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FACTORS THAT CORRELATE WITH THE USE OF TECHNOLOGY IN GEORGIA'S ELEMENTARY SCHOOLS

by

SHELLEY ARNETT SAMON

(Under the Direction of Barbara Mallory)

ABSTRACT

The purpose of this quantitative study was to investigate the relationship of different factors, including leadership, on Georgia elementary teachers' technology use. The researcher investigated the availability and the usage of technology in Georgia elementary public schools by teachers for delivery of instruction. The researcher also investigated school principals' support for technology use, and school teachers' attitude (technology autonomy, technology self-efficacy, technology experience, and technology anxiety) in relation to technology use.

Following the pilot study, questionnaire packets were mailed to third grade teachers' of 150 elementary schools that participated in the study. The final sample of this study consisted of 355 Georgia third grade elementary teachers. The collected data were entered in the Statistical Package for the Social Sciences (SPSS) program. The data were analyzed using descriptive statistics. Pearson's correlation and regression analysis were used to determine if relationships existed between the collected data.

The data indicated that Georgia's elementary teachers did have access to instructional technology and they were using the technology. The data indicated that school principals' support of technology, teachers' experience with technology and teachers' anxiety towards technology correlate with technology use. Teachers'

technology autonomy, teachers' technology self-efficacy and schools selected technology procedures were not significantly related to technology use.

School principals need to encourage their teachers to use the technology available to them and to support their participation in technology professional development. School principals need to continue to encourage technology integration and to continue funding for technology equipment. Colleges' and universities' educational departments can use this study to educate aspiring school principals in their future roles as technology leaders. School principals can use this study to help in making informed decisions when dealing with teacher anxiety as a result of the high expectations of technology integration.

INDEX WORDS: Educational technology, Technology in education, Technology integration, Technology for instructional purposes, School principals' attitudes towards technology

FACTORS THAT CORRELATE WITH THE USE OF TECHNOLOGY IN GEORGIA'S ELEMENTARY SCHOOLS

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A Dissertation Submitted to the Graduate Faculty of Georgia Southern University in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF EDUCATION

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DEDICATION

I dedicate this dissertation to my mom, Ms. Jane D. Samon, and in loving memory of my dad, Mr. Edward A. Samon Sr. Thank you for all your love and support and for constantly encouraging me not to give up. I love you.

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I would like to thank the following people for I would not and could not have finished if not for your support: my family, friends, co-workers, professors, and others who have made contributions to this process. I want to sincerely say "Thank You" to each one of you for your encouraging words and your assistance in finding and/or printing resource materials and other services provided.

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and support throughout this process. Your friendship means so much to me. I want to thank my Louisville Academy family and my Jefferson County family for their support throughout this process. I would like to extend my appreciation and thanks to the 355 teachers who provided the essential information for me to conduct this study.

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CHAPTER I

INTRODUCTION

Some citizens believed the American educational system worked fine as it was. They provided evidence by citing examples of how the educational system produced those who landed on the moon and those who routinely replaced diseased hearts with healthy ones. However, the educational systems that were in place worked as well as the air travel system did before airplanes with propellers were replaced by jet-powered airplanes when it comes to the integration of technology. If American citizens were not content with what the nation had accomplished in math, science, and technology and wanted to meet the challenges of the twenty-first century, then a change in the American educational system had to occur (Romano, 2003).

Americans were challenged to do for the educational system what was done for air traffic controllers, physicians, bankers, other businesses and professions. It is hard to imagine any organization that does not or could not advantageously use a computer and other technology in its operations, such as the Chicago Mercantile Exchange (CME). This institution built its business by trading commodities and was on the edge of bankruptcy. CME retained an army of IT professionals who created cutting-edge technology to quickly deliver products and services. As a business, CME has changed tremendously from its founding in 1898 as the Chicago Butter and Egg Board. Seventy percent of all trades took place on the company's electronic platform, CME Globex. In 2005, CME traded more than 1 billion contracts worth $638 trillion (Ruiz, 2006). However, education has not fully taken advantage of technology to change. There is a need to amplify the educational systems'

capacity to function. Empowering school systems with technology will propel them to a new evolutionary level (Romano, 2003).

