlined in the matrix, schools reporting hardware Levels 1 - 4 (N = 190) indicated that (a) teachers had access to stand-alone computers in their classrooms and in the media center; (b) some computers had multimedia capabilities, which included access to scanners, digital cameras, and active matrix projection panels; (c) all classrooms had a minimum of four computers (Level 4); and (d) schools had 50% of their
Table 4

**Frequency Distributions**

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<th>Level</th>
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</tr>
<tr>
<td>5</td>
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<tr>
<td>5</td>
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</tbody>
</table>

**Note.** 0.1

Low socioeconomic status: 75% - 100% students in the school participate in free or reduced-price lunch program. Average socioeconomic status: 25% - 74.99% students in the school participate in free or reduced-price lunch program. High socioeconomic status: 0 - 24.99% students in the school participate in free or reduced-price lunch program.
classrooms supplied with current technology (Level 4).

The pattern of reported higher levels of hardware associated with higher levels of support might be explained as a result of on-site support personnel having had specific duties related to the purchase of technological hardware in the schools. For example, the schools’ on-site technology coordinator may have had a greater awareness of the specific hardware needed for, and requested by, the teachers at the school. Purchasing of hardware could be more focused with this information available. Further, the matrix indicated that higher levels of support included increased time spent on technology-related activities, such as those supporting the school’s infrastructure. This, too, could have played a role in the greater gains seen in hardware procurement for the classrooms and media centers. Apparently, having a specialist dedicated to technology for at least a part of the school day may have contributed to the purchase of hardware necessary to accomplish their goals and objectives.

These findings are supported in the literature where Quinlan (1996) noted that technology coordinators kept teachers aware of and trained in the use of new hardware and software. In addition, this finding was supported by
Strudler (1995) who found that a coordinator was needed to organize and to maintain the computer lab's hardware and software.

Though this study supported the rejection of Hypothesis 1, on-site technology support does not significantly affect \((p < .01)\) the achievement of hardware standards in public schools, grades k through 12, it is important to note that 92% of the schools in the sample \((n = 175)\) did not achieve levels 4 or 5 in the standard hardware on the matrix. Interestingly, one of the three standards for Level 4 on the matrix states that, "fifty percent of classrooms have current technology, such as Power PCs or Pentium computers." It appeared, then, that the majority of the schools in the sample had lower-level computers in their classrooms. This finding is supported in the research, where it is indicated that much of the computer hardware in schools are older machines unable to support CD-ROM-sized databases, modems, or integrated networked systems (U.S. Congress, 1995).

In the current study, socioeconomic status \((p = .493)\) and school level \((p = .116)\) did not significantly \((p < .01)\) affect the level of hardware reported in the sample. These
findings could be interpreted to mean that the schools in the sample were advancing their hardware inventories equally, or just as poorly, across school levels and socioeconomic boundaries.

**Technology-Related Software**

The findings indicated that as levels of on-site support increased, software availability and use by the students and by the teachers also increased. With support exhibiting the greatest correlation with software (r = .563), it is suggested that teachers and students utilized more and varied software programs as technological assistance increased. Ninety-eight percent of all schools in the sample (n = 186) reported software levels of 1, 2, or 3. Achievement of these levels indicated that (a) schools used a variety of software in their classrooms, including Level 1 laser discs and some CD-ROM programs; (b) some site licenses and utility programs were available; (c) teachers used productivity tools for items such as newsletters and parent communication; (d) Level III laser discs were available (Level 3); and (e) multimedia production software tools were available (Level 3). This finding is consistent with the literature, where Strudler
(1995) identified that computer coordinators kept teachers current in the use of new software programs.

Although the findings of this study indicated on-site support as a significant factor in schools reaching higher levels of software use, an overwhelming majority of schools (n = 186) did not surpass Level 3 on the matrix. This finding appeared to be related to the level of hardware achieved, that is, schools could not utilize more advanced software if the hardware was not available.

