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The Perceived Confidence Level of 5th and 6th Grade Teachers in Sevier County, Tennessee Using Technology in the Classroom

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To the Graduate Council:

I am submitting herewith a dissertation written by Jerry Ray Baxter Jr. entitled "The Perceived Confidence Level of 5th and 6th Grade Teachers in Sevier County, Tennessee Using Technology in the Classroom." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Education.

Thomas N. Turner, Major Professor

We have read this dissertation and recommend its acceptance:

Charles Chance, George Harris, C. Glennon Rowell

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

To the Graduate Council:

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Thomas N. Turner

Dr. Thomas N. Turner, Major Professor

We have read this dissertation
and recommend its acceptance:

[Signature]

Charles A. Glance

C. Shannon Powell

Accepted for the Council:

[Signature]

Interim Vice Provost and
Dean of The Graduate School

THE PERCEIVED CONFIDENCE LEVEL OF
5TH AND 6TH GRADE TEACHERS IN
SEVIER COUNTY, TENNESSEE
USING TECHNOLOGY IN
THE CLASSROOM

A Dissertation
Presented for the
Doctor of Education
Degree
The University Of Tennessee, Knoxville

Jerry Ray Baxter, Jr.

August 2000

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ABSTRACT

The purpose of this study was to determine the perceived confidence level of 5th and 6th grade teachers in Sevier County Schools in relationship to their use of using technology in the classroom. Another purpose was to determine what methods of training teachers prefer in order to develop a strategy for future training.

The study was the result of work initiated in the 1995-96 school year by the researcher at the request of the Sevier County School System. The population for the study consisted of teachers who taught 5th and 6th grades in the Sevier County School System in Tennessee. In 1996 all of the 5th and 6th grade teachers received equipment for a 21st Century Classroom. Surveys were given in the spring of 1996 and in the spring of 1999. A total of 40 teachers have remained and participated throughout the entire study.

Results from the study indicated that there was an increase in the confidence level in all surveyed categories of technology use in the classroom. The largest increases were found in the use of an Internet browser and email software. The methods of training that the participants indicated they preferred were small groups and peer team training located at the local school level.

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CHAPTER I

Introduction

Throughout history many devices, inventions and gadgets have been advocated as items that would revolutionize the way people live, work and play. As we begin the new millennium, the sheer number of these items being considered or developed has skyrocketed. For the most part people can look around anywhere they happen to be and point to the successes while the failures are soon forgotten. This is especially true in education. Items such as televisions, calculators, overhead projectors, etc. have truly revolutionized education through their wide use in the classroom. Some of the items on the list of inventions may appear outlandishly silly or common place in the 21st century; however, they are all a part of the recipe that makes-up the educational system of today.

Educational systems across the country have been burdened, in the last three decades, with the evolution of the expanding role school systems are responsible for in order to educate the nation's children. Enormous amounts of resources have been allocated to address areas such as

school safety, illegal drugs, nutrition, teen pregnancy, student achievement, etc. The nation is now struggling with the issues that surround the rapid explosion of technology. The technology revolution has profound and far-reaching implications for all aspects of our culture. The technology revolution has the potential to rival the industrial revolution in the magnitude of impact on people's daily lives.

Technology makes it possible to instantaneously extend information to all parts of the world. Technology is transforming all aspects of the way people live, work, and play. This is also true in schools across the country. The education systems across the country use technology in many aspects of conducting school on a daily basis. Everything from transportation, foodservice, student performance, student accountability, school accountability, and daily academic instruction are caught up in the advances in technology. The influx and perpetual bombardment of technological advances being waved in front of our school systems is overwhelming. The cost factor for retooling classrooms is enormous; however, the cost is probably not the greatest obstacle to retooling. The

training of teachers is the crux of reformulating the recipe of education in the United States.

The challenge for educators today is to prepare students for life in an information driven global society. Educational technology is a key component in shaping a curriculum that will meet the needs of students as they move through the educational process. Educational technology is a teaching tool in education rather than the study of technology. Educators of today have enormous competition for the attention of their students. Educational technology provides a tremendous repertoire of instruments and methodologies to motivate and excite learners. The pressure placed on school districts as society changes from a manufacturing to a global informational and technological economy is the catalyst fueling the concerns over preparing students with the skills needed to compete in a global society. Teachers of the 21st century will have access to information on a scale never before witnessed. This technology will not supplant the teacher but rather enhance the ability to stimulate, motivate, and expose students to the wealth of knowledge that encircles the world. The challenge for teachers will

be to become confident in using technology to expand the traditional finite confines of the classroom.

Statement of the Problem

There have been millions of dollars allocated across the country during the past five years in an attempt to retool the nation's classrooms for the 21st century. The advances in technology have made information globally available almost instantaneously. In order to be a productive citizen in this evolving information age, a person must obtain the skills to search, retrieve, analyze, and manipulate information. These skills will not only be necessary for careers but will also be needed for typical everyday communications, banking, transportation, consumer transactions, and entertainment. The school systems are burdened with the task and expense of meeting the educational needs of students in this age of information and technological wizardry.

The financial aspect of retooling the infrastructure of the nation's classrooms for this technological age is enormous; however, the retooling of teachers may pose a

much greater obstacle. The technology revolution is growing at an exponential rate. According to a NEA report, "Status of the American Public School Teacher, 1995-96: Highlights", the average teacher in the United States is a female and 43 years old. Many students growing up in this age of technology, unlike the typical teacher, naturally bring a broader understanding and awareness of technology to the classroom.

Over the past five years, an enormous amount of time and financial resources have been allocated to bring the age of information to the classroom. Everything from hardware, software, and training has been held up as the excuse or barrier for the slow transition of technology integration into the classroom. The teacher however is still the most intricate and dynamic part of the classroom. The factors of teacher ability and confidence to use technology in the classroom are vital if the transformation of the classroom is to succeed. Regardless of the amount of resources available, if the teacher is not confident in using the resource than the resource, no matter how revolutionary, is negatively impacted.

The Tennessee Department of Education, in conjunction with local school systems, has spent millions of dollars on

hardware, software, and training for educators. With the evaporation of state funds in recent years more of the financial burden has been placed on local governments to support the astronomical cost of keeping pace with current technological advances. The spending of these vast amounts of money, along with preparing students for a productive life in the information age, fosters the need for a formal study to determine how educators view their ability to foster the growth of students in this age of free-flowing information.

Purpose

The purpose of this study was to determine the perceived confidence level of 5th and 6th grade teachers in Sevier County Schools in relationship to their use of using technology in the classroom. Another purpose of the study was to determine methods of training preferred by teachers in order to develop a strategy for future training.

Need for the Study

The Tennessee Department of Education in 1993-94 initiated the 21st Century Classroom technology program. The program provided funds to establish a statewide education network along with providing funds to purchase and integrate technology into the classroom. Since that time, according to the Tennessee State Department of Education web site, the Tennessee General Assembly has provided a total of \$127 million in state funds for advancements in educational technology in Tennessee schools, including nearly \$95 million for 21st Century Classrooms. Local districts along with individual schools have also allocated a tremendous amount of money to further infuse technology into classrooms across the state. In recent years, more of the financial burden for technology has been placed on local education districts. In this era of accountability and state budget shortfalls, the need to allocate resources judiciously is a priority in order to gain the most from every dollar spent on education.

The financial aspect of providing technology is however only one component of integrating technology into classrooms. Classrooms filled with equipment are of no use

unless there is a trained, confident, willing teacher to implement and use the technology. Schools system across the state are being pressured from parents, communities and businesses to provide the tangible workings of technology and looking sparsely at the intangible, a confident teacher. There have been many reports to provide information concerning hardware and connectivity issues, but few studies to discuss the implementation and use of current technology resources being provided to educators. The U.S. Department Of Education Publication, President's Committee Of Advisors On Science And Technology, March 1997 suggested that the attitude or confidence level of teachers in using technology is a strong determinate of teachers success in retooling their skills in the classroom.

It was thought that the need for a study to assess the changes in the confidence level of teachers over a four-year period would add much needed information to the body of literature that exists concerning other aspects of educational technology. It was believed that the study would provide information needed for further planning, financial allocations, and training. The researcher was of the opinion that the study would also indicate areas that have all the resources needed to integrate technology

except for a confident user. The statement that "perception is reality" holds true for teachers attempting to integrate technology into the classroom. If teachers in the study perceive a lack of confidence in their abilities to use technology, then spending any amount^{of} money or allocating resources to any area other than a plan to remedy the perceived lack of confidence would be futile.

The researcher initiated the study in the belief that the study would yield data in the following areas:

- Status and growth of confidence levels in the areas of hardware and software
- Status and growth of confidence levels in the area of administrative use of technology in the classroom
- Status and growth of overall confidence levels
- The type of training environment preferred by teachers

Research Questions

The study addressed the following research questions:

1. What are the perceived confidence levels of 5th and 6th grade teachers using technology in the classroom?
2. What method of training is perceived to be the most comfortable for teachers using technology in the classroom?

Method

The participants were 5th and 6th grade teachers in the Sevier County School System. The participants had been given a survey during the 1995-96 and 1998-99 school year. The survey was developed and given by the researcher at the request of the Sevier County School System. The survey is a Likert-type scale containing 40 statements.

All 5th and 6th grade teachers were asked to participate and sign each survey. The surveys were then numbered in order to keep the responses of individuals confidential. Of the original 70 participants in 1996, 40 participants

were still teaching in 5th or 6th grade in 1999 and participating in the surveys. This study determined the perceived confidence level of the remaining 40 participants in the 1998-99 survey compared to the 1995-96 data. The survey instrument had remained unchanged except for an added question in 1998-99 pertaining to the preferred method of training.

Statistical Method

The researcher, in consultation with Dr. Donald J. Dessart, has determined that the data being used falls under the statistical area of population statistics. The data were analyzed by using measures of central tendencies that include frequency distributions, comparable means, median, mode, variances, and standard deviations. Because it was a population study, this study did not involve prediction and therefore levels of significance were not used. Inferential statistical methods were not necessary because the data collected represented the entire population. Further discussion of the statistical method can be found in chapter three.

Assumptions

This study was based on the following assumptions:

1. The responses given by the participants concerning frequency of use, ability, and comfort levels indicated their perceived level of confidence in using technology.
2. The participants answered the survey honestly.
3. The participants felt that their responses would remain confidential.
4. The participants would understand the survey statements and how to properly indicate their responses on the instrument.

Definition of Terms

The following terms are defined for the purpose of this study:

1. 21st Century Classroom - A classroom equipped with computers, printers, multimedia hardware, software and an Internet connection.
2. Integrate Technology into the Classroom - The confident and productive use of technological devices to enhance the instructional program.

3. Core Team - A group of teachers selected and trained at the system level to support teachers at the school level.
4. Core Team Member - A teacher, who receives additional training from the Sevier County School System, serves as a trainer at the schools and trouble shoots basic hardware and software problems at the school level.
5. Perceived Confidence Level - How teachers view their abilities to use technology as indicated by their responses on the survey instrument.
6. Method of Training - The conditions and environment that training took place including the location, time, facilitator, and size of group.
7. Comfortable - The description of the environment that teachers perceived as being conducive to the learning of technology topics.

Limitation and Delimitation of the Study

The study was delimited to the population of 5th and 6th grade teachers in Sevier County over a four-year period of time. The study was also delimited to two grade levels in the Sevier County School District. The survey limits participates to a number of responses. The survey was also limited to the time of the year that participates took the survey.

Organization of the Study

This study is organized into five chapters. Chapter one includes the introduction, statement of the problem, need for the study, purpose, research questions, method, statistical method, assumptions and the summary. Chapter two provides a review of the literature. Chapter two is organized into the five sections of the introduction, teachers' attitudes toward technology in the classroom, resources allocated for training, models of professional development and the summary. Chapter three provides the methods and procedures and is organized into eight sections. The eight sections consists of the introduction, the population, 21st Century Classrooms, professional development during the study, the instrument, the method of analysis and the summary. Chapter four provides the presentation of the data. Chapter four is organized into three sections. The sections include an introduction, presentation of the data and the summary. Chapter five provides the conclusions and recommendations and is organized into three sections. The three sections include the introduction, conclusions and recommendations.

Chapter II

Review of Literature

Introduction

The purpose of this study was to determine the perceived confidence level of 5th and 6th grade teachers in Sevier County Schools in relationship to their use of using technology in the classroom. Another purpose of the study was to determine what methods of training teachers prefer in order to develop a strategy for future training. The review of literature is organized into four sections. The first section provides the organization of the review of literature. The second section describes findings in reference to teachers' attitudes toward technology in the classroom. The literature reported that teachers cited lack of time, continuous individualized training and local support as obstacles to integrating technology into the classroom. The third section discussed key elements in resources allocated for training. The literature review found the following as key elements for training:

- Training must be hands on

- Training should be frequent
- Training should meet individualized needs
- Technology integration into the curriculum should be the main focus
- Teachers should train teachers
- There should be an on-site person for support
- Participants must stay focused on the task and direction at hand

(Shelton & Jones 1996, p.100)

The fourth section describes various models of training that have been effective at training and educating teachers in the area of technology.

Teachers Attitudes Toward Technology in the Classroom

The National Center for Education Statistics in 1999 published The Condition of Education. The publication indicated a need to take into account the teachers' feelings of preparedness as an indicator of readiness as stated in the following:

"Reform initiatives, new technologies, and changing student populations have required teachers to learn new ways of presenting material and managing their classrooms. Teachers' initial professional training may not have prepared them adequately to meet current expectations, so continuing professional development is important. Teachers' self-assessments provide one indication of the extent to which preservice and on-the-job

learning prepare them to meet the new demands."
(National Center for Educational Statistics 1999b, p.48)

A survey of 266 principals by Sullivan and Keating (1998) indicated that many teachers were not computer literate, inservice occurs on an irregular basis and that veteran teachers were less familiar with technology than newer teachers. The findings from the study indicated three basic areas of need to promote technology in the schools. The first need was for computer technology training in education courses. Teachers graduating from educational programs need extensive training in the latest technology. New teachers need skills to develop material and use technology to expand and enhance their classroom activities. Teachers also need the skills and confidence level to teach, lead and demonstrate to students how to use the Internet and other technologies as learning tools.

The second need involved veteran teachers and their ability to become more confident in dealing with available technology. Veteran teachers need to become immersed in extensive training in how to integrate technology into their classroom. A starting point of training would center around professional development activities with emphasis

being placed on increasing the skills level and confidence level of the participants.

The third need involved the curriculum leader in the schools. The principal in the school must become a competent, confident user in the latest technology. Principals also need continuous training to use technology, but more importantly to have the ability to model expected use of current technologies.

The need for school systems to properly plan and confidently integrate technology in the classroom was part of the catalyst driving the International Society for Technology in Education (ISTE) to develop standards that are being used by the National Council for Accreditation of Teacher Education (NCATE). The standards were perceived as the catalyst that would bring major changes to both pre-service and in-service activities for teachers. The emphasis was to restructure education to utilize the advantages that new technologies bring to the field of instruction. The standards for all educators were stated as follows:

1. Demonstrate the ability to operate a computer system in order to successfully utilize software
2. Evaluate and use computers and related technologies to support the instructional process

3. Apply current instructional principles, research, and appropriate assessment practices to the use of computers and related technologies
4. Explore, evaluate, and use computer/technology-based materials, including applications, educational software, and associated documentation
5. Demonstrate knowledge of uses of computers for problem solving, data collection, information management, communications, presentations, and decision making
6. Design and develop student learning activities that integrate computing and technology for a variety of student-grouping strategies and for diverse student populations
7. Evaluate, select, and integrate computer/technology-based instruction in the curriculum of one-subject area(s) and/or grade levels
8. Demonstrate knowledge of use of multimedia, hypermedia, and telecommunications to support instruction
9. Demonstrate skill in using productivity tools for professional and personal use, including word-processing, databases, spreadsheet, and print & graphic utilities
10. Demonstrate knowledge of equity, ethical, legal, and human issues of computing and technology use as they relate to society and model appropriate behaviors
11. Identify resources for staying current in applications of computing and related technologies in education
12. Use computer-based technologies to access information to enhance personal and professional productivity

13. Apply computers and related technologies to facilitate emerging roles of the learner and the educator
(Skills Expected of Teachers and Students, p.1)

The standards attempt to cover all avenues that would effect the successful implementation of technology into the repertoire of tools used by teachers and students. School districts along with state, local and federal educational agencies are searching for the recipe and the ingredients to integrate technology into the nation's educational systems.

President Clinton, in his February 4, 1997 State of the Union Address, issued a Call to Action based on seven priorities developed by Secretary Riley and Senior U.S. Department of Education officials. The seven priorities developed were the following:

1. Reading independently and well by the end of third grade
2. Mastering challenging mathematics, including the foundations of algebra and geometry, by the end of eighth grade
3. By 18 years of age, being prepared for and able to afford college
4. All states and their schools will have challenging and clear standards of achievement and accountability for all children and effective strategies for reaching those standards

5. A talented, dedicated and well-prepared teacher in every classroom
6. Every classroom will be connected to the internet by the year 2000 and all students will be technologically literate
7. Every school will be strong, safe, drug-free and disciplined (U.S. Department of Education 1998)

Priorities number five and six place technology in a pivotal role in achieving a quality education for all students. The National Center for Education Statistics in 1999 released a book titled The Condition of Education. The book discussed the status of education including areas listed in the seven priorities. The publication listed the following statistics:

1. Eighty-eight percent of elementary schools had Internet access in 1998.
2. Fifty-one percent of elementary instructional classrooms had Internet access in 1998.
3. Seventy-five percent of students in grades 1-12 used a computer at school in 1997.

With Internet access obviously increasing, teachers were surveyed on how well they felt prepared to integrate educational technology in the grade or subject they taught. The following summarizes the findings:

1. Very well prepared 20%

2. Moderately prepared 37%
3. Somewhat prepared 34%
4. Not at all prepared 9%

The number of professional development hours for teachers responding in the category of very well prepared was the following:

1. 0 hours professional development 11%
2. 1-8 hours professional development 17%
3. More than 8 hours professional development 33%

The survey found a clear connection between the amount of time spent on training and the confidence level of teachers integrating the technology into the classroom.

Resources Allocated for Training

The need for teachers to be adequately trained to integrate technology into the classroom has been discussed at the federal, state and local levels since the early 1990's. The discussion by the mid 1990's had turned to more specifically address the resources that needed to be

allocated to successfully educate, train, and retool teachers in technology.