In hard economic times, as citizens sought employment, having technology skills was critical to securing a job. Twelve out of the twenty fastest growing occupations in America required a minimum of a bachelor's or associate's degree. The use of technology played a major role in many of those jobs, which consisted of network systems analysts, computer software engineers, data communications analysts, diagnostic medical sonographers, database administrators, physician assistants, forensic science technicians, veterinary technologists and technicians, systems software administrators, network systems administrators, and computer systems administrators (Su, 2006).

The technological advances in America left a clear distinct implication for the educational system. Students that graduated from high school in the United States needed to be proficient in the use of the latest technology in order to compete globally for those fast growing occupations and many other job positions (Brown, 2001). American students needed a strong foundation in technology education starting in their public school years and continuing throughout their college years (Su, 2006).

Technology today facilitates the storage, transmission, and retrieval of information in multimedia and on an individualized, interactive basis (Roblyer, 2006). Roblyer (2006) suggested that technology should have a central role in what teachers do. Still, the facts were that after fifty years of costly trial and error, technology was still not an integral routine part of what happens in the classroom. In order to ensure that America's transformation from an industrial age to informational age also changed American schools for the better, strong

leadership was needed during process of change to ensure that the implementation of technology into the school was done efficiently and effectively (McCain & Jukes, 2001).

In 21st century elementary schools, many teachers had access to technology, but less clear was the extent to which elementary teachers used the technology, or those factors that influence their decision to employ the technology. Therefore, the purpose of this study was to investigate the influence of different factors, including leadership, on elementary teachers' technology use.

Background of the Study

Historical Background

Technology was the technical means people used to improve their surroundings. Technology was people using knowledge, tools, and machines to improve their ability to do work, to do tasks more efficiently, and to make their lives easier and better. Technology allowed people to communicate better, make more and better products, to travel in comfort and at faster speeds. Technology was everywhere and could make life better (Oldenziel, 2006).

For thousand of years, from the invention of the wheel around 8000 BC to today's high-tech computers and machines, humans have been using their knowledge and experience to develop tools, and machines to make their lives and work easier. In 1436, Johannes Gutenberg began working on his rendition of the printing press. It consisted of movable wooden or metal letters and they were replaceable. Gutenberg completed his printing press in 1440. His printing press is credited for revolutionizing the production of books along with fostering rapid development in the sciences, arts and religion through the transmission of

texts. It brought down the price of printed materials and made such materials available for the masses. It remained the standard until the twentieth century (Morris, 1978).

The steam engine could easily be considered the single most important invention of the entire industrial revolution. There are not many present day industries that can be examined without coming across some type of reference or dependence upon the steam engine. The majority of people will tell you that the steam engine was invented by James Watt, but like all other great inventions and great discoveries, the steam engine came about after centuries of work by numerous scientists and engineers. Thomas Savery patented the first crude steam engine in 1698. Savery was working on solving the problem of pumping water out of coal mines when he invented the boiler which became the power for his steam engine (Hills, 1989).

Thomas Newcome introduced his engine in 1712. It was basically a combination of the boiler used in Savery's engine with a cylinder and pump. It was the first engine that was actually self acting. In 1765, James Watt was assigned the task of repairing a Newcome engine. That started the inventor to work on several improvements to Newcome's design. Watt's engine soon became the dominant design for all modern steam engines and helped bring about the Industrial Revolution (Marsden, 2002).

In the late 1790's, the need for multiple copies of documents became increasingly important. The quill pen was the preferred and main tool used for writing during that time period. Extra copies of document were written by hand meaning, exact copies of documents were non-existent (Adler, 1990). Wedgewood introduced the word "carbon paper" to society when he invented the stylographic writer in 1806. It used carbon paper which produced a good original with a pen or pencil, but it did not always provide a good copy. Carbon paper

required adequate pressure in order to provide a good copy. Wedgewood's stylographic writer led to the development of the type writer for commercial use in 1872. For the first time a good copy could be produced at the same time as a good original. The typewriter produced excellent originals and copies, and carbon copying on the typewriter progressively became standard practice in the office (Adler, 1990).