Socioeconomic status (p = .014) and school level (p = .724) were not significantly correlated (p < .01) with the software standards. This could be interpreted to mean that the schools in the sample were advancing their software inventories equally. Although not significant at the .01 level, it is interesting to note that socioeconomic status and software are significantly related at the .05 level (p = .014). This could suggest that the socioeconomic status of a school could be a factor in the amount and kinds of software utilized in the classroom.

Staff Training

The findings also revealed that the reported levels of training increased as the level of on-site support increased.
As support increased, greater numbers of teachers identified individual training needs and developed plans to meet their individual goals as specified on the matrix. Ninety-four percent of the schools (n = 180) reported Levels of 1, 2 or 3. This indicated that in the majority of the schools, (a) teachers had at least a basic understanding of technology, (b) some staff members were highly trained in the use of technology, and (c) 50% of the staff members developed and implemented training plans (Level 3). Schools in Broward County are expected to achieve the standards indicated on the matrix according to their self-designed plans. The staff training plans must include an individual teacher’s self-imposed time line for gathering knowledge related to technology integration in the classroom. According to this study, at least 44% of the schools in the sample (n = 84) had 50% or more of their staff working on individual training plans.

These results could be interpreted to mean that on-site support personnel were assisting staff members with the development of the training plans, thus increasing the amount of training taking place. Whether or not the support personnel were conducting the training is unclear as a result
of this study. However, increased training in any respect
could be considered a significant finding.

This fact is supported in the literature where Stearns
et al. (1991) reported that the presence of on-site
coordinators helped teachers become more motivated in their
use of technology and, as a result, trained other teachers in
methods of technology integration. Robey et al. (1991) found
that an increase in the availability of on-site support
resulted in an increase in the use of computers.
Evans-Andris (1996) indicated that informal coordinators at
the elementary level assisted teachers in many areas,
including training. Whiting (1996) found that teachers
gained advanced skills when they were assisted by part-time
aides or by advanced students.

Socioeconomic status ($r = .050$) and school level
($r = -.025$) were not significantly correlated with training.
Here again, the product moment correlation suggested that
schools of varying levels and socioeconomic status were
achieving training standards equally. The socioeconomic
status finding follows the pattern of relationship expressed
in some of the literature and was previously discussed.
Integration of Technology

A direct relationship existed between on-site support and the integration of technology into the classroom curriculum. As support increased, teachers and students utilized technology to a greater degree. The significant correlation between the integration of technology and on-site support ($p < .01$) is extensively supported in the literature.

In the sample, 54% of the schools ($n = 102$) reached Level 2, and 25% achieved Level 3 ($n = 47$) in integration. Schools reporting standards at these levels indicated that (a) technology was an integral component of daily instruction in some classrooms (Level 2), (b) 50% of the teachers in the school used multiple forms of computer technology for instruction and student activities (Level 3), (c) some teachers and students used interactive software, Level III laser disc programs and multimedia presentations (Level 3), and (d) some teachers used the Internet for research and for lesson development (Level 3). Having technical support available at the school level appeared to provide teachers with an opportunity to utilize more technology in their lesson planning. These findings appeared to agree with Evans-Andris (1996) where she noted that to integrate
computers into the school curriculum, users must have access to technical expertise and support. Socioeconomic status and school level were not significantly correlated to integration of technology into the curriculum for the reasons discussed above.

**Networking**

The on-site support and networking were significantly correlated (r = .315, p < .01) in the sample (N = 190). The data revealed that 67% of the schools reported a Level 3 or 4, and 32% reported a Level 5, fully 99% of the sample (n = 189). This indicated that the majority of schools (a) had a minimum of 50% of its classrooms networked to the district standard, (b) had its media center networked to district standards, (c) had at least limited access to the Internet, (d) had a campus that was fully retrofitted to district standards (Level 4), (e) had all classrooms on the local area network (Level 4), or (f) all classrooms had full access to the Internet (Level 5).