President Clinton, in his January 23, 1996 State of the Union Address, challenged the nation to work together to help make students technology literate by the 21st century. Four goals were announced which are now referred to as pillars. (The President's Educational Technology)

The four pillars of the challenge were quite simple:

I. Modern computers and learning devices will be accessible to every student.

II. Classrooms will be connected to one another and to the outside world.

III. Educational software will be an integral part of the curriculum and as engaging as the best video game.

IV. Teachers will be ready to use and teach technology. (U.S. Department of Education 1998)

The pillars illustrated the vision of education where hardware, software, and connectivity are universal.

Pillars one, two and three are tangible, measurable items.

Pillar number four is an area that would be more difficult to measure and quite possibly more illusive than the first three pillars to attain.

According to the U.S. Department of Education, in pillar number four, it was stated that professional development was key to effectively integrating technology into the classroom and to increasing student performance. Pillar four stated that adequate time was needed to acquire new skills and that teachers learn best from their colleagues. The office of technology assessment estimated that it would take up to five years to effectively integrate technology into the classroom and that teachers needed to be trained and supported during that time.

According to a U.S. Department of Education publication, "President's Committee Of Advisors On Science And Technology" March 1997, teachers would have to master a wide variety of powerful tools and redesign lesson plans in order to make effective use of technology. Teachers receive sparse training and support in technical, pedagogic and administrative issues surrounding the implementation of technologies that are at the apex of the transformation of the classroom. The report also stated 79% of the instruction that was received by teachers on new technology focuses on hardware, Internet usage, or a specific piece of software. This type of instruction was perceived negatively among teachers who prefer to be instructed on

how to use technology to enhance their teaching. The President's Panel on Educational Technology views teachers' needs as follows:

"What teachers actually need is in-depth, sustained assistance as they work to integrate computer use into the curriculum and confront the tension between traditional methods of instruction and new pedagogic methods that make extensive use of technology. Such assistance should include not only purely technical support, but pedagogic support as well, ideally including observation within the classrooms of successful technology-using teachers, periodic consultation with more experienced mentors, and ongoing communication with other teachers grappling with similar challenges."

(President's Committee of Advisors on Science and Technology 1997, p.22)

In the same March 1997 report to the President on the use of technology to strengthen K-12 education in the United States, the President's committee of Advisors on Science and Technology suggested that the greatest single factor holding back the adequate preparation of teachers is a lack of time. The report indicated an insufficient amount of time is being utilized to effectively incorporate technology into the curriculum. The report indicated that every hour set aside in the school week for technology-related curricular design through professional development

activities would add between four and five billion dollars to the nation's yearly expenditures on K-12 education. The panel also reported that it would take a typical teacher three to six years to fully integrate technology into their classroom. The panel stated that if teachers were going to be confident users of technology these problems must be overcome in order to successfully integrate technology into the classroom. The first problem to be overcome was inadequate funding for hardware and software. The second problem was aimed at developing educational programs that properly arm future teachers, with the tools to use technology. The third problem was time for educational programs and also time for veteran teachers to successfully infuse current and future technologies into their programs.

Since this 1997 report, studies have found that school districts have made progress toward providing hardware and software to their respective schools. According to Crane and Spoon (1998), schools have made substantial progress in acquiring new technology. The problem with integrating the new technology revolves around the need to train teachers in how to confidently use new technology in the classroom. Unlike the business world where employees are constantly retooling and upgrading their skills, training often is

complete once teachers begin their teaching career. Crane and Spoon cited a CEO Forum's 1997 study titled "School Technology and Readiness Report", that reported only 13 percent of public schools mandate technology-related training. The report also stated that 50 percent of teachers cite lack of time to be trained as the greatest obstacle to being able to confidently integrate the Internet into the classroom.

A survey of teachers conducted by Shelton and Jones (1996) in the Fort Worth Texas Independent School district revealed four factors that affected the use of technology in the classroom. The four factors that teachers indicated were time, training, technology and teacher-type tasks (e.g. instruction, grading, etc.). In order for teachers to be confident and comfortable at integrating technology into the classroom the survey revealed the following:

1. Training must be hands on.
2. Training should be frequent.
3. Training should meet individualized needs.
4. Technology integration into the curriculum should be the main focus.
5. Teachers should train teachers.
6. There should be an on-site person for support.

7. Participants must stay focused on the task and direction at hand. (Shelton & Jones 1996, p.100)

The National Center for Education Statistics reported in January 1999 that only 20 percent of teachers felt very well prepared to integrate technology into the classroom. The report indicated that only 12% of the teachers who participated in professional development activities for less than eight hours indicate that the professional development activity improved their teaching a great deal in 1998. In the group of teachers who received more than eight hours on professional development training 38 percent indicated that the activity improved their teaching a great deal in 1998.

In a 1995 study by the U.S. Office of Technology Assessment found that school districts spent about ten percent of their technology budget on staff development training. The industry suggests for any new technology investment a minimum of 30 percent should be spent on training to adequately and confidently train teachers in the new technology. (NEA Focus on Technology)

The traditional methods of staff development employed for training almost always fall short of adequately preparing teachers for effectively using the technology.

"Teachers say the "Best" professional development programs in instructional technology - - those that yield the most impressive results include clearly articulated goals, adequate allocation of time, money and other resources, ongoing support and an understanding that serious change in instructional practice requires a long-term investment in teachers and schools."

(NEA Focus on Technology, p.1)

The study indicated that training should be conducted with the following:

1. Small groups
2. Ongoing continual training
3. School based
4. Teacher-led collaborative components of the best staff development models

Vaughn Murphy of Heartland Area Education Agency in Iowa recommends that at least 30 percent of a school's technology budget be committed to staff development.

Murphy stated:

"You can't reap the real benefits of your technology investment without a strong commitment to staff training." (Mather 1996, p.25)

The resources needed to bring about fundamental change included continuous ongoing training, technical support at the building level, time to practice new technology learned, hardware, software, incentives, administrative support, community support, and district support.

According to Schrum (1999), traditional staff development models did not take into account the unique qualities that make technology staff development different. Schram indicated first that it takes an enormous amount of time to learn how to use technology compared to learning other new teaching models. An estimated 30 hours of training is needed in order to feel confident enough to incorporate a technology skill into a teacher's repertoire. The second component was to have access to technology at home and in the classroom. The third difference was that technologies were more intimidating to some teachers as compared to the learning of other new types of teaching models.

Schrum indicated that workshops were often one size fits all rather than taking into account individualized needs. Technology training unlike traditional staff development training needed certain key elements and resources. The resources needed were time, equipment, support, training and money. These resources were not one-time needs but rather continual while refining the process along the way.

Models of Professional Development

According to Hay (2000), the "Net Generation" (children born between 1977 and 1999) tends to be more comfortable with technology than their parents, teachers, and all others born prior to 1977. This generation does not typically fear computers and regularly use computers and other technology in all facets of their lives. The "Net Generation" has grown up with technologies and have become self sufficient at exploring hardware, software, and other technologies as they become available. The challenge for schools is not to teach technology but rather to embrace new technologies as tools for teaching and learning. Hay stated the following concerning the plight of the current and future education:

"The way we are teaching and the way kids today learn (and will learn tomorrow) have begun to clash... Technoliterate children will challenge educators to accommodate their learning needs in imaginative ways... The Internet has only intensified the importance of presentation aspects of information sharing."

(Hay 2000, pp.7-8)

"The Forum on the Future of Technology in Education: Envisioning the Future", sponsored by the U.S. Department of Education, met in December 1999. The forum consisted of participants from around the country representing local

school districts, state departments of education, universities, Office of the U.S. President, research institutes, private industries and others. The forum concluded with the identification of emerging priorities. One of the priorities was that all teachers would effectively use technology. The forum summarized the priority as follows:

"Participants were universal in their support for devising ways to encourage teacher use of technology aligned with instructional goals-whether delivered through preservice education or inservice professional development or both. Noting the continual changes and advances in technology, participants pointed out that the need for training is ongoing and must not only be about how to use technology, but also about how to support student learning."

(Forum on Technology 1999, p.18)

Another priority identified by the forum was that research, development and evaluation would shape the next generation of technology applications for teaching and learning. The forum further explained this priority in the following way:

"As the use of technology in education becomes more commonplace, it becomes critical to understand what we are learning about what works and what does not. Too often individual schools and districts are left without good information that could guide them in making appropriate investments in technology investment that could result in tremendous changes to the educational experience for both teachers and students." (Forum on Technology 1999, p.18)

David Thornburg, Director for the Thornburg Center and Senior Fellow of the Congressional Institute for the Future and participant at the forum, stated that we must prepare learners for their future, not for our past. Thornburg further stated that staff development should be moved to the forefront in any dialogue on technology in education.

(Forum on Technology 1999)

Local school districts across the country are searching for productive methods of staff development that would empower teachers to more confidently integrate and use available technology in their classrooms. One example of an effective staff development program can be found in New Jersey. According to Gray (1998), Hunterdon Central Regional High School in Flemington, New Jersey has developed a technology training program that really "pays off". The greatest obstacle to getting the program up and running was changing the attitude of how teachers should be trained. Traditional professional development was left to individual teachers to foster during their own time and outside the school district's educational focus. The new model of professional development was designed and administered by the local school district and closely linked to the educational focus of the system.

The professional development model called, the Hunterdon Central Academy for Continual Development, was designed to help teachers master technology skills. The academy had core classes that lasted from 5 to 20 hours and offered a wide range of ability levels. Teachers had two options during the summer that enhanced their motivation for participating in the classes. The first option was to receive continuing education credits, which helped propel teachers up the district salary scale. The second option was to receive an \$80.00 per day stipend. The stipend was not an option during the year. Classes were taught, when possible, by teachers in the district who had already mastered particular technology skills.

The district also implemented a peer-coaching program. The program builds on the academy where teachers observe other teachers implementing skills learned by participating in the academy. This sharing and critiquing of information helps teachers become more secure and confident in using technology to enhance their classrooms.

A successful model of professional development should include several elements in order to be effective at allowing teachers to integrate technology into their classroom. According to Tenbusch (1998), a successful

professional development program in technology focuses on skill building and incentives. The program must contain these two elements in order to motivate teachers to devote the time and energy to use computer technology confidently in the classrooms. A model professional development program, as stated by Tenbusch, should include the following:

1. Intensive training in which teachers explore new ideas and materials over several sessions
2. Follow-up consultation with mentors over an extended time period as teachers implement new practices
3. Ongoing reflective conversation with colleagues doing the same job and implementing similar technology applications
4. Observation of other teachers using exemplary techniques for incorporating technology in the classroom (Tenbusch 1998, p.18)

Tenbusch refers to the Southern Technology Council 1997 book, Making Technology Happen: Best Practices and Policies From Exemplary K-12 Schools, in which the council stated that mandates and incentives were dominant themes in establishing professional growth programs in the area of technology that are successful.

Tenbusch also referred to the Technology Council's list of best practices to implementing a productive

professional development program in the area of technology.

The following were some of the technology council's

recommendations:

1. Mandating that teachers use classroom management software
2. Requiring teachers to earn inservice credit in the area of technology
3. Provide stipends for teachers willing to participate and train other teachers in technology
4. Peer-based training
5. Reward teachers with hardware and software who participate in the technology training
6. Provide lap tops for home use for teachers
7. Provide free internet service for teachers at home
(Tenbusch 1998, p.19)

Another model of professional development could be found in a Texas school district. In an article by Boyd 1997, "Training-on-Demand: A Model for Technology Staff Development", a professional development technology program in Ralls, Texas, that addressed the problems of ample training and effective training in technology is described. The professional development program for the entire staff is based on a three-component approach. All teachers are provided with the first two components while the third is

elective. The program was designed to effectively move the staff to be confident technology users.

The first component of "Training-on-Demand" was called whole group instruction. This instruction was limited to an overview of information about technology and the uses for it in instructional settings. The duration of the training sessions ranged from 15 to 60 minutes. There was no hands-on or how-to instruction in the whole-group instruction session. Teachers were only introduced to technologies and how they could be implemented in their classroom.

The second component of "Training-on-Demand" was written procedures. In this component step-by-step procedures for technology related tasks were given to teachers. Teachers developed a notebook in order to have a quick and accurate reference. The step-by-step directions were typically created by a trainer who was versed in the integration of technology into the classroom.

The third component of "Training-on-Demand" was one-on-one or small group sessions. The technology trainer was available for individualized or small group hands-on training. The training was scheduled in advance and complements the written procedures. Teachers who were less

confident users of technology have the opportunity to build their confidence level with the security of having this one-on-one instruction. The strength of one-on-one training came from the training usually taking place in the teacher's classroom using the teacher's equipment.

Another school district that revamped its traditional professional development program could be found in Illinois. According to Kozlowski (2000), the Prairie-Hills Elementary School District 144 in Hazel Crest Illinois used traditional staff development training methods five years ago when the school embarked on preparing teachers for new technologies in the classroom. The staff development training consisted of having consultants provide all day staff development and pay for substitute teachers. The traditional staff development proved to be ineffective. The training focused on curriculum software. There was no provisions made for the level of expertise or lack thereof for their individual skill level. Even novice users could manipulate a pre-installed piece of software, but were uncomfortable in exploring other software titles.

The district revamped the traditional training sessions. The district found that using its own staff to provide peer training proved to be a winning combination

for transferring what was learned in training to the classroom. Training was also broken down into five levels to accommodate the confidence level of the teacher.

The following were five levels of training used to describe the technology training courses that teachers were able to choose to meet their skill level:

Level 1: Basic computer skills

Level 2: Mastery of an application package

Level 3: Mastery of an Internet browser and e-mail

Level 4: Expanded use of multimedia

Level 5: Focus on integrating technology
(Kozlowski 2000, pp.26-28)

The Prairie-Hills Elementary School District 144 abandoned the traditional staff development model of large group, lecture hall, and outside consultant training. The training that proved to be successful was personalized to meet learners' individualized skills and comfort levels.

According to Ritchie and Wiburg (1994), traditional staff development was not sufficient at implementing successful practices that would integrate technology into the classroom. Three reasons were given concerning the ineffectiveness of transferring information received in a

traditional staff development setting back into the classroom. The three reasons stated were the following:

1. Failure to conduct a needs analysis to identify knowledge required by users.
2. Presentations limited to factual knowledge, which omit higher level thinking strategies.
3. Failure to incorporate activities which are relevant to the audience in a collaborative, problem solving approach. (Ritchie & Wiburg 1994)

In order for teachers to feel confident and comfortable in integrating technology into the classroom, traditional staff development training methods must be revised to address individualized needs. The diversity of skill levels in technology among teachers brings forth unique and complicated issues surrounding the effective implementation of technology in the classroom.

One model of professional development that uniquely addressed individual needs was developed in the New Braunfels Independent School District, Texas. In 1997 the New Braunfels Independent School District, a "Generational Model for Professional Development" was developed to educate teachers about integrating technology into the classroom. The model was developed in conjunction with the Southwest Texas State University's Education Department. The initial phase of the model was to select a group of

teachers to be the first generation to be educated in the area of technology integration. The word educate, instead of training, is meaningful because the traditional form of professional development was ineffective. The word educate was emphasized in order for teachers to think differently about technology rather than to have training in a specific element in technology.

The Generational Model teams consisted of administrators, University professors, and teachers. A team was selected and educated in an intense summer program. The following school year the teachers were given time, support, and encouragement at the school level. The educational process for the model was ongoing throughout the school year.

According to Caverly 1997, the first generation would educate the second generation in the following year. Teams were made up of two second generation members and one first generation member. The education process passed through the stages of: basic use of the technology, guided and independent practice, and then teachers as catalyst for change in using technology as a tool to enhance student achievement.

On June 3, 2000, the weekly Saturday radio address of President Clinton to the Nation, presented a three year, 128 million dollars technology grant program to help teachers prepare 21st century students. The grants would be awarded over a three-year period to teacher colleges and other partners throughout the nation. President Clinton stated the following during the radio address:

"Today two out of three teachers with access to a computer say they don't feel well-prepared to use it in class. We owe it to America's children to help their teachers become as comfortable with a computer as they are with a chalkboard. And we must start early. With rising student enrollment and teacher retirements, America will need more than 2 million new teachers over the next 10 years. We have to make sure every one of them can use a computer to help students meet high standards. We're taking steps to do that."

(President Clinton, 2000)

Summary

In this chapter, the review of literature was organized into four sections. The first section provided the organization of the review of literature. The second section described findings in reference to teachers' attitudes toward technology in the classroom. Teachers' attitudes and feelings toward technology were important

factors in the successful integration of technology into the classroom. The Condition of Education, published in 1999 by the National Center for Education Statistics, indicated a need to take into account the teachers' feelings of preparedness as an indicator of readiness for future professional development.

The third section of the review of literature discussed key elements in resources allocated for training. The literature review found a common thread woven throughout the literature indicating key elements in resources allocated for training. Vaughn Murphy of Heartland Area Education Agency in Iowa recommends that at least 30 percent of a schools technology budget be committed to staff development. Murphy stated:

"You can't reap the real benefits of your technology investment without a strong commitment to staff training." (Mather 1996, p.25)

The key resources needed to bring about fundamental change included continuous ongoing training, technical support at the building level, time to practice new technology learned, hardware, software, incentives, administrative support, community support, and district support.

The fourth section of the review of literature described various models of training that have been

effective at training and educating teachers in the area of technology. The models of training that the literature indicated as being successful factored into account teacher attitudes and perceived confidence levels of individuals when developing a model of training. The models of training that were successful all contained the various common threads of key elements that were woven throughout the literature indicating the resources that needed to be present in order to build a successful training program.

CHAPTER III

Methods and Procedures

Introduction

The purpose of this study was to determine the perceived confidence level of 5th and 6th grade teachers in Sevier County Schools in relationship to their use of using technology in the classroom. Another purpose of the study was to determine what methods of training teachers prefer in order to develop a strategy for future training. The chapter was organized into six sections that included the introduction, the population, 21st Century Classrooms, the instrument, the method of analysis, and the methods of training over the duration of the study.

The Population

The population for the study consisted of all teachers who taught 5th and 6th grades in the Sevier County School System in Tennessee. Sevier County is a rural school

district in East Tennessee that over the last few years has become the fastest growing school system in East Tennessee. This growth is largely the result of the ever-expanding tourist industry associated with the heavily visited Great Smokey Mountain National Park, outlet malls, restaurants and theme parks.