Every ten years, the United States of America takes a census to get an official count of its population. The 1880 census was done by hand and took eight years for The U.S. Census Bureau to complete it. While boarding a train, an American engineer named Herman Hollerith watched a train conductor punch the tickets of the boarding passengers. This inspired him to invent a machine that could read, sort and count punch cards whose holes represented data that was gathered. Hollereith's tabulation machine was used for the 1890 census. The U.S. Census Bureau completed the census in one year. Hollerith created a company to sell his tabulating machine. The company became a part of IBM in 1924. Hollerith's punch cards and tabulating machines led the way toward automated computation. Punch card technology was used in computers up until the late 1970s (Kistermann, 1991).

The introduction of computers into society has been called the "new industrial revolution". Computers have taken over the routine tasks of mankind, can perform thousands of calculations in seconds and have extended our ability to process information quickly. The computer has gone through several "generations," each new computer becoming faster and more reliable. The development of the modern day computer was the result of advances in technologies and man's need to quantify (Nolte, 2001).

The first fully electronic computer was developed at the University of Pennsylvania in the 1920's. During that time, computers were really just glorified overvalued fast

calculators. They were use primarily for computing numbers and checking the calculations of mathematicians, accounts and book keepers. Today's computers are used to process data and paperwork for major industries and governments like, banking accounts, payroll, inventories, and airline reservations. Computers have brought speed and accuracy to weather forecasting and some computers can make rough translations from one language to another. Computers have proven to be a very important necessity to society and will continue to become faster and even more reliable in the future (Nolte, 2001).

All of these technological inventions made a huge impact in the American work force. Companies were able to produce more products for less money and in less time because of the creativity and determination of a few men (Aspray, 1990). Politicians believe that incorporating more technology into American schools will increase student achievement and can be effective tools for instruction (Snyder, 2004).

National standards on technology in education can be linked back to the early 1970's when the former United States Office of Education (USOE) incorporated them into their industrial arts program. The focal point of these national standards was to prepare students to enter the world of industry when they graduated from high school. The content standards for the programs were left up to the state and local educational systems. In the 1970's, science and technology were closely linked, and in some instances were considered the same therefore, no major technology changes occurred during this time because of the push for science and mathematics (Dugger, 2004).

There was not a major influence on state and local educational systems to make changes to their policies and practices with technology until the mid 1980's when the focal point became use of technology within the school system and in society (Dugger, 2004). In

an effort reorganize and prepare students for technology use in the twenty-first century, educational systems on the state and local levels began to change or develop new curricula to reflect more technology use within schools (Phillips, 2002).

In the early 1990's, educators began to look at technology from the perspective that technology was a discipline of its own separate from science that was best taught through a variety of methods including experiential learning (Snyder, 2004). At this time, the emphasis of technology shifted from computer programming to the use of word processing, spreadsheets, and databases (Means, 2000). Software began to appear that addressed academic content areas, although these programs were not used as frequently as office applications (Means, 2000).

Reform in technology education failed in the early 1990's, mostly because computer companies' software did not match up well with school district's curriculums. The software provided by the computer companies during this time focused on the basics which could only be used for drill and practice (Means and Olson, 2002). During the late 1900's and early 2000's, technology education as an individual content course was in the developmental stages (Phillips, 2002). Educators and technologist realized that no single curriculum area can achieve the goal providing American students with quality technological experiences. They recommended that existing curricula in science, social science, and other subjects also need to deliver technology subject matter, thus, requiring school district to properly restructure and redirect their curricula once again (Pearson and Young, 2002).

Politics and Technology

In 1996, President Clinton challenged the American Educational System in his State of the Union address. He wanted to see all classrooms across America connected to the

information superhighway (Internet) and well trained teachers in order to get America's students ready for the 21st century. This was known as Clinton's American technology literacy challenge (Clinton, 1996). Later that year, the U.S. Secretary of Education Richard W. Riley released the nation's first educational technology plan. This plan was designed not only to increase the use of technology in public schools but, also for the technology to be used effectively and efficiently in elementary and secondary education to help the next generation of school children to be better educated (United States Department of Education, 2004).