For a detailed report of the state of Florida's initiatives in the area of technology, readers are encouraged to review the Florida Department of Education's web site, specifically, District Technology Plans. (FDOE, 1997, http).
School districts and individual schools in the state benefited from an increased focus on technology. For example, the 1996-1997 Florida Educational Finance Program Allocations in Technology for the Broward County School District, the sample, amounted to $7,796,390 under Appropriation 109. A portion of these funds, as well as money from individual school budgets, were used to assist with retrofitting in some of the schools in the sample. (FDOE, 1997, http) As a result, generalization to all schools and districts in the nation should be made with caution.

Higher levels of reported networking included classrooms having access to wide area and local area networks, as well as access to the Internet. This finding could be a result of the federal government’s focus in this area, as well as the district’s commitment to retrofitting all schools as mentioned above. An Issue Brief from the National Center for Education Statistics (1998) reported an increase in the number of public schools having access to the Internet from 35% in Fall 1994 to 78% in Fall 1997. The government’s efforts to connect all the nation’s public schools to the information superhighway by the Year 2000 are moving swiftly.
According to the study, 95% of all public schools are going to have, or are expected to have, Internet access by the Year 2000. This could explain the increased levels of networking reported by the sample schools in the current study.

**Socioeconomic Status**

Socioeconomic status did not affect the achievement of the technology standards in any of the schools in the current study. However, 36 of 174 schools in the sample (21%) had 75% or more of their children in the free or reduced-price lunch program. This indicated that these schools had income levels at, below, or close to the poverty level. Yet, this factor did not influence the achievement of technology standards in the sample. These findings are contradictory to the research of Anderson et al. (1984), where it was reported that access to computers by disadvantaged students was limited by widespread patterns of inequitable distribution of computer equipment within and across schools. Schools in this study appeared to have access to the hardware, software, training, and other resources at a level equal to each other, regardless of socioeconomic status.
Chapter V: Conclusions and Recommendations

Conclusions

The purpose of this study was to explore the relationships between the availability of on-site technology support and the achievement of technology standards in the areas of hardware, software, training, integration, and networking. Further, the study investigated the relationships between socioeconomic status and school level with the achievement of the same technology standards.

In the sample (N = 190), on-site support was significantly correlated (p < .01) with the reported achievement levels of all five technology standards (a) hardware (r = .338), (b) software (r = .563), (c) training (r = .451), (d) integration (r = .432) and (e) networking (r = .315). Thus, higher reported levels of on-site support resulted in higher levels of achievement in these areas at the school level. The highest, positive correlation was between on-site support and software (r = .563).

In the sample, socioeconomic status (N = 174) was not a significant factor (p < .01) in the achievement of the five
technology standards. According to these findings, schools across all three levels of socioeconomic status achieved the standards equally. Although not significant in this study, socioeconomic status correlated significantly \((r = .187)\) with software at the .05 (2-tailed). It appeared in the sample that school level \((n = 190)\) was not a significant factor in the achievement of technology standards. The greatest, positive correlation was with on-site support \((r = .101)\).

The level of on-site support positively affected the achievement of specific technology standards at all school levels. Sample schools reported increased levels of achievement in the areas of hardware, software, training, integration, and networking when greater levels of on-site support were available. Educational leaders should consider these findings significant when staffing schools and centers. This is especially important in those schools where technology and computer-based learning are major aspects of the curriculum, including technology magnet schools and computer-enhanced learning centers.

State initiatives and local efforts are ensuring that schools have access to new hardware and software necessary to meet goals and objectives developed in the writing of
individual technology plans. Private industry and business partners are also assisting schools and districts in this area. Funding sources for technology-related hardware and software, including networking needs, continue to grow. However, funding support for the personnel needed to assist with integration of technology into the curriculum is almost nonexistent.