The study was the result of work initiated in the 1995-96 school year by the researcher at the request of the Sevier County School Superintendent. In 1996 all of the 5th and 6th grade teachers received equipment for a 21st Century Classroom. A total of 40 teachers have remained and participated in the entire study. Permission to use the data collected was requested and granted from the Superintendent of the Sevier County Schools.

The Concept of 21st Century Classrooms

The importance of technology in education was placed at the forefront of the educational agenda of Governor Ned McWherter. During Governor McWherter's administration the General Assembly appropriated over 98 million dollars for education technology over a period of three years beginning

in 1994. This was among the largest expenditure for a special initiative in Tennessee education history. Among the components of this special initiative were the development of the Tennessee Educational Network and 21st Century Classrooms. The Tennessee Department of Education's major objective with the 21st Century Classroom was originally for teachers to obtain competency in basic skills and to incorporate the new technology into their teaching style. The goal of the 21st Century Classroom was to teach students through the use of technology.

In 1995 the office of W.R. Snodgrass, Comptroller of the Treasury for the State of Tennessee, distributed a pamphlet to all school districts titled Implementing the Tennessee Education Network. This 46-page pamphlet described the 21st Century Classrooms as follows:

"The 21st Century Classrooms program is perhaps the most important component of the TEN project, because it directly affects students, teachers, and curricula in the classroom. The purpose of 21st Century Classrooms is to use computer technology to enhance student learning. A goal of the project is to bring instructional technology into every Tennessee classroom by the year 2000. Rather than teaching students how to use computers, the objective is to integrate technology into classroom instruction. In other words, 21st Century Classrooms are designed to teach students with technology rather than about technology" (Snodgrass, 1995)

Initially all the 21st Century Classrooms in the Sevier County School System consisted of the following equipment:

- One IBM Teacher Work Station
- Four IBM Compatible Student Work Stations
- One Epson Dot Matrix Printer
- One Desk Jet Printer
- One Print Server
- One Network Hub
- One 32" Television
- One PC/TV Converter Box
- One VCR
- One Laser Disk Player
- Three Computer Tables
- One AV Wet Cart

The 21st Century Classroom teachers were required to attend 30 hours of training. The Tennessee State Department of Education provided training at three regional training centers located in Jackson, Nashville, and Knoxville, Tennessee. Teachers were able to review computer hardware and software at these three facilities. The Tennessee State Department of Education gave local

education agencies the option of training teachers at local sites if the local education agency submitted a training plan that met the goals and objectives of 21st Century Classroom training (Appendix C) and was approved by the Tennessee State Department of Education. Local education agencies that were approved to do their own training were provided \$225.00 per teacher from the state.

Professional Development During the Study

The 5th and 6th grade teachers in the study were exposed to a number of professional development activities over the four-year duration of the study. The teachers first participated in 21st Century Classroom training. The training was for 30 hours over a period of four days and covered the following topics:

1. Overview and Orientation of 21st Century Classroom
2. Basic Concepts of Hardware, Software, and the Internet
3. Word Processing
4. Spreadsheet
5. Instructional Software

6. Optical Technology

7. Presentations

8. E-mail

9. Internet

During the summer of 1996 training workshops were offered. The topics included information covered in the 21st Century Classroom in order to give the 5th and 6th grade teachers an opportunity to reflect on the first year of using the technology in their classrooms. The training was extensively hands-on with a number of question and answer sessions.

In the fall of 1996 a Core Team was developed. The Core Team was organized in order to offer peer tutoring on site at each school. Core Team members were selected from each school on the basis of technology skills and willingness to sever as a Core Team member. Each had a variety of technological skills at the beginning of the development of the 21st Century Classroom. Core Team members were given more intense and advanced training than other 5th and 6th grade teachers. The Core Team members would then train teachers one-on-one in their classroom twice a year with the school system providing a substitute teacher for released time for both the Core Team member and

the teacher participating in the training. The Core Team also provided informal daily support for teachers at the local school level. The Core Team model of training is ongoing.

In the spring of 1997, the Sevier County School System adopted Windows on Science as the curriculum for the 5th and 6th grade. The Windows on Science curriculum is based on an interactive program using laser disks players rather than a printed textbook. The 5th and 6th grade teachers were given extensive training on the transition from a textbook to a technologically-based curriculum. Training was offered at a variety of locations and consisted of a review of the hardware being used as well as the instructional material on the laser disk. The school systems technology coordinator and the middle school supervisor did the initial training. A Core Team member currently provides the training for new 5th and 6th grade teachers at a central site.

Professional development activities were offered during the summer of 1997. Teachers could count the training and activities toward flexible inservice credit. The topics involved were Windows on Science, Jasper Woodberry Math Software, a variety of software selections,

basic trouble shooting, and basic software issues. The middle school supervisor included several sessions on integrating technology into the curriculum.

During the 1998-99 school year the Sevier County School System provided funding for twelve Core Team member teachers to attend the Tennessee Education Technology Conference. Teachers participating in the conference were encouraged to share ideas and conduct workshops with their peers at both the school and system level.

The Survey Instrument

One of the purposes of the study was to determine the perceived confidence level of 5th and 6th grade teachers in the Sevier County Schools in relationship to using equipment in the 21st Century Classrooms. The study also determined the preferred methods of training in order to develop a strategy for future training.

The survey instrument was developed by the researcher. The researcher reviewed current literature, consulted with the technology coordinator, curriculum supervisors, teachers, and administrators while developing the

instrument. A review committee critiqued the individual items on the instrument and made suggestions for changes of items that needed modification.

The suggestions of the review committee were implemented, and revisions were made to the instrument. The committee consisted of curriculum supervisors, the technology coordinator, teachers, and administrators.

In its final form, the survey instrument consisted of 40 statements. In the survey instrument, 5th and 6th grade classroom teachers were asked to respond to each statement indicating their agreement or disagreement on a Likert-type scale.

Method of Analysis

The population was all teachers who taught 5th and 6th grade for a four-year period from the 1995-96 school year to the 1998-99 school year in the Sevier County School System. The study was considered a population study since the population consisted of all teachers who taught for a four-year period. The 5th and 6th grade teachers who were given the survey in the 1995-96 school year were the same

participants who were given the survey in 1998-99 and still teaching 5th and 6th grade.

The surveys were given in the spring of 1996 and in the spring of 1999. The surveys were delivered to and distributed at individual schools of 5th and 6th grade teachers. Teachers completed the surveys and returned them in a sealed envelope by the internal school mail system. The return rate for the surveys for both 1996 and 1999 was 100 percent.

The responses from the survey instrument were analyzed by using a table to tabulate the frequency of responses by the participants. Measures of central location, commonly known as measures of central tendencies, were also used to analyze the responses by the participants. According to Ferguson and Takane(1989), the term central location was defined as the following:

"A central reference value which is usually close to the point of greatest concentration of measurements and may in some sense be thought to typify the whole set." (Ferguson and Takane 1989)

The measures of central location used to analyze the responses were mean, median, and mode.

Measures of variation were also used to analyze the responses. According to Ferguson and Takane (1989), the most widely used measures of variation are the variance and standard deviation.

Summary

The purpose of this study was to determine the perceived confidence level of 5th and 6th grade teachers in Sevier County Schools in relationship to their use of using technology in the classroom. Another purpose of the study was to determine what methods of training teachers prefer in order to develop a strategy for future training.

The Tennessee Department of Education in 1993-94 initiated the 21st Century Classroom technology program. The program provided funds to establish a statewide education network along with providing funds to purchase and integrate technology into the classroom. Since that time, according to the Tennessee State of Education web site, the Tennessee General Assembly has provided a total of \$127 million in state funds for advancements in

educational technology in Tennessee schools, including nearly \$95 million for 21st Century Classrooms.

The participants were 5th and 6th grade teachers in the Sevier County School System. The participants had been given a survey during the 1995-96 and 1998-99 school year. The survey was developed and administered by the researcher at the request of the Sevier County School System.

The responses from the survey instrument were analyzed by using a table to tabulate the frequency of responses by the participants. Measures of central location were also used to analyze the responses by the participants.

The findings of the study will assist the Sevier County School System in determining the confidence level of teachers in using technology in the classroom and the method of technology professional development teachers in the Sevier County School System prefer. The findings will also describe the amount of increase in the teachers' confidence level in the various uses of technology in the classroom over the four-year period of the study. The results of the study will assist the Sevier County School System in determining the future direction of integrating technology into the classroom including types of professional development activities, budgeting, and the

type of resources needed to successfully integrate
technology into the classroom.

CHAPTER IV

Presentation of the Data

Introduction

The purpose of this study was to determine the perceived confidence level of 5th and 6th grade teachers in the Sevier County Schools in relationship to their use of technology in the classroom. The study also determines what methods of training teachers prefer in order to develop a strategy for future training.

The population for the study consisted of all teachers who taught 5th and 6th grades in the Sevier County School System in Tennessee. The Sevier County School System is a growing school system in East Tennessee with the annual addition of 300 to 500 new students. Although the school system was traditionally recognized as a rural school system, the last 20 years has seen a robust growth in tourism. The study of this population was initiated at the request of the Sevier County School Superintendent and conducted by the researcher. Permission to use the data

was requested from and granted from the Superintendent of the Sevier County Schools.

In 1994-95 school year all of the 5th and 6th grade teachers received a 21st Century Classroom. In the spring of 1996, at the request of the Sevier County School Superintendent, the 5th and 6th grade teachers were surveyed to determine their perceived confidence level in using technology in the classroom and to also determine what methods of training they preferred. A total of 40 teachers have remained and participated in the study since the 1995-96 school year.

The survey instrument was developed by the researcher. The researcher reviewed current literature, reviewed goals and objectives developed by the Tennessee Department of Education, consulted with the technology coordinator, curriculum supervisor, teachers, and administrators while developing the instrument. A committee reviewed and critiqued the individual items and revisions were made to the instrument. The committee consisted of curriculum supervisors, the technology coordinator, teachers, and administrators. The survey instrument consisted of 40 statements asking 5th and 6th grade classroom teachers to

respond to the statements by indicating whether they agree or disagree by marking a Likert-type scale.

Presentation of the Data

Data collected from the study were used to determine how confident Sevier County 5th and 6th grade teachers were about using technology in the classroom. A second use of the data was to determine what method of training these teachers preferred. A series of research questions relating to the purpose of the study were posed in chapter one. The researcher analyzed the data related to those two issues, examining responses to each research question in turn.

Question 1. What are the perceived confidence levels of 5th and 6th grade teachers using technology in the classroom?

Statements one through 35 and 39 of the survey dealt with the perceived confidence of teachers in using technology in the classroom. The areas that the statements covered were hardware, software, usage, management, trouble shooting, and the participants' overall confidence level.

Statement number one addressed the confidence issue directly. Teachers were asked to respond to the following:

I am a confident user of the school's computer and software. All 40 teacher responded to this statement for 1996 survey and the 1999 survey.

Figure 1 on page 61 represents the frequency distribution of responses to statement number one. Table 1 on page 62 shows that the percentage of gain for statement 1 for all teachers was 12.5% and that both the median and the mode had increased from 3.0 to 4.0

Table 2 on page 62 represents the changes in the variance and standard deviation for statement 1. The value of the variance and the standard deviation decreased over

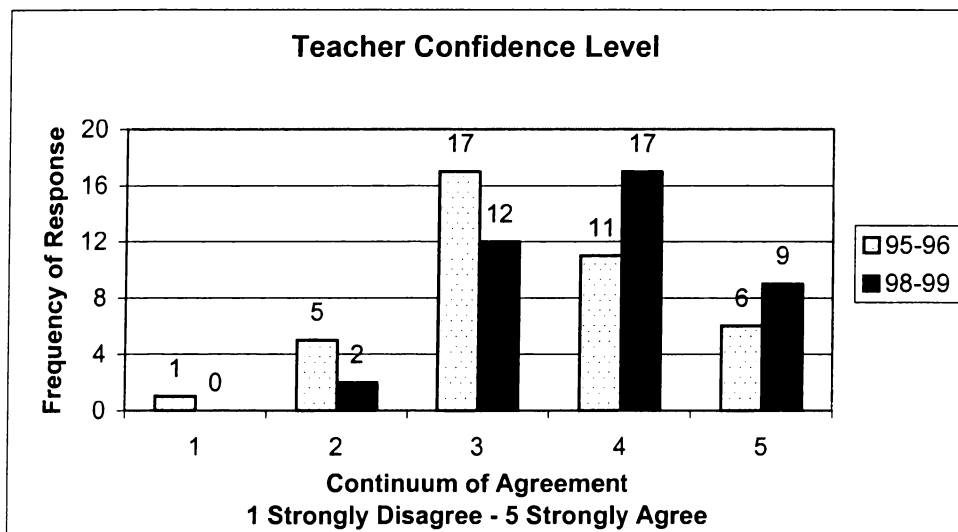


Figure 1. Teacher Confidence Level

Table 1

Percent of Gain of Teacher Confidence Level

	Average score for all teachers	Percentage of Gain	Median	Mode
1995	3.400	----- ----	3.0	3.0
1999	3.825	12.5%	4.0	4.0

Table 2

Teacher Confidence Level Variance and Standard Deviation

	Variance	Standard Deviation
1995	0.964	0.982
1999	0.712	0.844

the four-year period. Overall Tables 1 and 2 on page 62 show that teachers overall confidence improved over the period covered by the study. They do not, however provide any information about whether that gain was due to technology exposure and use or the training that was provided or a combination of the two.

Statement number two related to teachers' ability to use computers in teaching. It asked: I can teach a curriculum-linked lesson in which educational computing makes a unique contribution. All 40 teachers responded to this statement for the 1995 survey and the 1999 survey. Figure 2 on page 64 represents the frequency distribution of responses to statement number two. Table 3 on page 64 shows that the percentage of gain for question 2 for all teachers was 13.1%. The median and the mode had both increased from 3.0 to 4.0

In statements number three through five the researcher attempted to determine if teachers used technology to a greater extent in some subjects than in others. The statement read: I most often use the computer in the following subject area(s). The subject areas included reading, English, math, and science. Table 4 on page 65 represents the mean score of responses to statements number

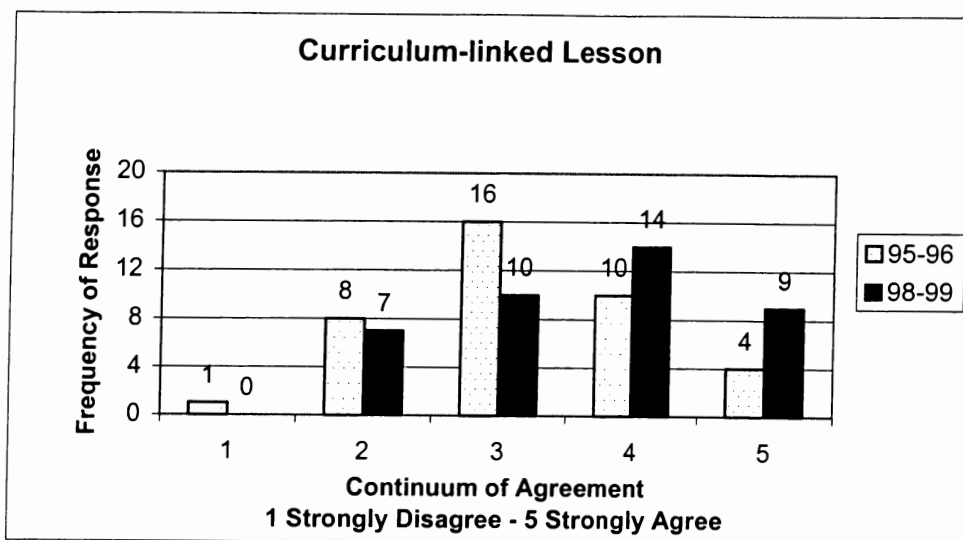


Figure 2. Curriculum-linked lesson

Table 3

Curriculum-linked Lesson Gain Score

	Average score for all teachers	Percentage of Gain	Median	Mode
1995	3.205	----- -----	3.0	3.0
1999	3.625	13.1%	4.0	4.0

Table 4

Mean Score Increase in Reading, English and Math

Subject	1995-96 Mean Score	1998-99 Mean Score	Amount of Increase	Percentage Of Increase
Reading	3.318	3.560	0.242	7.3%
English	3.833	3.929	0.095	2.5%
Math	3.571	3.643	0.071	2.0%

three through five. The mean score increased 7.3% in reading, 2.5% in English, and 2.0% in math. The median in reading increased from 3.5 in the 1995-96 survey to 4.0 in the 1998-99 survey. The median in both English and math remained 4.0 in both surveys. The mode remained 5.0 for both reading and English in both the 1995-96 and 1998-99 surveys. The mode for math remained 4.0 for both the 1995-96 and the 1998-99 school year. Figure two on page 64 and Table four on page 65 show that teachers were increasingly better able to use technology in computer based lessons. The greatest increase was in reading while only a small gain occurred in mathematics.

Statements number six through eight focused on the

subject areas of science, social studies and health. The participants were asked to respond to the following statement: I most often use the computer in the following subject area(s). The subject areas included science, social studies and health.

Table 5 on page 67 represents the mean score of responses to statements number six through eight. The mean score increased 28.0% in science, 21.9% in social studies and 24.5% in health. The scores for science, social studies and health were much greater than the scores in English, reading and math. The science curriculum was videodisc based instead of textbook based.

In statement number nine, participants were to respond to a statement that referred to all other subject areas. It asked: I most often use the computer in the following subject area(s). In the 1995-96 survey the subject area "other" received the second highest mean score of 3.632. In the 1998-99 survey the subject area "other" once again received the second highest score of 3.8. The percentage of increase from 1995-96 to 1998-99 was 4.6%.

Statement number ten addressed the teachers' confidence level in planning to integrate technology. Teachers were asked to respond to the following: I am able

Table 5

Mean Score Increase in Science, Social Studies and Health

Subject Area	1995-96 Mean Score	1998-99 Mean Score	Amount of Increase	Percentage Of Increase
Science	2.650	3.391	0.741	28.0%
Social Studies	3.185	3.882	0.697	21.9%
Health	2.059	2.563	0.504	24.5%

to develop a plan for integrating educational computing into the classroom. Figure 3 on page 68 represents the frequency distribution of responses to statement number ten. Table 6 on page 68 presents the mean scores for statement ten and the amount of increase and percentage of increase for 1995-96 to 1998-99. The mean score increased from 3.0 to 3.550. The percentage of increase was 18.3% and the median and mode increased from 3.0 to 4.0. Figure 3 and Table 6 show that the teachers' ability plan for technology integration improved greatly over the duration of the study.