This technology plan was revised in 1999 once some of the short comings from the plan were identified. The new version of the technology plan addressed those short comings and incorporated the corrections into the future goals that the United States Department of Education wanted to achieve. These technological goals held that schools and children needed to have better access to computers, they needed access to the Internet in their classrooms, teachers needed professional development in the use of technology, and schools needed to have access to better digital academic content (United States Department of Education, 2004).

In 2002, President George W. Bush signed into law the No Child Left Behind Act of 2001 ("NCLB"). This act introduced a rigorous plan for education reform, challenging the nation's schools to increase student achievement and teacher quality (The Journal, 2005). A goal of the NCLB Act was to use technology to close the achievement gap between minority students and majority students. NCLB emphasized reporting student achievement data by disaggregating students by categories (male, female, race, special education, socio-economic

background, etc.) The NCLB Act placed an additional emphasis on states, districts, and schools to address those issues and report on the progress being made (THE Journal, 2005).

A second technological goal of the NCLB Act was to have all students technologically literate by the end of their eighth grade school year. The definition of "technologically literate" was left up to each state (Fletcher, 2004). The accountability section of the NCLB Act also extended to professional development programs aimed at the integration of technology into the curriculum. That goal of the NCLB Act required states to show how they would ensure that technology was integrated throughout all of their curriculum and instruction by Dec. 31, 2006. NCLB mandated that 25% of technology funds be devoted to high quality professional development in technology. In addition, NCLB required that technology professional development was ongoing, high in quality, and based on relevant research (Fletcher, 2004).

On the state level, Georgia has been operating under the Quality Basic Education Act of 1985 for over a decade. Governor Roy Barnes of Georgia envisioned a new roadmap for the improvement of teaching and learning in Georgia public schools (Jacobson, 2001). Governor Barnes assembled the Education reform study commission of 2000 in June of 1999 and during his speech to them he unveiled House Bill 1187, formally entitled “The A Plus Education Reform Act of 2000” (Georgia Department of Education, 2004).

House Bill 1187 proposed to increase student academic performance by holding local school systems accountable for student academic achievement (O’Neal, 2000). Most of the responsibility for implementation of House Bill 1187 rested with administrative personnel who were responsible for the supervision, evaluation, and staff development of all certified staff. House bill 1187 was passed by the Georgia Education Reform Commission in March

of 2000 and was signed into law later that same year (Georgia Department of Education, 2005).

In1995, the state of Georgia conducted a needs assessment on teachers' and principals' knowledge and use of technology within their schools. The results of the needs assessment indicated that over 40% of elementary, 37% of middle, and 25% of high school teachers gave themselves a "low" rating on their knowledge regarding the effective use of technology. Approximately 75% of all the teachers rated their level of access to technology-based in-service training as low or medium. Over two-thirds of elementary, middle and high school teachers rated their administrators' knowledge of effective technology as low or medium. Thus, there seemed to be a clear need for training that would provide teachers and administrators with the skills necessary to effectively integrate technology into the K-12curriculum (Georgia Department of Education, 2005).

Georgia's House Bill 1187 (2001) had a technology mandate that required teachers who held a renewable certificate to pass a computer skills competency test before they could receive certification renewal. This could be achieved by the successful completion of the phase one InTech training model at a state educational technology training center or a State Board of Education approved redelivery team (Georgia Department of Education, 2004)

Although some schools have made great strides in helping their teachers learn to use basic technological tools - such as a word processor, the In-Tech Project involved training teachers to use the computer and related technologies to support and enhance existing curriculums and to provide a catalyst for fundamental change to take place in the teaching and learning process (Georgia Department of Education, 2004).

Use of Technology by Teachers

Benchmarking, defined as "the process of identifying, learning and adapting outstanding practices and processes from any organization, anywhere in the world, to help an organization improve its performance," was being used by teachers to understand the principles and the specifics of effective practices (Auluck, 2002). Teachers used computers to store and interpret benchmarking data such as standardized test scores, online assessment test, performance tasks and individual test constructed by the teachers' themselves. Teachers used this information to identify the best teaching methods and strategies utilized and incorporate them into their daily teachings. (Epper and Bates, 2001)

Epper and Bates (2001) suggested that the degree to which teachers used technology in their classroom increases as they go through four process stages. The first stage of the process was faculty and staff access to the technology. Has the school provided the necessary tools so that teachers have access to technology? The second stage that increased the teacher's use of technology was awareness. Did the teachers know what resources and software were available and how to use them within their school setting and classrooms? The third stage is mastery. Did the teachers who used the technology master it and were they able to effectively incorporate it into their teaching and daily lessons. The last stage was application. The application of the technology only occurred if teacher's achieve the first three process stages.