This research project and the literature support the need to employ on-site personnel to accomplish the goals that policymakers, educational leaders, and school decision-making committees establish for technology. Based on the findings of this study, every school should have a technology coordinator, someone with a teaching background, who could assist with the development of integration plans, coordinate training of staff, help with the purchase of hardware and software, and monitor the equipment in use. The coordinator should be both skilled in writing lesson and unit plans and well-versed in the equipment and software in which that person will be expected to monitor. Teachers can assist the coordinators with these efforts but must be free to continue doing what they do best, teach. This study's conclusion is
consistent with the report of the OTA (U.S. Congress, 1995), which indicated:

Lessons from experienced implementation sites suggest that those who wish to invest in technology should plan to invest substantially in human resources. Currently most funds for technology are spent on hardware and software. Increasingly experienced technology-using sites advocate larger allocations for training and support. (p. 130)

The findings of this study call for a change in educational policymaking. Educational leaders must have access to resources which will enable them to provide their staffs with on-site technology support. In some cases, school-based decision-makers could amend their budgets to include additional staff to meet this need. Others will require help from district-level or even state resources to reach this goal.

As discussed earlier, the literature revealed that studies of on-site support and the achievement of technology-related standards at the school level were severely limited. It was the intent of this study to begin to fill this gap in the research. It now appears that on-site technology support specialists do make a difference.

Further, colleges and universities must begin to increase efforts in educating teachers and administrators who
are prepared for the technology that they will encounter in the classroom. Preservice teachers should be strongly encouraged to write and to present technology integrating lesson plans as part of their training.

This research has shown that socioeconomic status had no effect on the achievement of specific technology standards at the school level. Local funding efforts in technology appeared to be an important factor that contributed to this conclusion. Broward County policymakers seemed to have succeeded with their efforts to ensure that all schools had access to the funds necessary to meet the established standards of technology. Broward County, the fifth largest school district in the nation, has a diverse population representing the full range of economic levels. Yet, it has not allowed income level to affect the integration of technology in its schools. This suggests other districts with similar populations could also find the political will to not allow socioeconomic status as an excuse for poor technology integration in their schools. Continued research in this area is recommended. Further, establishing a standard definition for socioeconomic status must be considered a priority for research purposes.
Greater student achievement is the ultimate goal of technology integration. If this statement is indeed true, and this researcher believes that it is, then educators need to develop outcome standards by which they can measure student achievement as it relates to technology. Attaining hardware, software, and training goals is measurable. To establish that children are learning to greater degrees because of technology integration is much more difficult to measure. Future research should be conducted in this area.

Finally, there were no significant differences reported in the sample related to the achievement of technology standards based on school level. Local policies and incentives in the area of technology appear to be directed equally across all school levels. Again, local efforts need to be considered an important factor contributing to this conclusion.

Recommendations and Suggestions for Further Research

An analysis of the data and a review of the related literature generated the following recommendations.

Districts and individual schools should employ a full-time technology specialist to assist with the integration of technology into the curriculum. Districts
should also begin to upgrade their hardware inventories to accept the more advanced software programs and communication systems necessary for learning and instruction in the years to come. Colleges and universities must begin to treat technology as a core subject. Students studying to become teachers must be taught, and must be able to graduate with, advanced technological skills in instructional methodology.

Finally, there is a need to duplicate this research to include additional school districts to determine if the results may be specific to the particular schools in the sample. More districts need to begin to develop standards that will guide teachers in the development of lessons and units needed to increase student achievement. There is also a need to expand this research utilizing a common set of technology standards in the districts to be studied. The research community should come to an agreement as to what constitutes an indicator of socioeconomic status. Efforts should be made to standardize this concept for use in all research.

As each day dawns, new technology is developed that affects our lives. Technology will soon be part of every aspect of our day-to-day living. However, it is clear that
we are having difficulty keeping up with these fast-changing developments. Already major companies are identifying lack of talent in this area as a major area of concern. A recent editorial in the weekly computer journal PC Week reported that 10% of all information technology jobs in the United States, about 346,000, are now vacant (Filling the IT Shortage, 1998). With the continuous explosion of technology, especially Internet-based, demand will only increase. Educators must begin to help develop a solution to this concern.