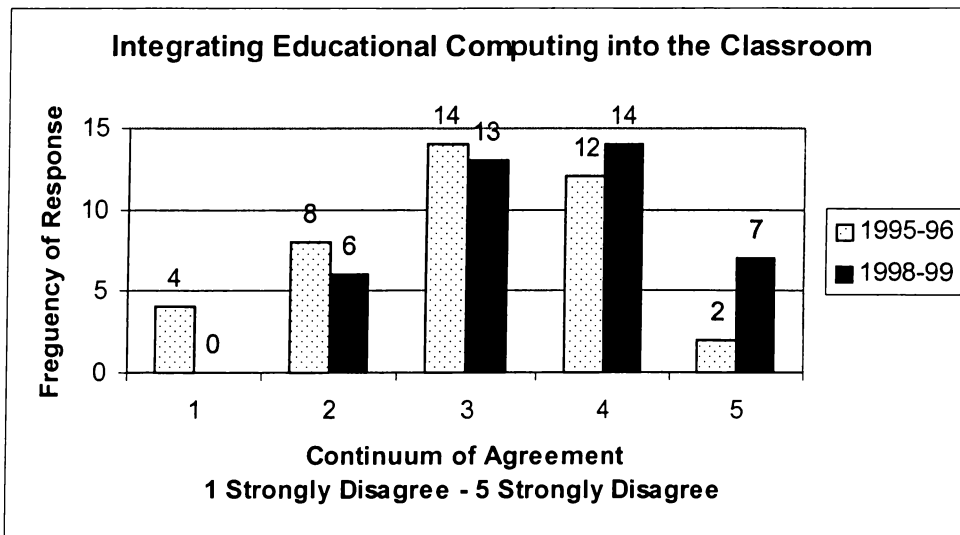


Figure 3. Integrating Educational Computing into the Classroom

Table 6

Develop a Plan for Integrating Educational Computing into the Classroom

	Mean Score for all Teachers	Percentage of Gain	Median	Mode
1995	3.000	----- ----	3.0	3.0
1999	3.550	18.3%	4.0	4.0

Statement number eleven asked teachers to respond to a statement concerning their confidence in creating letters. The teachers responded to the following statement: I am able to use a word processor and a printer to create letters to parents, students, and others. All 40 teachers responded to this statement for 1995 survey and the 1999 survey. Figure 4 on page 69 represents the frequency distribution of responses to question number eleven. The variance and the standard deviation for the distribution of responses for statement eleven are represented in Table 7 on page 70. Figure 4 and Table 7 show that teachers were quite confident in both surveys at using a word processor

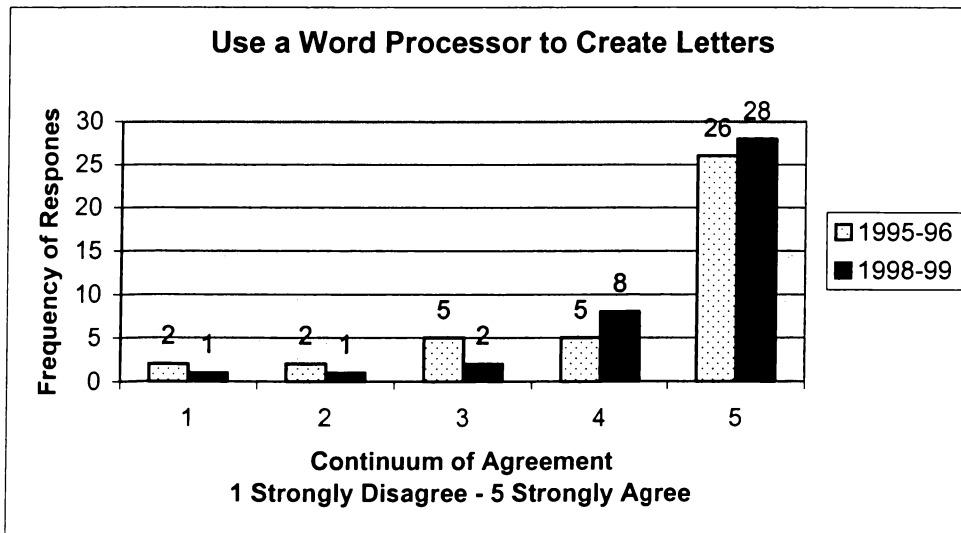


Figure 4. Use a Word Processor to Create Letters

Table 7

Use a Word Processor and a Printer to Create Letters

Year	Variance	Standard Deviation
1995-96	1.384	1.176
1998-99	0.820	0.905

to create letters.

Statement number twelve asked teachers to respond to the following: I am able to use a word processor and a printer to correspond with peers and administrators. Table 8 on page 71 represents the mean, median and mode of the distribution of responses. The mean score increased 24.3% from 1995-96 to 1998-99. Unlike statement number eleven dealing with letters to parents and students, statement twelve dealt with using a word processor to correspond with peers and administrators. The mean score increased sharply as shown in Table 8.

Statements number 13 and 14 were related to creating tests and worksheets and were asked in the following way: I am able to use a word processor to do the following:

13. Create tests

Table 8

Use a Word Processor and a Printer to Correspond with Peers
and Administrators

Year	Mean	Median	Mode
1995-96	3.579	4.0	5.0
1998-99	4.450	5.0	5.0

14. Create worksheets, study guides, etc.

Table 9 on page 72 represents the mean, median and mode of the distribution of responses. The mean score increased 6.0% for statement 13 related to creating tests. The mean score increased 6.5% for statement 14 related to creating worksheets, study guides, etc. Table 9 shows that teachers were very confident at creating tests and worksheets from the beginning of the study.

Statement number 15 asked teachers to respond to the following concerning the production of a newspaper or newsletter: I am able to use a word processor and a printer to publish a newspaper or newsletter. The mean score for 1995-96 was 3.211. The mean score for 1998-99 was 3.300. The median and mode for 1995-96 and 1998-99 were 3.0. The mean score shows a minimal increase of only 2.8%.

Table 9

Use a Word Processor & Printer to Create Tests & Worksheets

	Question 13 Create tests	Question 14 Create worksheets, study guides, etc
1995-96 Mean	4.128	4.200
1998-99 Mean	4.375	4.475
1995-96 Median	5.0	5.0
1998-99 Median	5.0	5.0
1995-96 Mode	5.0	5.0
1998-99 Mode	5.0	5.0

In statement number 16 teachers were asked to respond to the following: I am able to use a word processor and a printer to create evaluation checklists. The mean scores increased 0.397 or 12.1% from 1995-96 to 1998-99.

Statement number 17 asked teachers to respond to the following concerning their confidence in the ability to produce teaching materials: I am able to use a word processor and a printer to create teaching aids and materials. The mean scores increased 0.754 or 22.0% from

1995-96 to 1998-99. Figure 5 on page 74 represents the mean scores and shows an increase in their ability to use technology to produce teaching materials.

Statement number 18 consisted of the following concerning communication with parents: I have made parents aware of the technology brought into the classroom. The mean score increased from 3.475 in 1995-96 to 3.650 in 1998-99. The median score increased from 3.0 to 4.0. The mode was 3.0 for both the 1995-96 and 1998-99 school year. Figure 6 on page 74 represents the frequency of responses to statement number 18 and shows that teachers felt quiet proficient from the beginning of the study in this area.

Statement number 19 was related to the using of cooperative groups for instruction. It asked: I have students work in cooperative groups on theme-related activities using software. The mean score increased from 2.487 in 1995-96 to 3.500 in 1998-99 or 40.7%. The median score increased from 2.0 to 3.0. The mode increased from 1.0 to 3.0. The variance decreased from 2.204 to 1.385 and the standard deviation decreased from 1.485 to 1.177. Figure 7 on page 75 represents the frequency of responses to statement number 19. The use of technology in this instructional method shows teachers incorporating and

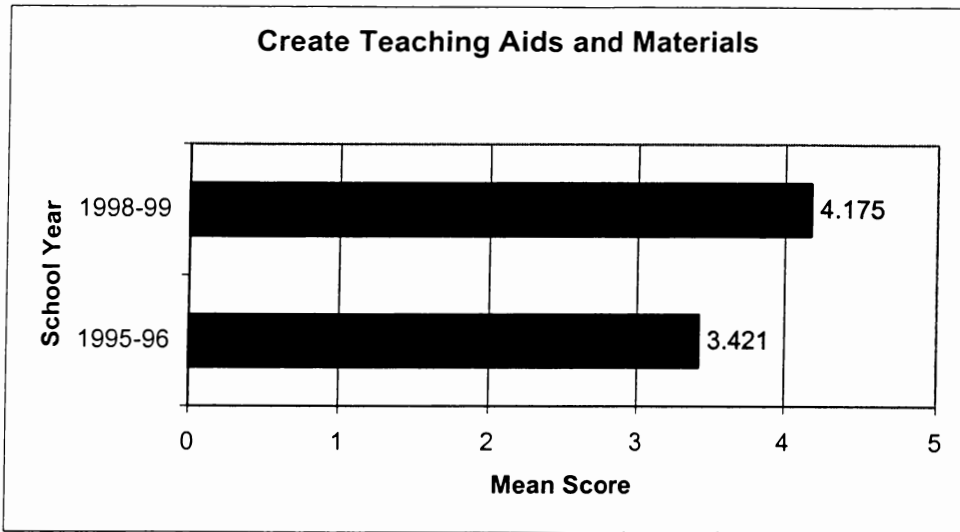


Figure 5. Create Teaching Aids and Materials

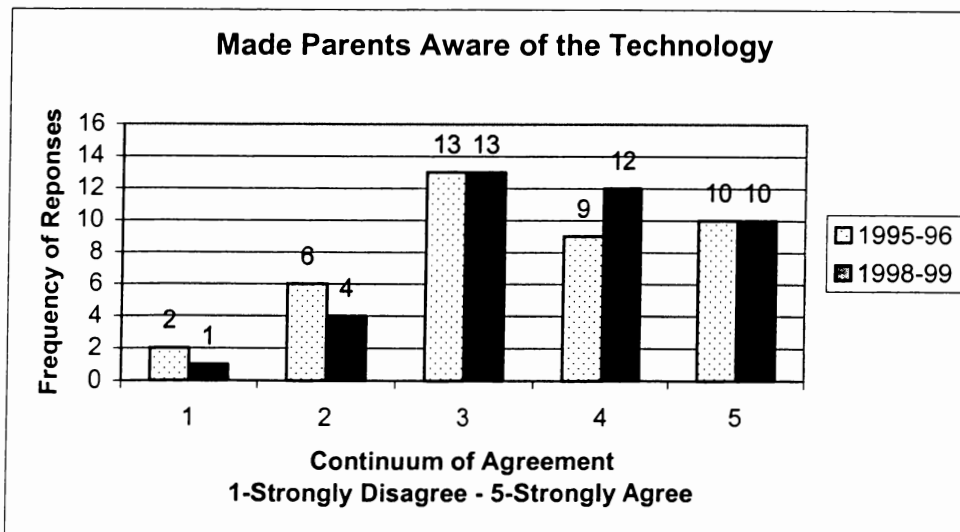


Figure 6. Made Parents Aware of the Technology

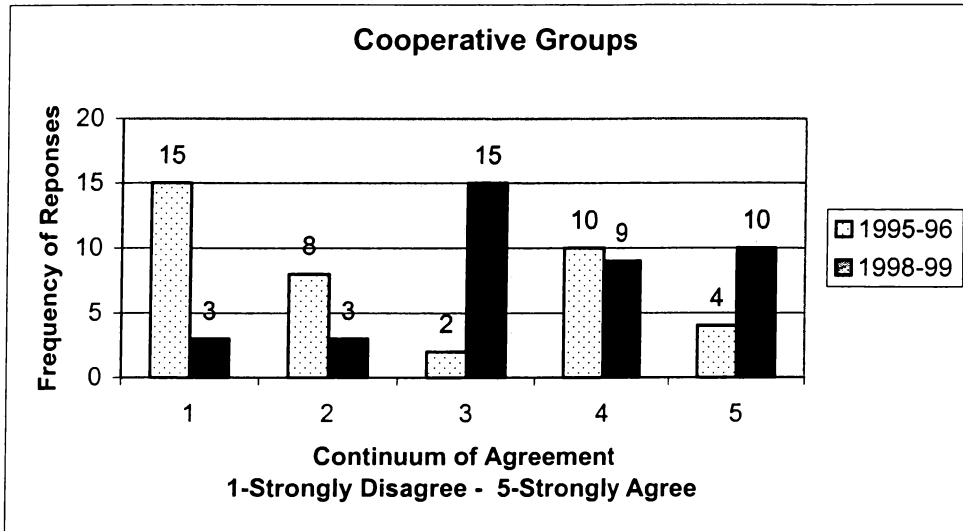


Figure 7. Cooperative Groups

expanding methods of instruction.

Statement number 20 consisted of the following:
 My students know how to behave around the computer (i.e., take turns, no food, etc.). The mean score increased from 4.500 in 1995-96 to 4.525 in 1998-99 or only 0.6%. The median score and mode were 5.0 for both school years. Figure 8 on page 76 represents the frequency of responses to statement number 20.

Statements 21 through 21e were statements concerning the use on a regular basis of 21st Century Classroom technology. This technology included computers, printers,

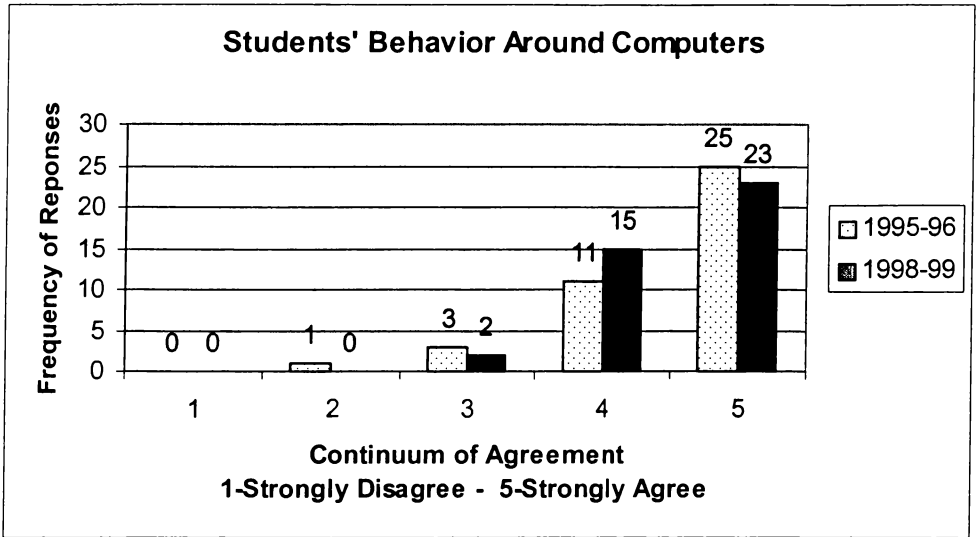


Figure 8. Students' Behavior Around Computers

videodisc players, VCRs, CD-ROMs, and televisions. All classrooms were initially provided with all new equipment at the implementation of the 21st Century Classroom program.

Statements number 21 through 21e consisted of the following: I use the following 21st Century Classroom equipment on a regular basis in my classroom.

- 21. Computer
- 21a. Printer
- 21b. Videodisc Player
- 21c. VCR
- 21d. CD-ROM
- 21e. TV

The mean score for statement 21 concerning computer usage increased from 4.154 to 4.475 or 7.7%. The median and mode were 5.0 for both school years.

The mean score for statement 21a concerning printer usage increased from 3.615 to 4.100 or 13.4%. The median score increased from 4.0 to 5.0. The mode was 5.0 for both school years.

The mean score for statement 21b concerning videodisc player usage increased from 2.947 to 3.650 or 23.8%. The median score increased from 3.0 to 4.0. The mode increased from 3.0 to 5.0. The videodisc player and the television were the primary pieces of hardware used in the Windows on Science curriculum.

The mean score for statement 21c concerning the already widely used VCR increased from 4.175 to 4.350 or 4.2%. The median score increased from 4.0 to 5.0. The mode was 5.0 for both school years.

The mean score for statement 21d concerning CD-ROM usage increased from 3.513 to 4.275 or 21.7%. The median score increased from 4.0 to 4.5. The mode was 5.0 for both school years.

The mean score for statement 21e concerning TV usage, a piece of technology that has been available for more than

half a century, increased from 4.275 to 4.450 or 4.1%. The median score increased from 4.5 to 5.0. The mode was 5.0 for both school years.

There was an increase usage in all equipment from the 1995-96 school year to the 1998-99 school year. Figure 9 summarizes the mean score increases of statements 21 through 21e. Figures 10 through 15 on pages 79-82 represent the frequency of responses from the participants.