Principals' Attitudes about Technology

In the last decade of the twentieth century, many school principals began to realize that incorporating new technology in their schools was expensive by itself. The wiring of older schools, electrical upgrades, high-speed internet access and the purchasing of up to date

equipment to allow every student access was costly. Not realizing and planning properly for the supporting factors of technology was even more expensive. Principals learned that technology integration was not a one-time funding of hardware, but hardware investment was only just the beginning when adding new technology within a school. Support services, training, and replacement of cost became more expensive than the initial cost and therefore, required ongoing budgeting and planning by school principals (Epper & Bates, 2001). Even if schools were completely wired and had the latest technology did not signify or prove that it was being used wisely and appropriately. Change was occurring at such a slow rate that it was becoming harder and harder to justify implementing a full scale technology program (LeBaron and Collier, 2001).

Statement of the Problem

As of 2001, with the passage of NCLB, the United States and its citizens were demanding accountability in schools. They were also seeking more challenging curricula, higher standards, and higher test scores. They were attempting to address and meet the needs of those students who could not or did not make educational progress at the same rate as other children. From President Clinton's technology literacy challenge, President Bush's No Child Left Behind Act of 2001 to Georgia's Governor Barnes passage of the A Plus Education Reform Act of 2000, incorporating technology into the educational system was one of many strategies that the federal and state governments were suggesting to achieve student performance goals.

The technological world had much to offer the field of education, and students enrolled in 21st century schools had much to learn to be prepared for the global world. Educators saw many potential benefits of incorporating the latest technology into their school

systems and classrooms. Some educators already used technology in their classrooms and have incorporated it into their daily lessons, while others were still resisting it and were unwilling to change. It was important to assess the current use of technology, how often teachers used it, and the factors that influenced their use of it in order to assist current and aspiring teachers who have an impact on student learning. The factors that contributed to educators' use of and confidence with technology needed to be identified to inform professional development programming, as well as to provide individual assistance to teachers.

Purpose of the Study

Incorporating new ideas, strategies, and programs were a part of the job of an educational leader. In some situations, a specific step-by-step process or procedure was used as a guide by educational leaders to assist them through an implementation process. When educational leaders implemented new technology into a school, they typically identified any researched processes and procedures they used. Educational leaders were front runners in the use of computer technology. They generally have an identified level of training concerning technology and an identified level of technology standards and qualities. Therefore, the researcher of this study investigated factors that related to the use of technology by Georgia elementary school teachers within their classrooms. The purpose of this study was to investigate the relationship of different factors, including leadership, on elementary teachers' technology use.

Research Questions

One goal of educational leaders was to get teachers to use technology in their classrooms on a daily basis. The strategies and processes the technology leader used while

implementing the technology may have influenced on whether teachers did or did not use it in their classrooms. Therefore the researcher investigated the relationship of different factors, including leadership, on elementary teachers' technology use. The following questions guided this study:

1. What technology equipment was currently available for use in the delivery of classroom Instruction?

2. To what degree was technology being used by teachers in Georgia public schools for the delivery of classroom instruction?

3. What was the relationship between teachers' attitudes toward technology and the use of technology within their school?

4. What was the relationship between principals' attitudes toward and support of technology and technology use within their school?

5. What was the relationship between schools selected technology procedures and the use of technology within their schools?

Significance of the Study

A technological goal of the No Child Left Behind Act of 2001 was that all students would be technologically literate by the end of their eighth grade school year. If students were to really gain the benefits of technology within a school setting, school districts and local schools must fully commit to its use and create a culture that was guided by the concept that technology was important. Technology should not only play an important role in the school systems' day to day function, but should also be a major part of the school's curriculum and the teacher's daily lessons. This study may be used by practitioners to help

them develop more friendly based software and implementation strategies for school systems that can be shared during professional development sessions.