Effective use of technology in schools will help to secure the future for children. The intensive training needed to accomplish this goal, however, will be an expensive and lengthy process. Teachers will only begin to utilize technology to greater degrees if they become more familiar with the hardware and software available to them. Teachers can eventually become computer literate if they are given the support that they need. Thus, if districts invest in technology specialists who can work directly with teachers, instruction and learning will improve, ultimately resulting in greater student achievement. In conclusion, this study
has revealed that employing on-site technology specialists at the school level can help to make this goal a reality.
REFERENCES


Appendix A

Technology Standards of Service Matrix Reporting Instrument
# Technology Standards of Service

Requirements of prior level should be met as school progresses to the next level

<table>
<thead>
<tr>
<th>Level</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td><strong>Integration</strong></td>
<td>□ 11a. Some teachers integrate a variety of curriculum resources as part of the delivery of instruction such as ITV programming, video-tapes, laserdiscs and/or CD-ROMs</td>
<td>□ 12a. Technology is an integral component of daily instruction in some classrooms.</td>
<td>□ 13a. Fifty percent of the teachers use multiple forms of computer technology for instruction and student activities. Some teachers and students use interactive software and level III laserdiscs and multi-media presentations.</td>
<td>□ 14a. Most of the teachers use multiple forms of computer technology for instruction and student activities. Students and teachers complete some projects, presentations and activities using technology.</td>
<td>□ 15a. Technology is an integral component of daily instruction in every classroom.</td>
</tr>
<tr>
<td></td>
<td>□ 15b. Majority of student activities and products require the use of technological resources within and outside the classroom.</td>
<td>□ 15c. All teachers and students use the Internet as a part of daily instruction and projects.</td>
<td>□ 15d. Teachers utilize data from the data warehouse for the purpose of analyzing and improving instruction.</td>
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<tr>
<td><strong>Training</strong></td>
<td>□ T1a. Some staff members have a basic understanding of technology.</td>
<td>□ T2a. Most staff members have a basic understanding of technology. Some staff members are highly trained and knowledgeable in the use of technology.</td>
<td>□ T3a. 50% of the staff have developed and begun implementation of their individual training plan that includes integrating technology into the curriculum.</td>
<td>□ T4a. 75% of the staff have developed and begun implementation of their individual training plan that includes integrating technology into the curriculum.</td>
<td>□ T5a. Ongoing training continues.</td>
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<td></td>
<td>□ T5b. 100% of the staff are implementing their individual training plan that focuses on integrating technology into the curriculum.</td>
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<td></td>
</tr>
<tr>
<td><strong>On-Site Support</strong></td>
<td>□ O1a. School has one or more staff members who are available for assistance with technology.</td>
<td>□ O2a. School staff team is available for assistance with technology.</td>
<td>□ O3a. School has staff team with expertise to support technology at this level. One part-time staff member is responsible for technology.</td>
<td>□ O4a. School has one part-time teacher to support technology curriculum integration.</td>
<td>□ O5a. School has full time technology resource teacher who provides assistance with curriculum integration and training.</td>
</tr>
<tr>
<td></td>
<td>□ O4b. School has one part-time staff member to support technology infrastructure at the school.</td>
<td></td>
<td></td>
<td>□ O5b. School has full time technologist to provide support for infrastructure and to manage the local network functions and services.</td>
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</table>

(SBBC, 1997)
### TECHNOLOGY STANDARDS OF SERVICE

Requirements of prior level should be met as school progresses to the next level

**Curriculum & Instructional Focus**

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<td><strong>Hardware</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ H1a. Stand-alone computers are used in some classrooms and/or media center</td>
<td>□ H2a. All teachers have access to computers</td>
<td>□ H3a. All classrooms have computers for instructional purposes.</td>
<td>□ H4a. All classrooms have a minimum of 4 student computer workstations</td>
<td>□ H5a. All teachers have laptop computers.</td>
<td></td>
</tr>
<tr>
<td>□ H2b. Stand-alone computers are used in most classrooms and media center.</td>
<td>□ H2b. Some laptop computers are available for checkout.</td>
<td>□ H3b. Some laptop computers are available for checkout.</td>
<td>□ H4b. Fifty percent of the classrooms have current technology such as Power PC's or Pentium computers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ H2c. Media center and some classrooms use workstations with CD-ROM capability.</td>
<td>□ H3c. One multimedia workstation (which may include equipment such as scanners, video and/or digital cameras, active matrix projection panels or projectors) available for classroom use.</td>
<td>□ H4c. Minimum of one multimedia workstation for each grade level or department.</td>
<td>□ H5b. All students have access to laptop computers.</td>
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</tr>
<tr>
<td>□ H5d. Equipment to produce (burn) CD-ROM disks available at the school.</td>
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</tbody>
</table>