The use of a videodisc player increased by the greatest percentage 23.8%. The CD-ROM received the next highest increase of the 21st Century Classroom equipment used by teachers. The CD-ROM usage increased to 21.7%. The only other piece of hardware to receive a double-digit increase was that of the printer. Computer usage increased by 7.7%. The ever-popular television and the VCR received the lowest amounts of increase in usage. The VCR usage increased only 4.2% while television usage increased only 4.10%. The mean score for these two pieces of equipment in the 1995-96 survey had the highest mean scores of all the equipment. The television had the highest mean score of the equipment in the 1995-96 school year survey. The mean score was 4.275 out of a possible 5.000. The VCR had the second highest mean score of the equipment in the 1995-96

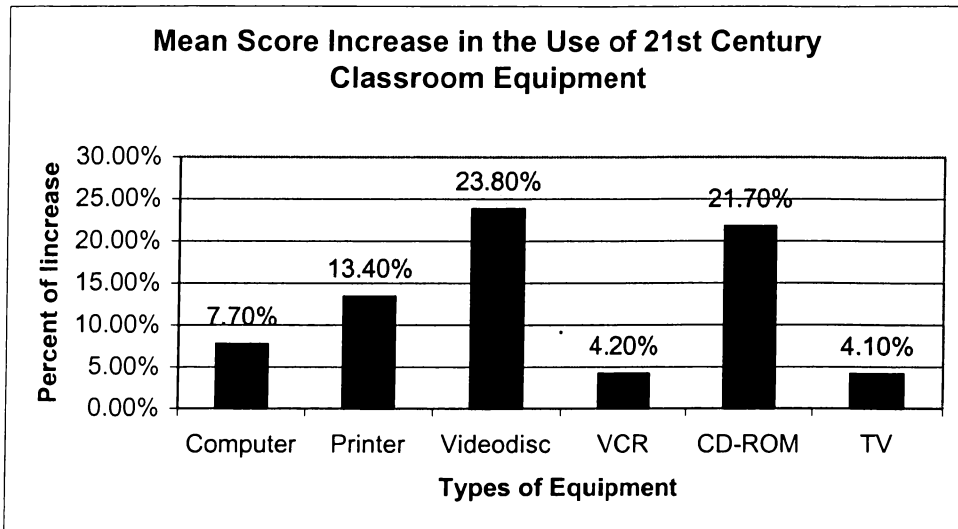


Figure 9. Mean Score Increase in the Use of 21st Century Classroom Equipment

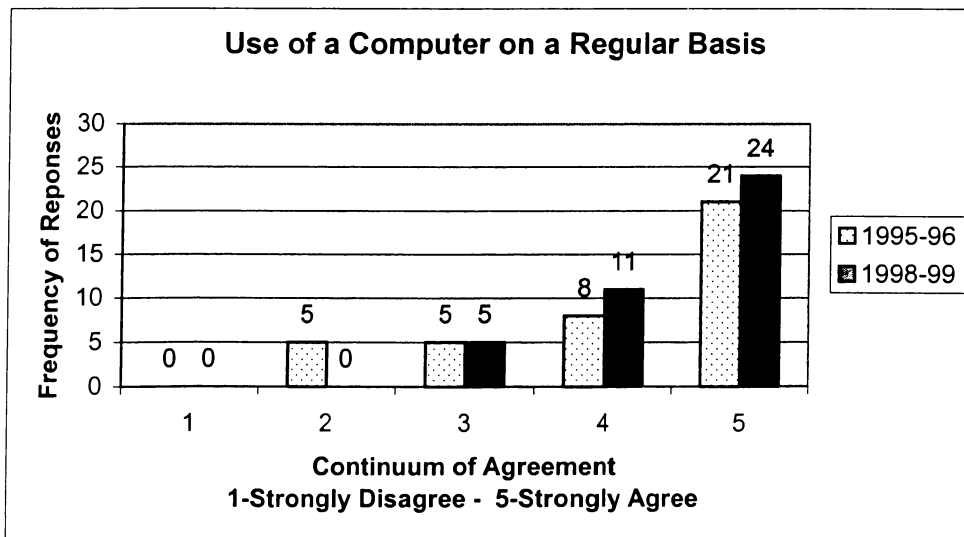


Figure 10. Use of a Computer on a Regular Basis

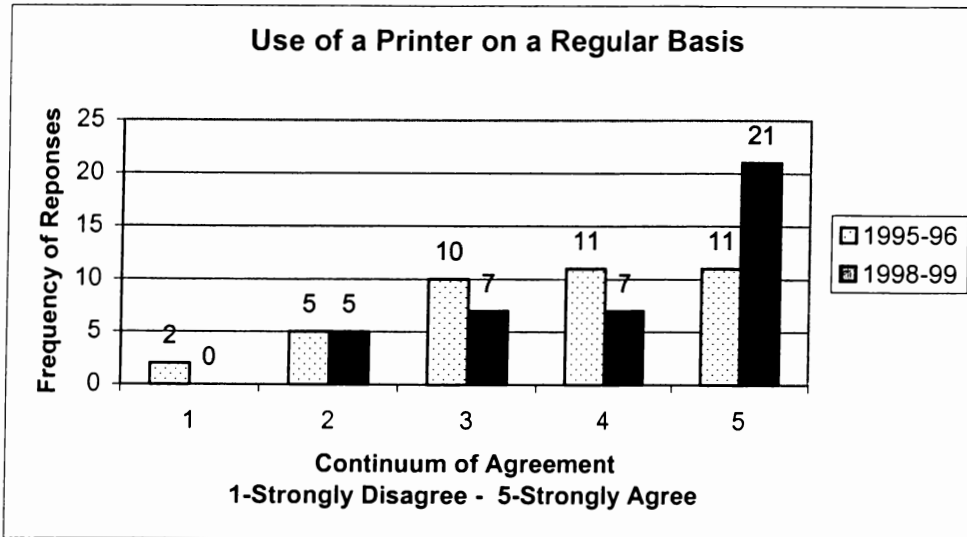


Figure 11. Use of a Printer on a Regular Basis

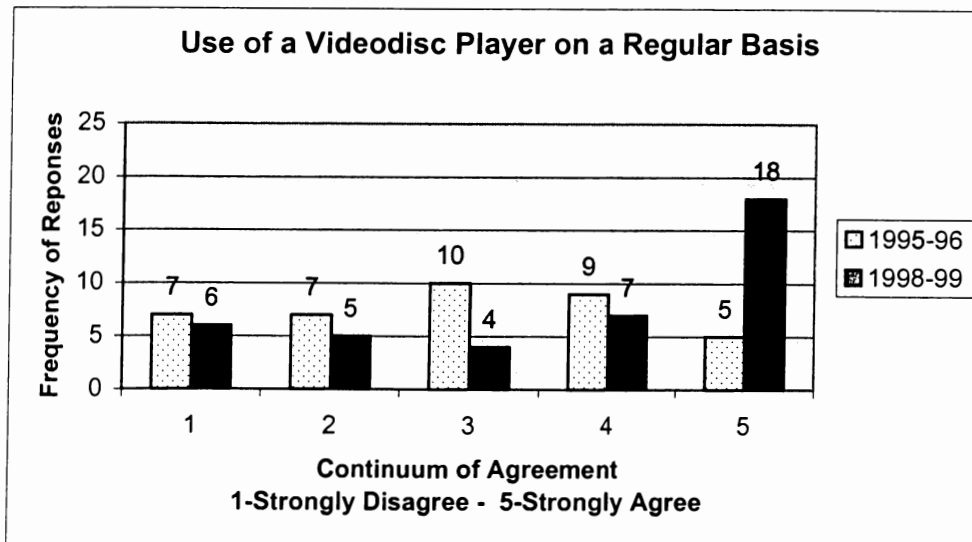


Figure 12. Use of a Videodisc Player on a Regular Basis

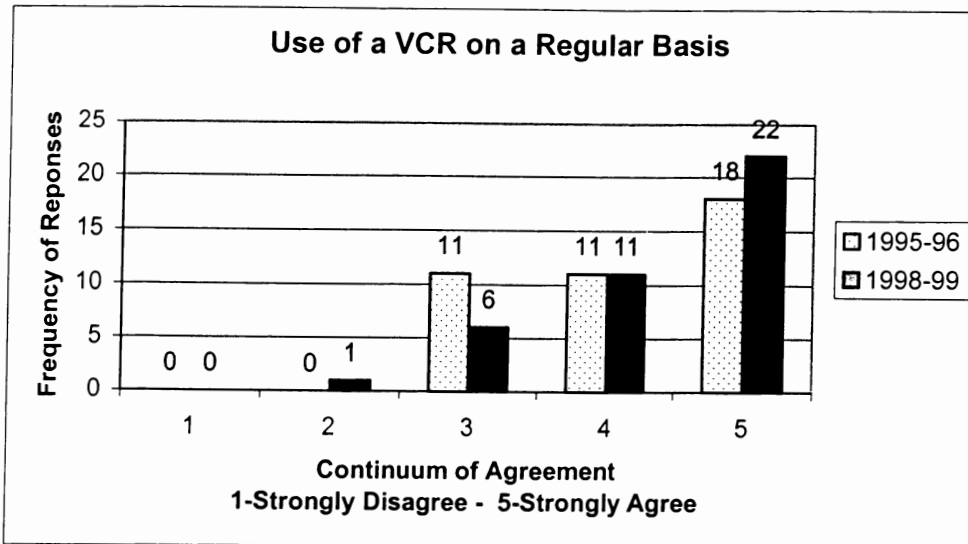


Figure 13. Use of a VCR on a Regular Basis

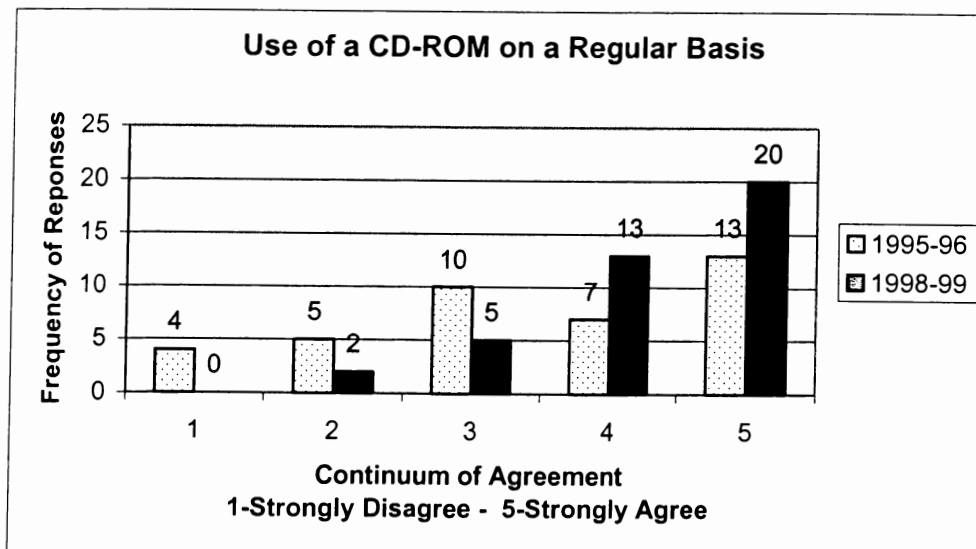


Figure 14. Use of a CD-ROM on a Regular Basis

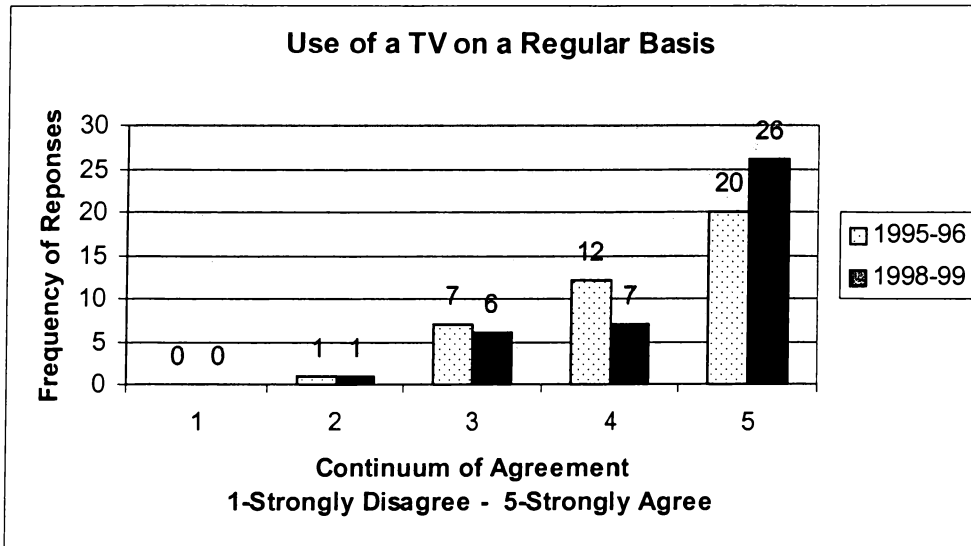


Figure 15. Use of a TV on a Regular Basis

school year survey. The mean score was 4.175 out of a possible 5.000. The data in the 1998-99 school year survey found the 21st Century Classroom equipment used in the following frequency as indicated by the mean score: television, computer, VCR, CD-ROM, printer and videodisc player. The mean scores ranged from 4.450 to 3.650. The data in the 1995-96 school year survey found the 21st Century Classroom equipment used in the following frequency as indicated by the mean score: television, VCR, computer, printer, CD-ROM and videodisc player. The mean scores for the various pieces of 21st Century Classroom equipment ranged from 4.275 to for 2.947.

Statement number 22 through 26 related to teachers' ability to use a variety of application software. It asked: I can use the computer to do the following:

- 22. Mail merge
- 23. Spreadsheet
- 24. Database
- 25. Charts and Graphs
- 26. Labels, Signs, Posters, etc.

The mean score for statement 22 concerning the perceived ability of teachers to utilize the mail merge function of a software package increased from 1.579 to 2.375 or 50.4%. The median score increased from 1.0 to 2.5. The mode was 1.0 for both school years. Figure 16 on page 84 represents the frequency distribution of responses for both the 1995-96 and 1998-99 school years concerning the application of mail merge. The mail merge application was a key item on a summer training agenda where teachers received training and scripted instruction to carry back to their classrooms.

Statement 23 was concerned with the perceived ability of teachers to utilize the database function of a software package. The mean score increased only 5.4%. The median score increased from 2.0 to 3.0. The mode was 1.0 for 1995-

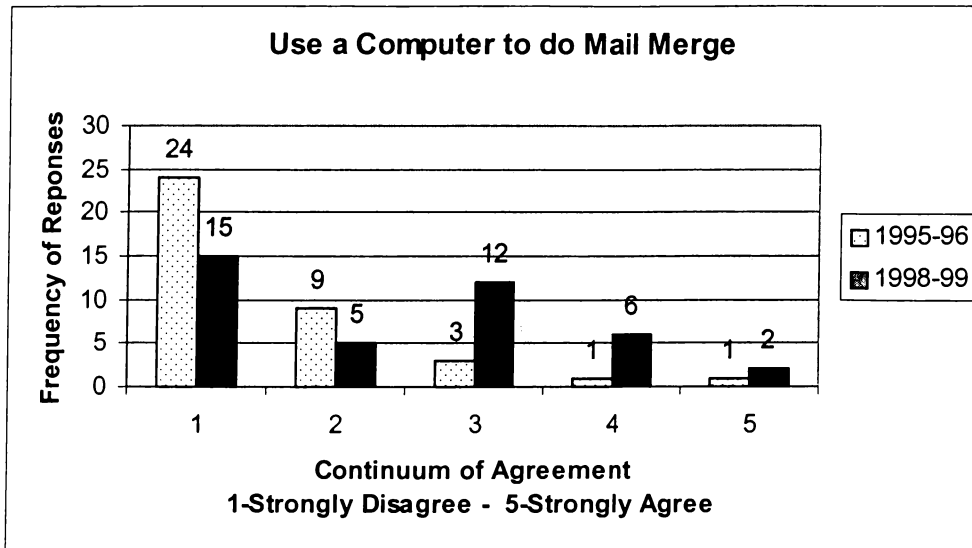


Figure 16. Use a Computer to do Mail Merge

96 and 3.0 for the 1998-99 school year. Figure 17 on page 85 represents the frequency distribution of responses for both the 1995-96 and 1998-99 school years concerning the application of databases. Figure 17 shows minimal gain in the utilization of databases by teachers.

Statement 24 continued looking at the application software. The spreadsheet function of a software package increased from 2.800 to 2.875 or 2.7%. The median score was 3.0 for both school years. The mode was 4.0 for 1995-96 and 3.0 for the 1998-99 school year. Figure 18 on page 85 represents the frequency distribution of responses concerning the application of spreadsheets, which closely

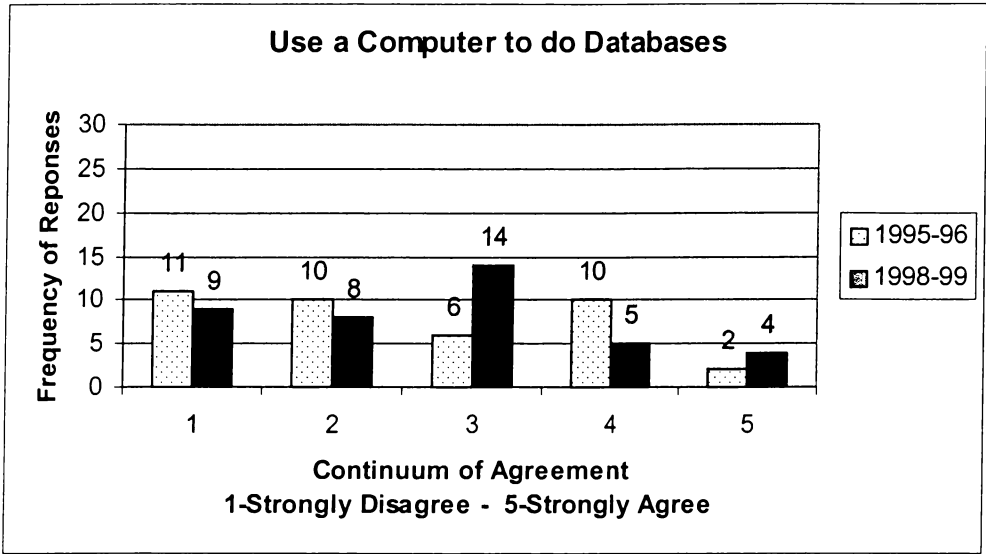


Figure 17. Use a Computer to do Databases

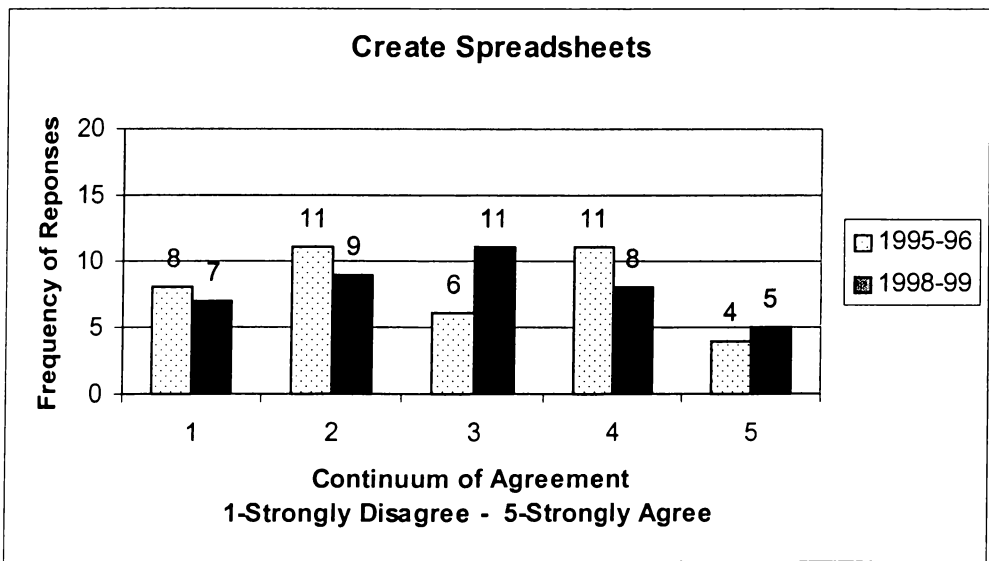


Figure 18. Create Spreadsheets

parallels the minimal gains found in the use of databases.

The mean score for statement 25 concerning the usage of a computer to make charts and graphs increased from 2.550 to 3.225 or 26.5%. The median score increased from 2.0 to 3.0. The mode was 2.0 for 1995-96 and 3.0 for the 1998-99 school year. Figure 19 on page 87 represents the frequency distribution of responses for both the 1995-96 and 1998-99 school years concerning the use of a computer to make charts and graphs. Figure 19 shows a much greater utilization of technology for this purpose as compared to databases and spreadsheets.

Statement 26 dealt with the usage of a computer to make labels, signs, posters, etc., increased from 3.325 to 3.600 or 8.3%. The median score was 4.0 for both school years. The mode was 5.0 for 1995-96 and 3.0 for the 1998-99 school year. Figure 20 on page 87 represents the frequency distribution for using a computer to create labels, signs, posters. Figure 20 shows an increase in the confidence level of creating labels, signs and posters. In statements 27 through 31 the researcher attempted to determine how teachers perceived their abilities to perform some basic daily operation of a computer. The statement read: I can

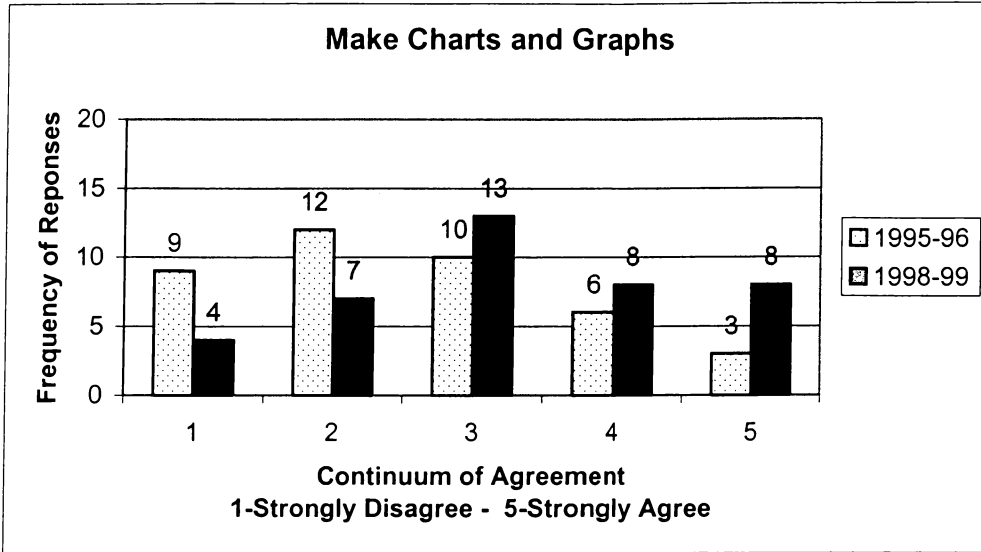


Figure 19. Make Charts and Graphs

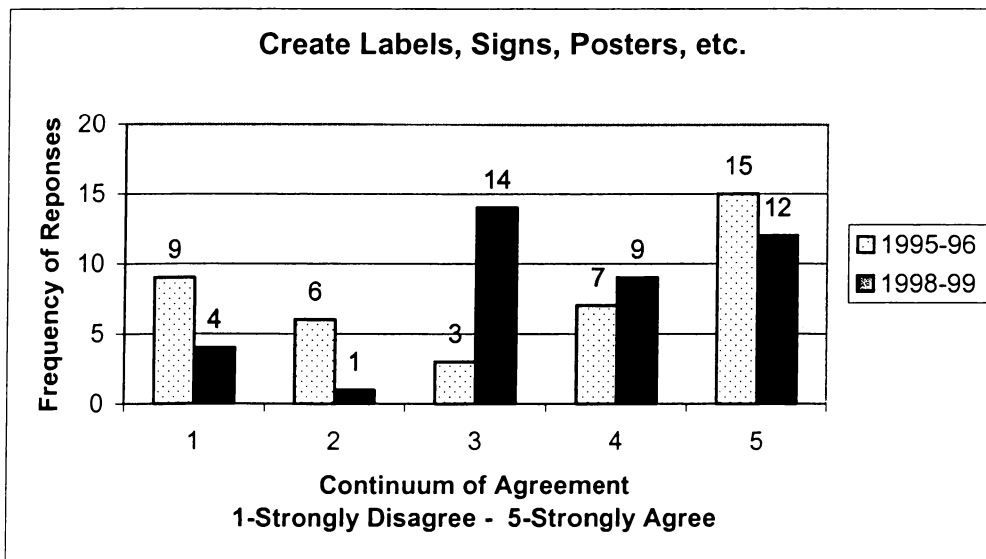


Figure 20. Create Labels, Signs, Posters, etc.

use the computer to do the following:

27. Install software using file manager
28. Change screen saver and color schemes
29. Scandisk and defrag (basic maintenance)
30. Format a floppy disk
31. Copy a floppy disk

The mean score for statement 27 regarding the installing of software increased from 3.325 to 3.700 or 11.3%. The median score increased from 3.5 to 4.0. The mode was 5.0 in 1995-96 school year and 4.0 in the 1998-99 school year.

The mean score for statement 28 pertaining to the changing of screen savers and color schemes increased from 3.675 to 34.075 or 10.9%. The median score was 4.5 in 1995-96 school year and 4.0 in the 1998-99 school year. The mode was 5.0 in both school years.

The mean score for statement 29 relating to basic maintenance such as defrag and scandisk increased from 1.513 to 3.050 or 101.6%. The median score increased from 1.0 to 3.0. The mode was 1.0 in both school years.

Statement 30 was related to the ability to format a floppy drive. The mean score increased from 2.575 to 3.325

or 29.1%. The median score increased from 2.0 to 3.0. The mode score was 2.0 in the 1995-96 school year and 5.0 in the 1998-99 school year.

The ability to copy a floppy disk, statement 31, increased from 2.265 to 3.725 or 41.9%. The median score increased from 2.0 to 4.0. The mode was 2.0 in 1995-96 and 5.0 in 1998-99.

The frequency distribution of participants' responses of statements 27 through 31 are represented in figures 21 through figure 25. Figures 21 through 25 on pages 90-92 show that teachers were increasingly better able to use technology in basic daily operations of a computer. The largest increases were found in scandisk and defragging, copying a floppy disk and formatting a floppy disk. The highest mean score of the category was the teachers' perceived ability to change screensavers and color schemes.

In statement 32 the researcher attempted to determine the degree of utilization of teachers in using the Internet browser Netscape to navigate the World Wide Web. The mean score increased from 1.900 to 4.475 or 135.5%. The median score increased from 1.0 to 5.0. The mode score increased from 1.0 to 5.0.

Statement 33 was related to the use of e-mail

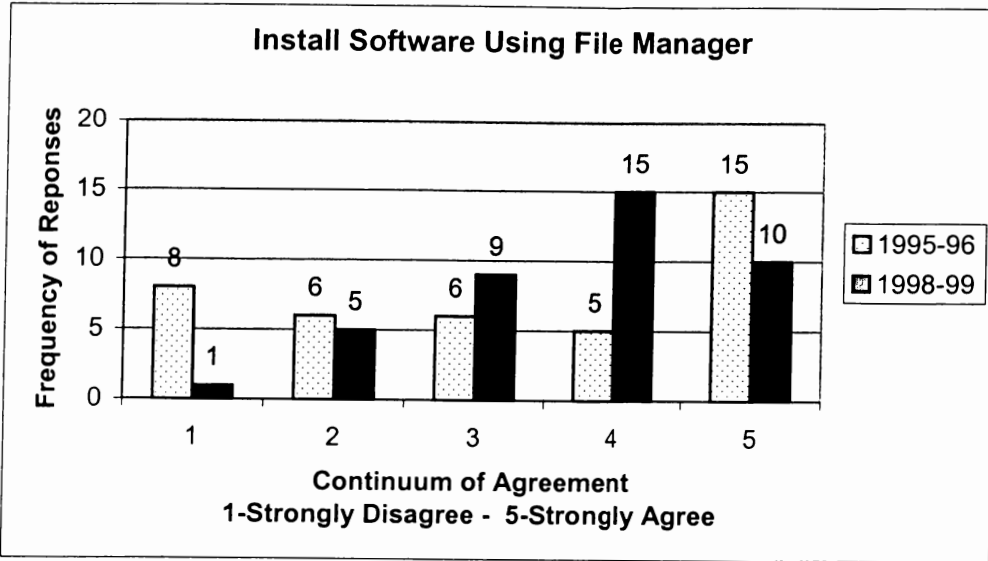


Figure 21. Install Software Using File Manager

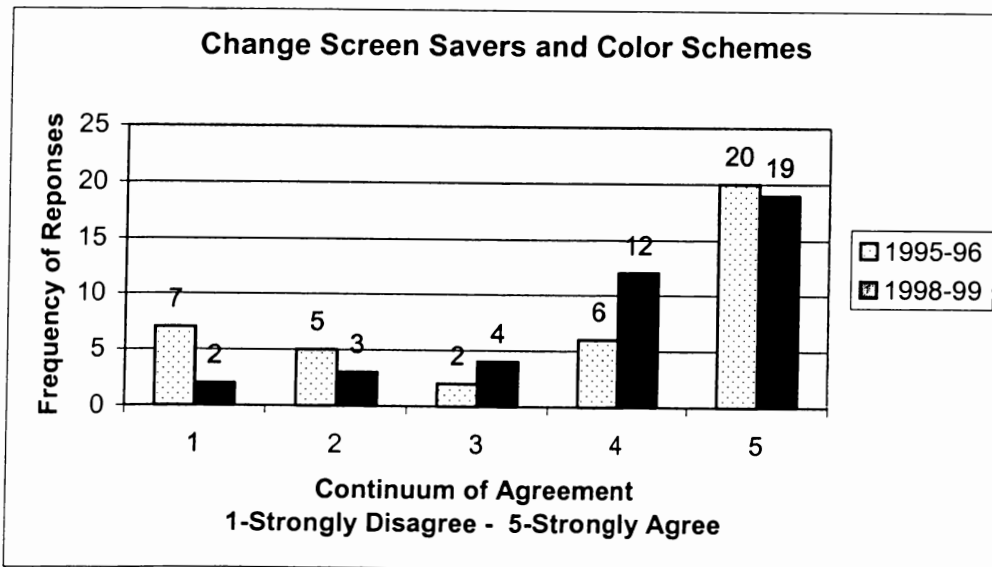


Figure 22. Change Screen Savers and Color Schemes

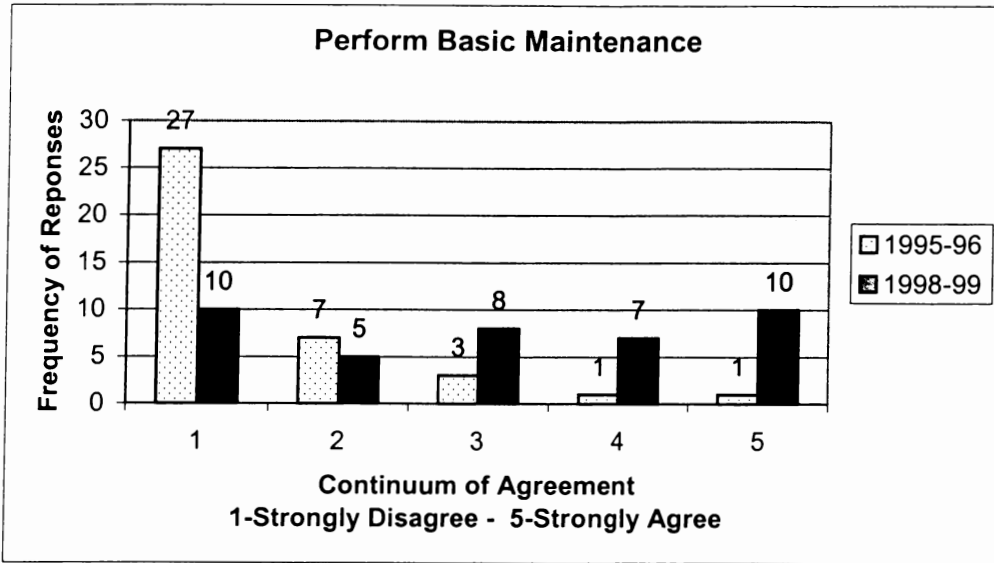


Figure 23. Perform Basic Maintenance

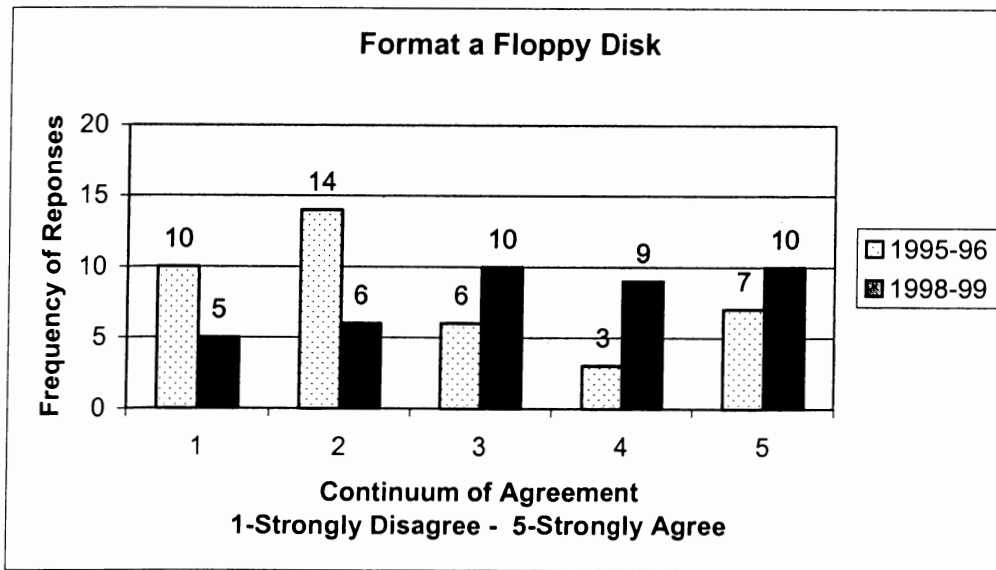


Figure 24. Format a Floppy Disk

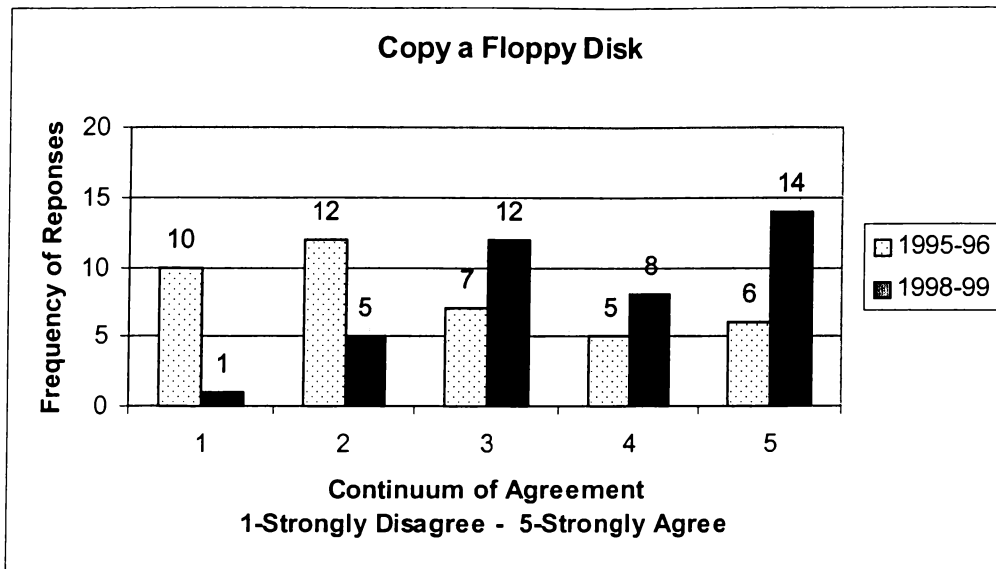


Figure 25. Copy a Floppy Disk

software Eudora for sending and receiving e-mail. The mean score increased from 1.850 to 4.350 or 135.1%. The median score increased from 1.0 to 5.0. The mode score increased from 1.0 to 5.0. Figures 26 and 27 on page 93 represent the frequency distribution of responses of statements 32 and 33 and show the largest two increases of all statements surveyed. The findings show a dramatic increase in the use of the Internet and the use of e-mail.