| **Software** | | | | | |
| □ S1a. Variety of stand-alone software packages for use. Level 1 Laserdiscs and/or CD-ROMs are used in several subject areas. | □ S2a. Integrated packages, CAI, utility programs and some site licenses are available at the school. | □ S3a. Level III laserdisc technology, networking, interactive, and/or CD-ROM software are available at the school. | □ S4a. Advanced multimedia (such as video capture programs, digital imaging), and presentation programs are available at the school. |
| □ S2b. Teachers use productivity tools for items such as newsletters and parent communications. | □ S3b. Beginning multi-media production software tools are available at the school. | □ S4b. All teachers use electronic productivity tools that communicate with the student database for recordkeeping and portfolio assessment. |
| □ S5a. A plan exists for upgrading all software from other levels as needed. | □ S5b. Software necessary for CD-ROM production. | □ S5c. Software necessary for distance learning and video teleconferencing. |
| □ S5d. Software available to support a school-based Intranet server. |

| **Networking** | | | | | |
| □ N1a. Non-existent networking system | □ N2a. Disjointed networking system | □ N3a. Media center is networked to district standard | □ N4a. Campus is fully retrofitted to district standard with at least two quad-jacks per classroom and telephone access in every classroom. |
| □ N3b. Fifty percent of the classrooms are networked to district standard. | □ N3c. Limited Internet access is available at the school. | □ N4b. All classrooms have access to Local Area Network. |
| □ N5a. All classrooms have access to district Wide Area Network emphasizing communications within innovation zone. | □ N5b. All classrooms have full Internet access via the district Wide Area Network. |
Appendix B

Technology Standards of Service

Status Checklist
## SECTION III
1997-98 STRATEGIC PLAN FOR TECHNOLOGY

<table>
<thead>
<tr>
<th>SCHOOL NAME</th>
<th>SCHOOL LEVEL</th>
<th>SCHOOL/CENTER</th>
<th>AREA</th>
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### VISION


### STATUS CHECKLIST (Please select a Level in each column.)

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<td><strong>SUPPORT</strong></td>
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<td><strong>CURRENT</strong> (Anticipated)</td>
<td><strong>CURRENT</strong> (Anticipated)</td>
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<td><strong>NETWORKING</strong></td>
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<tr>
<td><strong>CURRENT</strong> (Anticipated)</td>
<td><strong>CURRENT</strong> (Anticipated)</td>
<td><strong>CURRENT</strong> (Anticipated)*</td>
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*If applicable
Appendix C

Tally Sheet
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<th>Objects (schools)</th>
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<th>SES</th>
<th>Level</th>
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<th>Training</th>
<th>Network</th>
<th>Integration</th>
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<td>xₙ</td>
<td>yₙ</td>
<td>zₙ</td>
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</tbody>
</table>

**Note.** Socioeconomic status was recorded using 3 levels: (1) lower third, 75% or more students at school on free or reduced-price lunch; (2) middle third, 26% - 74% students at school on free or reduced-price lunch; (3) upper third, 25% or less students at school on free or reduced-price lunch. All other variables were recorded using 5 levels, 1 being the lowest.
Vita

Steve Montes currently resides in Coral Springs, Florida, with his wife and two children. He is an Assistant Principal with the Broward County School Board. He earned a Master of Education in 1981 and an Education Specialist Degree in 1994 from Florida Atlantic University in Boca Raton, Florida.