Statement 34 asked teachers to respond to the following: I can use the computer to do basic troubleshooting in Windows. The mean score for statement 34 concerning troubleshooting in Windows increased from

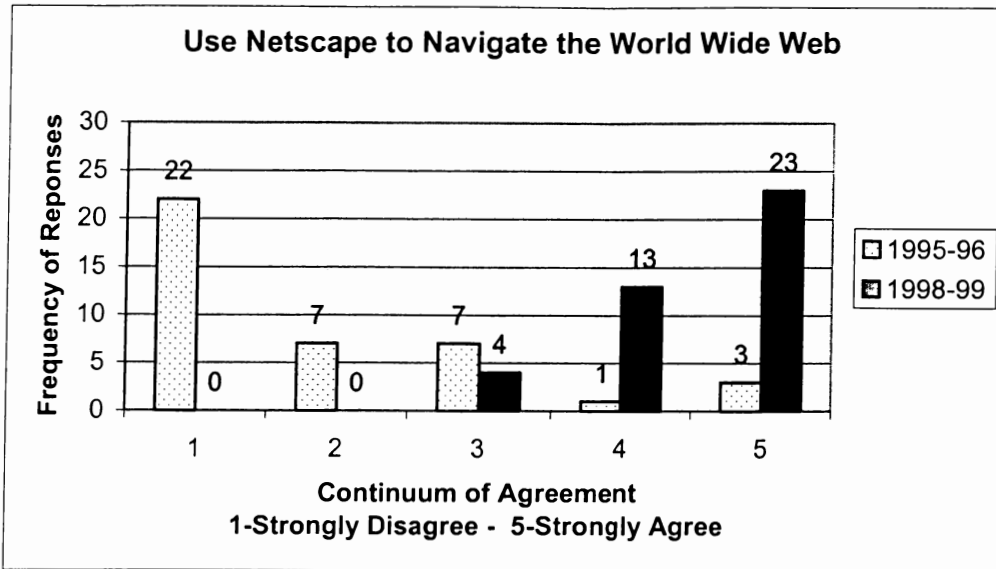


Figure 26. Use Netscape to Navigate the World Wide Web

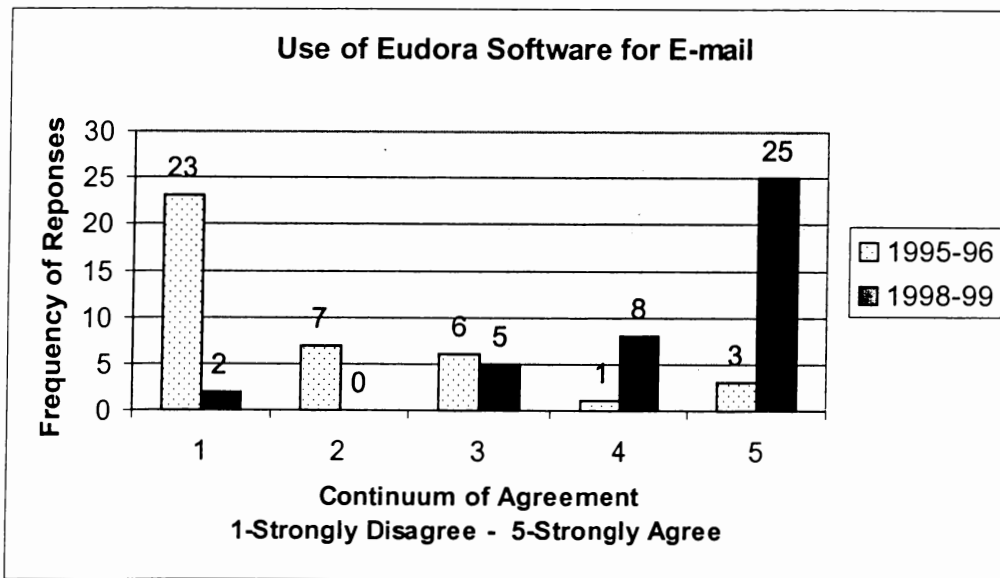


Figure 27. Use of Eudora Software for E-mail

2.250 to 3.150 or 40.0%. The median score increased from 2.0 to 3.0. The mode was 1.0 in the 1995-96 school year and 3.0 in the 1998-99 school year. The frequency distribution of responses for statement 34 is represented in figure 28 on page 95 indicating a large gain in this area.

Statement 35 asked teachers to respond to the statement concerning privacy and copyright laws. It asked: I understand the privacy and copyright laws and penalties pertaining to computer software. The mean score for statement 35 concerning privacy and copyright laws and penalties with software increased from 4.350 to 4.355 or 4.6%. The median score for both 1995-96 and 1998-99 school year was 5.0. The mode for both the 1995-96 and 1998-99 school year was 4.0. The frequency distribution of responses for statement 35 is represented in figure 29 on page 95. The finding revealed that teachers had a high perceived confidence level of these issues for both survey years.

Research question 2. What method of training is perceived to be the most comfortable for teachers using technology in the classroom? Statements 36, 37, 38 and 40 were related to research question number two.

Statement number 36 was answered by a yes or no

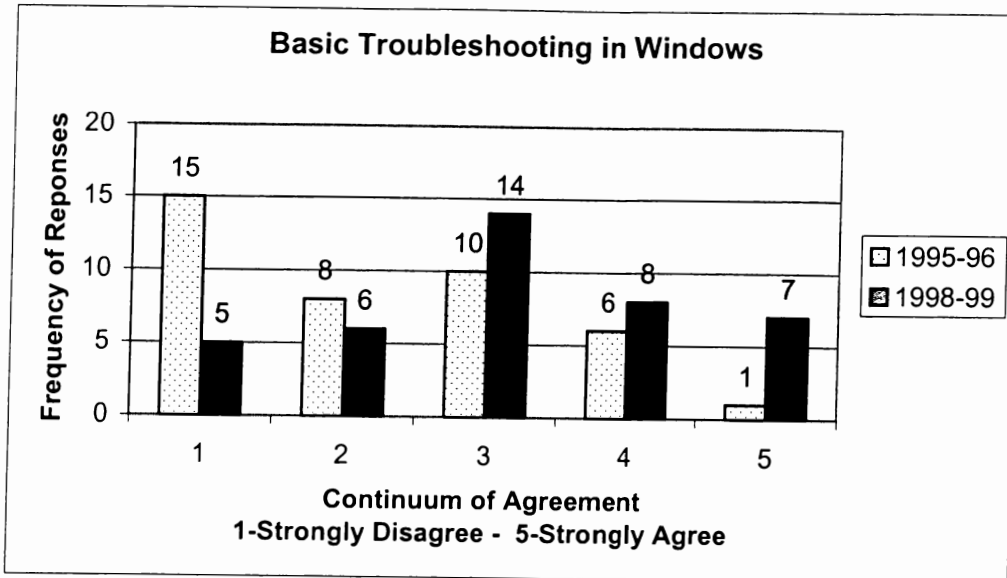


Figure 28. Basic Troubleshooting in Windows

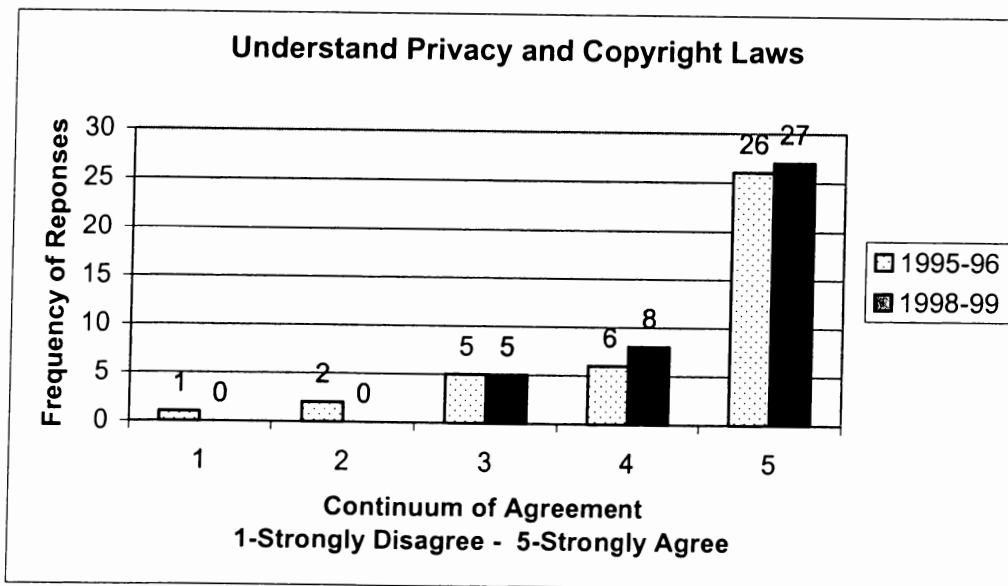


Figure 29. Understanding Privacy and Copyright Laws

answer. The statement asked teachers to respond to the following: I would be willing to serve as a trainer or facilitator in my school. All 40 participants answered the question on both surveys. In 1995-96, 10 out of the 40 participants or 25% stated that they would be willing to serve as a trainer or facilitator. In 1998-99, 12 out of the 40 participants or 30% stated that they would be willing to serve as a trainer or facilitator.

Statement 37 asked teachers to respond to the following: I am willing to come for additional training during the following times (check all that apply).

The choices were the following:

1. Afternoons
2. Weekends
3. Evenings
4. Summer Months

For the 1995-96 school year survey a total of 79 responses were selected for statement 37 for the 1998-99 school year. The choice of *summer months* was selected 35 times or 44.3%. *Afternoons* was the next most selected choice with participants selecting afternoons 27 times or 34.2%. The choice of *evenings* was selected eight times or 10.1% and the *weekend* choice was selected nine times or 11.4%.

A total of 69 responses were checked for statement 42 for the 1998-99 school year survey. The choice of *summer months* was selected 35 times or 50.7%. *Afternoons* was the next most selected choice with participants selecting afternoons 19 times or 27.5%. The choice of *evenings* was selected eight times or 11.6% and the *weekend* choice was selected seven times or 10.1%.

Statement 38 asked the following about training: I would feel more comfortable if training could be done (check all that apply).

The choices were the following:

1. One-on-One
2. Small Group
3. At My School
4. Large Group
5. Pairs
6. At the Central Office

The survey conducted during the 1995-96 school year elicited the following information out of 128 responses. The choice *one-on-one* was selected 16 times or 12.5%. The choice *small group* was selected 35 times or 27.3%. The choice *at my school* was selected 36 times or 28.1%. The choice *large groups* was selected only three times or 2.0%. The choice *pairs* was selected 21 times or 16.4%. The choice *at the central office* was only selected 17 times or 13.9%.

The survey conducted during the 1998-99 school year elicited the following information out of 107 responses. The choice *one-on-one* was selected 13 times or 12.1%. The choice *small group* was selected 34 times or 31.8%. The choice *at my school* was selected 34 times or 31.8%. The choice *large groups* was selected only five times or 4.7%. The choice *pairs* was selected 13 times or 16.4%. The choice *at the central office* was only selected 8 times or 7.5%. Figure 30 on page 99 represents the responses for both the 1995-96 school year and 1998-99 school year for statement 38.

Statement 39 attempted to assess their perceived confidence level over the past year. It asked: In the past year, my confidence level in using technology has:

1. Decreased Substantially
2. Decreased
3. Remained the Same
4. Increased
5. Increased Substantially

The choice of *increased* was selected 23 times or 57.5%. The choice of *remained the same* received the next highest total twelve or 30%. The choice of *increased substantially* was selected four times or 10%. The choices *decreased* and *decreased substantially* were not selected.

Statement 40 asked teachers to rank the following in

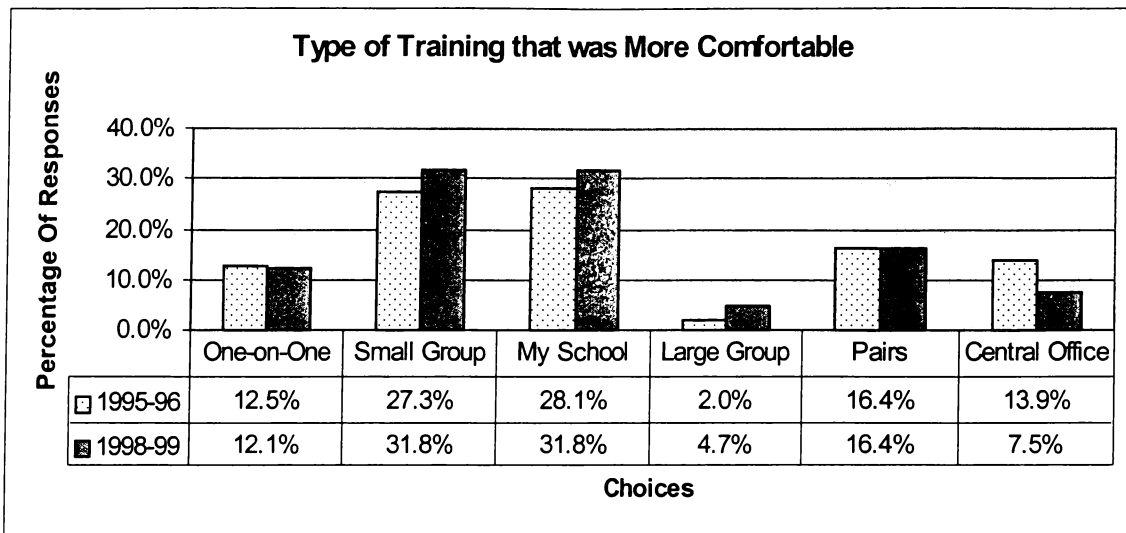


Figure 30. Type of Training that was More Comfortable

order of effectiveness toward increasing their skills and knowledge in using technology in the classroom, with 1 being most useful, and 6 being least helpful.

1. Summer Training
2. Peer/Core Team Training
3. School System Workshops (not summer)
4. State Conferences
5. Self Taught
6. Daily Exposure

The participants' first and second choices were *peer and Core Team training, summer training, and daily exposure*. *Peer and Core Team training* received 27 of the possible 80 selections. *Summer training and daily exposure* both received 19 of the possible 80 selections. These three choices received a total of 65 of the possible 80 choices

Summary

The data collected in this study indicated that there was an increase in the confidence level in all surveyed categories of technology use in the classroom. The largest increases were found in the use of an Internet browser to access the Internet and e-mail software. A considerable amount of training and emphasis was placed on these items over the four-years at both the district and school levels. Participants indicated that they preferred small groups and peer-team training as the methods of training. The data also indicated that they preferred training located at the local school level. Core Team training that was developed and initiated in 1996 was, by local definition, organized with the components of training that the participants preferred.

There was a significant gain in science, health and social studies mean scores. The level in these subject areas rose to the level that the subject areas of math, English and reading had recorded in the 1995-96 survey.

The findings of this study indicated an increase in the confidence of teachers performing applications and operations associated with technology that could be easily scripted in training sessions and later applied at the school level. These areas included use of scandisk, defragging, basic troubleshooting, copying a floppy disk and formatting a floppy disk.

The findings also indicated that the methods of training and the professional development opportunities developed and offered by the Sevier County School System had a positive effect on both the confidence and skill level of the participants. Conclusions and recommendations from the analysis of the findings and the review of literature can be found in chapter five.

CHAPTER V

Conclusions and Recommendations

Summary

The purpose of this study was to determine the perceived confidence level of middle school teachers in Sevier County Schools in relationship to their use of using technology in the classroom. Another purpose of the study was to determine what methods of training teachers prefer in order to develop a strategy for future training.

The population for the study consisted of all teachers who taught 5th and 6th grades in the Sevier County School System in Tennessee. The Sevier County School System is a growing school system in East Tennessee with the annual addition of 300 to 500 new students. Although the school system was traditionally recognized as a rural school system, the last 20 years has seen a robust growth in tourism industry.

The study was the result of work initiated by the researcher at the request of the Sevier County School

System in the 1995-96 school year. In 1996 all of the 5th and 6th grade teachers received equipment for a 21st Century Classroom. A total of 40 teachers have remained and participated in the entire study. Permission to use the data collected was requested and granted from the Superintendent of the Sevier County Schools.

The study was considered a population study since the population consisted of all teachers who taught for a four-year period. The 5th and 6th grade teachers who were given the survey in the 1995-96 school year were the same participants that were given the survey in 1998-99 and were still teaching 5th and 6th grade.

The surveys were given in the spring of 1996 and in the spring of 1999. The surveys were delivered to and distributed at individual schools of 5th and 6th grade teachers. Teachers completed the surveys and returned them by an internal school mail system. The return rate for both surveys was 100 percent.

The responses from the survey instrument were analyzed by using frequency distribution to tabulate the frequency of responses by the participants. Measures of central tendencies were also used to analyze the responses by the participants.

Conclusions

The findings from the study were reported in chapter four. These findings appear to support several conclusions. The findings where high positive results were shown could be traced to the training over a four-year period of time.

First Conclusion: The 5th and 6th grade teachers' confidence level in all areas of technology increased over the duration of the study. The increase in the confidence level as indicated by the findings in all the categories of technology use in the classroom could be attributed to a number of factors. The most important of these was the training methods at the school and system level which positively impacted the confidence level of the teachers and that sufficient time, four-years, was allowed for training and self-exploration.

Second Conclusion: The 5th and 6th grade teachers found the Internet and e-mail to be useful tools in the classroom. The largest increases of any category were found in using Internet browser to access the Internet and e-mail software to send and receive e-mail. A major portion of training time each year was devoted to these two areas. System wide training during summer months and after school

along with Core Team members offering peer training at the local school level enhanced the participants' abilities to utilize these two technology resources. E-mail was placed at the forefront of training in order to have avenues of communication between teachers, schools and the central office.

Third Conclusion: The adoption of the Windows on Science Curriculum had a positive influence on integrating technology into the classroom. The use of technology increased substantially in the subject area of science with the adoption of Windows on Science instead of a traditional textbook. After the Sevier County School Board adopted the Windows on Science Program, the school system contracted with a consultant to initially train 5th and 6th grade teachers on the use of the videodisc technology. A number of planning sessions occurred with the technology coordinator and the supervisor of the 5th and 6th grade curriculum. Follow-up training occurred, and Core Team members supported the program at the school level. The health and social studies subject areas had substantial increases that were attributed to the relationship to the use of technology in the science curriculum especially as

it relates to the health curriculum and the grouping of subjects and times taught.

Fourth Conclusion: The 5th and 6th grade teachers were more confident at basic troubleshooting of technology problems that occurred in the classroom. The confidence level in basic troubleshooting skills in technology increased 40.0% over a period of four years. A number of training sessions with Core Team members occurred during the school year that increased the problem-solving ability in basic problem areas such as printers, loading software and file management. The increases in gain scores in creating and formatting a floppy disk along with using defrag and scandisk were major topics in summer training in 1996. These topics were very basic and straightforward where step-by-step directions could be followed with a great degree of success. The findings of this study also indicated an increase in the confidence of teachers performing applications and operations associated with technology that could be easily scripted in training sessions and later applied at the school level. These areas included the use of scandisk, defragging, basic troubleshooting, copying a floppy disk and formatting a floppy disk.

Fifth conclusion: Teachers used cooperative groups to take advantage of the equipment in the 21st Century Classrooms. The large increase in students working in groups was attributed to the actual hardware arrangement of the 21st Century Classroom. A 21st Century Classroom contained five computers. The technology coordinator along with the middle school supervisor provided many professional development opportunities over the four-year period to adjust existing and current teaching styles and expose teachers to new methods of teaching and utilizing the technology through group work and cooperative learning strategies.

Sixth Conclusion: The teachers felt more comfortable with technology if the training was done at their schools, in small-groups and with a colleague doing the training. The preferred method of training was peer training and small groups training. The data gathered indicates that the Core Team that was initiated was productive in offering peer-group training at the school level. The data indicates that the school level was the preferred place for training during the school year. Teachers were able to use their own equipment instead of having to transfer training from other equipment at a central training site where the

equipment may be very similar but not exact. Research clearly demonstrates the need of the familiarity of the equipment and surroundings during training. The findings also indicated that the methods of training and the professional development opportunities developed and offered by the Sevier County School System had a positive effect on both the confidence and skill level of the participants.

Recommendations

The following recommendations were based on the analysis of the data collected and from the review of the literature.

Recommendations for additional research and training

1. Since this study did not consider gender and years of teaching experience, research should be conducted to evaluate what effects of gender and years of teaching experience have on the confidence levels of teachers using technology.

2. Research should be conducted to compare confidence levels of teachers using technology in the following grade configurations: primary, intermediate, middle, and high school.
3. School districts involved in technology planning should develop training models that utilize small group training, peer training, school based training, and ongoing continual training.

Recommendations for Sevier County Schools

1. In order to increase the confidence level of teachers using technology in 21st Century Classrooms, the Sevier County School System should further develop and expand its technology professional development program. Future training should include the following key elements: peer training, small groups, school level, system wide training during summer months, ongoing training, a variety of levels to meet individual needs, follow up training, incentives, local support, system wide support, and budgetary support.

2. Since the Core Team Training was one of the training methods preferred by teachers, the Sevier County School System should expand the Core Team Training Method. The number of Core Team members should be increased and the frequency of training sessions should be increased.
3. The Sevier County School System should expand the varieties of technology topics offered during professional development opportunities during summer months and initiate ongoing small group peer training related to the topics teachers are introduced to during summer training throughout the school year.
4. Since the Core Team Method was effective, the Sevier County School System should develop a technical support program system wide. This group could be comprised of non-certified employees of the school system.
5. Since the Windows on Science Curriculum was successful, the Sevier County School System should provide software and training in other subject areas equivalent to the Windows on Science Curriculum.

6. The Sevier County School System should develop a resource to provide quick reference to educational sites on the Internet. This site should also contain basic tutorial for new software and technology program initiatives. This resource should be web based for the ease of accessibility and updating.
7. The Sevier County School System should develop a system wide committee to coordinate technology resources found at the local school level.
8. The Sevier County School System should hire at the system level a person who has demonstrated the ability to effectively search for and acquire financial resources through federal, state, local, corporate and private grants to support the budgetary needs of technology expansion.

Recommendations for Local Research

1. Revise and develop a survey instrument to determine the confidence level of teachers in

future grade levels receiving 21st century equipment.

2. Research should be conducted comparing primary, intermediate, middle and high school confidence levels of teachers.
3. A follow up study should be conducted to follow the progress of the participants in this study.
4. Research should be conducted to determine if achievement of students is impacted if teachers demonstrate a high proficiency with technology.

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APPENDICES

APPENDIX A

Letter of Permission from
Sevier County Schools



Sevier County School System

Jack A. Parton, Superintendent

226 Cedar Street
Sevierville, Tennessee 37862

Phone : (865) 453-4671
Fax : (865) 522-1497

July 30, 1999

To Whom It May Concern:

Jerry Baxter has my permission to survey teachers and use past, current, and future data collected by Sevier County School System.

If I can be of further assistance, please call.

Sincerely,

Jack A. Parton, Superintendent

APPENDIX B

Survey Instrument

EDUCATIONAL COMPUTING TECHNOLOGY SURVEY

Directions: Please circle the number that reflects your opinion on the following questions.

		<u>Strongly</u> <u>Disagree</u>				<u>Strongly</u> <u>Agree</u>
I am a confident user of the school's computers and software.	1	2	3	4	5	
I can teach a curriculum-linked lesson in which educational computing makes a unique contribution.	1	2	3	4	5	
I most often use the computer in the following subject area(s).						
Reading	1	2	3	4	5	
English	1	2	3	4	5	
Math	1	2	3	4	5	
Science	1	2	3	4	5	
Social Studies	1	2	3	4	5	
Health	1	2	3	4	5	
Other	1	2	3	4	5	
I am able to develop a plan for integrating educational computing into the classroom.	1	2	3	4	5	
I know how to use a word processor and printer to do the following:						
Letters to parents, students, others	1	2	3	4	5	
Correspond with peers and administrators	1	2	3	4	5	
Create tests	1	2	3	4	5	
Create worksheets, study guides, etc.	1	2	3	4	5	
Publish a newspaper or newsletter	1	2	3	4	5	
Create evaluation checklists	1	2	3	4	5	
Create teaching aids and materials	1	2	3	4	5	
I have made parents aware of the technology brought into the classroom.	1	2	3	4	5	
I have students work in cooperative groups on theme-related activities using software.	1	2	3	4	5	
My students know how to behave around the computer (i.e., take turns, no food, etc.).	1	2	3	4	5	
I use the following 21st Century Classroom equipment on a regular basis in my classroom.						
Computer	1	2	3	4	5	
Printer	1	2	3	4	5	
Video Disc Player	1	2	3	4	5	
VCR	1	2	3	4	5	
CD-ROM	1	2	3	4	5	
TV	1	2	3	4	5	

	<u>Strongly Disagree</u>				<u>Strongly Agree</u>
I can use the computer to do the following:					
Mail merge	1	2	3	4	5
Database	1	2	3	4	5
Spreadsheet	1	2	3	4	5
Charts and graphs	1	2	3	4	5
Labels, signs, posters, etc.	1	2	3	4	5
Install software using file manager	1	2	3	4	5
Change screensaver and color schemes	1	2	3	4	5
Scandisk and defrag (basic maintenance)	1	2	3	4	5
Format a floppy disk	1	2	3	4	5
Copy a floppy disk	1	2	3	4	5
Use Netscape to navigate the WWW	1	2	3	4	5
Use Eudora to send/receive e-mail	1	2	3	4	5
Basic troubleshooting in Windows	1	2	3	4	5
 I understand the piracy and copyright laws and penalties pertaining to computer software.	1	2	3	4	5

I would be willing to serve as a trainer/facilitator in my school. Yes No

I am willing to come for additional training during the following times (check all that apply):

Afternoons Evenings Weekends Summer Months

I would feel more comfortable if training could be done (check all that apply):

One-on-One Large Group Small Group
 Pairs At My School At the Central Office

In the past year, my confidence level in using technology has:

Decreased Substantially Increased
 Decreased Increased Substantially
 Remained the Same

Please rank the following in order of effectiveness toward increasing your skills and knowledge in using technology in the classroom, with 1 being most useful, and 6 being least helpful.

Summer Training State Conferences
 Peer/Core Team Training Self Taught
 School System Workshops Daily Exposure
(not summer)

Signature _____ Date _____

APPENDIX C

21st Century Classroom Training
Objectives and Skills

Basic Concepts Objectives and Skills 21st Century Classroom Training

To provide an overview of the computer

- Connect the keyboard and the mouse to the computer.
- Connect the monitor to the computer.
- Connect the power supply to the computer.
- Identify the following basic components of a desktop computer system:
 - monitor
 - disk drive
 - CD-ROM drive
 - computer power switch
 - printer port
 - monitor power switch
 - computer unit (CPU)
 - keyboard
 - mouse
 - hard disk drive
- Turn on the computer
- Point, drag, click, and scroll using the mouse
- Become familiar with basic computer terminology

Perform basic operating system tasks

MAC

Become familiar with operating system
System 7__ System 7.1__ System 7.5__

- Understand the desktop
- Create/use folders
- Utilize control panels
- Format/initialize a 3.5" floppy disk
- File Management: copy & delete
- Open, close, and eject disk
- Shut down the computer

WINDOWS

Become familiar with operating system
DOS/Windows 3.1__ Windows 95__

- Understand the desktop
- Create/use folders
- Utilize control panels
- Format a 3.5" floppy disk
- File Management: copy & delete
- Access different disk drives
- Eject disk
- Shut down the computer

Word Processing Objectives and Skills 21st Century Classroom Training

Create a new document

- Enter text.
- Edit text:
 - Copy, cut, and paste
 - Delete text
 - Move text
 - Check spelling
- Format text:
 - Change fonts
 - Change styles
 - Change sizes
 - Change alignment
 - Change case
 - Shortcuts/Toolbars
- Save document:
 - Differentiate between **Save** and **Save As**
 - Change location of file
 - Change file name
 - Change file type
- Print the document.
- Import clipart into text (or into desktop publishing).
- Share examples of word processing in the classroom.

Database Objectives and Skills 21st Century Classroom Training

Create a database file

(example: field trip info, parent or guardian info, student info)

- Create fields for a database.
- Add specific data to a database.
- View database information in a variety of ways (depending on application software).
 - List view
 - Form view
- Save a database.
(Practice several methods for saving information)
- Sort fields:
 - Alphabetically
 - Numerically
 - In ascending and descending order
- Create queries using filtering techniques (search a database for specific information).
(Example: Categories having “science” in a specific field)
- Select records.
(Example: Records which begin with “a”)
- Create a header/footer for the database report.
(Example: Title of database, date database was created, page number, etc.)
- Print the database in report format.

Extended Skills

- Merge a form letter with a database.
- Create a database using data students may collect as part of a unit of practice.

Spreadsheet Objectives and Skills 21st Century Classroom Training

- Determine when to use a spreadsheet.
- Open the spreadsheet section of your software program.
- Create a new spreadsheet file.
- Identify spreadsheet terminology:
 - row
 - column
 - values
 - cells
 - cell location identification (J11, C3)
- Enter information into rows and columns.
(Example: *Labels*: Class names, categories of animals, etc. entered in columns;
Data: Numbers of animals in each category entered in the rows)
- Enter formulas into spreadsheet.
(Example: Create and enter a formula for total number of pets of the students in each classroom, total number of pets in each category, total number of pets of all children in the grade.)
- Gather information with which to create a chart or graph.
- Create one or more charts or graphs from the selected data.
- Change the settings for your chart:
 - Page setup (orientation, chart size)
 - Individualize: gridlines, borders, labels, title, etc.
- Print one or more charts or graphs.
- Share examples of classroom usage of spreadsheets.

Extended Skills

- Use an electronic gradebook program or a gradebook template from a spreadsheet program.
- Create a spreadsheet that would be useful in comparing and contrasting information about a curriculum topic. (Example: Information about the planets: size, distance from earth, temperature...)

Instructional Software Objectives and Skills 21st Century Classroom Training

Instructional Software

- Review the documentation that accompanies software packages using a cooperative learning, constructionist or problem solving model.
 - Determine from documentation the appropriate procedure to install the software on a fixed (hard) disk.
 - Determine what hardware is required to “run” the software package.
 - As appropriate, install the program on the fixed (hard) disk.
- Preview and evaluate instructional software to identify quality instructional software with the focus on curriculum.

Evaluate instructional software, considering:

- | | |
|---|--|
| <input type="checkbox"/> grade level | <input type="checkbox"/> time |
| <input type="checkbox"/> age appropriateness | <input type="checkbox"/> interaction possibilities |
| <input type="checkbox"/> subject matter | <input type="checkbox"/> tasks |
| <input type="checkbox"/> interest level/challenge | <input type="checkbox"/> assessment |
| <input type="checkbox"/> graphics | <input type="checkbox"/> uses |
| <input type="checkbox"/> skill level/skill adjustment | |
| <input type="checkbox"/> cost | |
- Describe appropriate instructional usage of the previewed programs.
 - CD-ROM Skills**
 - Correctly load a CD (Do you use a caddy or an internal tray on your computer?)
 - Review the CD to *access* information on it and/or *run* software from it.
 - Eject the CD.
 - Return the CD to the jewel case.
 - Turn off equipment.

Extended Skills

- Become familiar with tools for portfolio assessment.
- Write a unit of practice or lesson plan that includes technology resources.

Optical Technology Objectives and Skills 21st Century Classroom Training

Identify optical technology components

- Videodisc player
- Remote control
- Barcode reader
- Interface cable for Level III software
- Laserdisc

Set up multiple laserdisc stations in order for the small groups to perform the following activities and/or preview programs:

Laserdisc Format

Level I:

- Turn on videodisc equipment.
- Correctly load a videodisc player.
- Review the laserdisc.
 - Using the appropriate equipment (barcode reader/remote control):
 - Change the speed, audio channel, display, frame, and chapter of a laserdisc.
 - Play, scan, pause, still/step, and stop a laserdisc.
 - Eject laserdisc.
- Turn off equipment.

Level III:

- Turn on videodisc equipment.
- Correctly load a videodisc player.
- Connect the interface cable to the videodisc player and the computer.
- Launch the software program on the computer.
- Preview the laserdisc using the software program on the computer.
- Eject the laserdisc.
- Turn off the equipment and disconnect cable.

Presentations Objectives and Skills

21st Century Classroom Training

Use “presentation” software to create a lesson or lecture.

- Define the purpose of the presentation and plan a simple sequence to fulfill the purpose.
- Compose the written content.
- Examine and choose a slide background (design template).
- Use pre-formatted slide layouts.
- Individualize a pre-formatted slide layout.
- Create a “build” slide.
- Set slide transitions.
- Modify the slide sequence.
- Add clipart to a slide and alter its scale.
- Use the “chalk” tool during a presentation.
- Set the presentation timing.

Extended Skills

- Plan and create a “stack” using a linked presentation program.
- Plan and create a slide show using “presentation” software.
- Plan and create a presentation to introduce a unit of practice.
- Create a newsletter with desk top publishing features of a word processor or a specialized desk top publishing packet..
- Use a scanner to import graphics, photos and/or text into a presentation document.
- Use graphics software to create pictures.
- Add media clips or sounds to a presentation.
- Modify ready-to-use clipart.
- Use images captured from a digital camera or scanner in the presentation.

Internet Objectives and Skills

21st Century Classroom Training

Internet

- Use a graphical user interface to explore the World Wide Web.
 - Recognize basic toolbar buttons and develop screen navigation technique.
 - Follow links on a page.
 - Recover gracefully for service interruptions.
 - Differentiate between commercial and informational site content.
 - Create a personal definition for the limits of and liability for information located on the WWW.
 - Find specific information on the WWW using a variety of search engines.

- Bookmarks
 - Access bookmarks.
 - Create new bookmarks.
 - Organize bookmarks into folders for class projects.

- Review Acceptable Use Policies related to responsibilities for children.
- Review Acceptable Use Policies related to responsibilities for teachers.
- Discuss intellectual property/copyright law.

Extended Skills

- Upload/download files to/from the Internet.
- Create a page on the WWW.
- Use interactive video-conferencing in the classroom.

E-mail Objectives and Skills

21st Century Classroom Training

- Register a new TEN (Tennessee Education Network) e-mail account.
 - Understand acceptable use policy.
 - Establish password security.
 - Determine your own e-mail address.

- Use an available means to connect to the TEN-NASH system.
 - Recognize different connection methods.
 - Review modem connection settings.
 - Possibilities: telnet, terminal, hyperterminal, ProComm.

- Use the TEN-NASH menu system to:
 - Read general messages posted for subscribers.
 - Change password.
 - Look-up other subscribers' e-mail names.
 - Recognize the access route for Pine Mail.
 - Find on-line help.

- Enter the native (Vax) mail system.
 - Determine the contents of your e-mail box.
 - Read new mail.
 - Re-read old mail.

- Recognize the parts of a mail message and understand email etiquette.

- Process mail.
 - Reply to mail.
 - Compose a new mail message; send when complete.
 - Compose a mail message and cancel it.
 - Address a message to a non-subscriber (over the "internet").
 - Send a message to several recipients at once.
 - Forward a message to another subscriber.
 - Delete old mail.

- Practice techniques to manage mail.
 - Print email (depending on your connection mode and local resources).
 - Establish a setting to automatically send a copy of your own messages to yourself.
 - Create a distribution list for frequent group messaging.

Extended Skills

- Utilize the VAXPhone of TEN-NASH for real-time on-line discussion.
- Attach an application file to e-mail.

Supplemental Technology Objectives and Skills 21st Century Classroom Training

Note: These skills are part of using "Technology in the Classroom" but are not presently part of the objectives included in the 21st Century Classroom Training.

Video (TV and VCR)

- Run/view a video tape on a VCR.
- Manually tape a TV program off air/cable.
- Video tape off air/cable using timer.

Calculators

- Learn to use a graphing calculator.
- Gather examples of lesson plans and/or equations.
(A graphing calculator could be helpful in solving or visualizing.)

Extended Skills

- Use a camcorder to tape an event.
- Edit a single video tape
- Edit multiple tapes into a new product.

VITA

Jerry Ray Baxter, Jr. is the son of Jerry and Linda Baxter. He was born on November 26, 1964 and is a life-long resident of Sevier County, Tennessee. He attended public school in Sevier County and graduated from Sevier County High School in 1983.

Jerry entered the University of Tennessee, Knoxville in the fall of 1983 and received a Bachelor of Science degree in Education in 1987. In the fall of 1988, he began teaching in the Sevier County School System at Northview Elementary School. During the next six years at Northview Elementary School, Jerry taught sixth, seventh and eighth grade social studies and math. In 1990, he received a Master of Arts degree in Education from Tusculum College in Greenville, Tennessee. Jerry began part-time graduate studies in 1991 at the University of Tennessee, Knoxville.

In 1994, Jerry accepted the position of Assistant Principal at Northview Elementary School where he served until 1996. In 1996, he accepted a position as Student Management Systems Specialist for the Sevier County School System. The primary responsibilities of this system wide position are to supervise school and student accountability procedures and requirements. Jerry currently holds this position in the Sevier County School System.

Jerry continued his graduate studies at the University of Tennessee, Knoxville and later entered the Doctorate program. He received his Doctorate of Education degree on August 11, 2000.

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