If a school culture of this type was to exist, the school system, the principal and the school's faculty and staff must share a goal and vision of why the technology was needed and how it would be used within the school. There are many educational leaders in American school systems today, but there are few educational technology leaders. The process of how leaders implement technology was very critical if a technology-rich school environment was to be achieved. School leaders played a significant role in the successful use of technology within the school by their teachers. This study introduced strategies and techniques that school leaders could use while taking their school's through a change process.

This study was significant because it provided educational leaders with relevant information on how to implement new technology with in their schools. This study introduced educational leaders to the barriers that keep teachers from using and incorporating technology into their curriculum and daily lessons. The information from this study may help principals, teachers, and technology directors make informed decisions when selecting and attending professional development training and may assist in the training of new upcoming technology leaders and principals. This study may help state government and local school districts develop technology policies that would foster technology use for instructional purposes and not just for management purposes.

This study was significant to the researcher because the researcher was aspiring to be a school principal in the future. The researcher wanted to build a school culture with technology as its focal point. The information gained from this study was useful to help

establish a school climate and culture where technology was used on a daily basis by faculty, staff and students.

Procedures

In order to address the questions of this study, the researcher utilized a correlational, quantitative research design. Through a questionnaire, information was gained from data for the purpose of investigating the relationship of different factors, including leadership, on elementary teachers' technology use.

Specifically, the design was a non-experimental, descriptive, correlational research study. Correlational research allowed the researcher to analyze relationships among large numbers of variables within one study. Regression analyses were used to make predictions. Correlational research does not determine cause and effect, but correlational research does allow insight into relationships that exist in complex organizations, such as schools (Gall, Gall, & Borg, 2003).

The sample in this study consisted of 355 third grade Georgia elementary school teachers. In order to maximize the return of the questionnaires, the researcher provided two ways for the participants in the study to return them. First, the researcher provided a pre-stamped self addressed envelope for the participants to return the questionnaires, by mail. The envelope was part of the survey package. Second, the researcher created a web page with the questionnaire on it. The participants were able to take the survey on-line (the web address was provided on the instruction page in the survey package). The participants also were asked to submit comments. The data collected from the hard-copy questionnaires and from the online questionnaires were transferred to SPSS. Descriptive statistics, Pearson's Correlation and regression analysis were used to analyze the data. The findings were reported

in Chapter 4, and in Chapter 5, the researcher discussed findings and presented conclusions and implications of the study.

Assumptions

In this study, one assumption is that increased student leaning may be influenced by teachers' use of technology. It is assumed that having access to technology will influence teacher and student use of it. It is assumed that not all schools included in the study would respond in a timely manner, and that some would not participate, but those who did would answer truthfully.

Delimitations

- This research study was delimited to third grade elementary school teachers in the state of Georgia without regard to demographic information about the teachers. The researcher chose not to identify demographic characteristics of the participants involved in the study, thereby assuming that years of experience, would not relate to knowledge needed to complete the survey.

Limitations

- There are many factors that may affect the use of technology within a school that the principal and teachers have little control over, such as policy (House Bill 1187) and (NCLB ACT of 2001), state guidelines, money and budgets to purchase new technology, compatibility of old technology to new technology and school level., etc.
- Some school districts limited responses to surveys by Board policy. Therefore, the researcher was unable to obtain data from certain districts included in the pool of potential respondents.

- The quality of the responses to the surveys is related to the honesty and perceptions of the participants. The teachers were asked to estimate the number of times they use technology, and their estimates cannot be verified. The researcher did not envision teachers keeping records of all the times they use technology throughout the school week, month or year.

Definition of Terms

Technology – Technology is people using their knowledge, tools, and products that have audio and/or visual capabilities, such as; computers, digital and video cameras, computers, internet and e-mail to improve their ability to do work. (Oldenziel, 2006).

Principal – A person who holds a position of presiding rank as the head of a elementary, middle, junior high or high school (Boris and Langer, 2002). For this study, the principal is the educational and technology leader.

Computer – An electronic device that has a central processing unit (CPU), hard drive, monitors, video display, key board and mouse use for manipulation (Talbot, 2005).

Elementary School – A school that has any combination of grades from Pre-Kindergarten to fifth (Dugger, 2004).

Technology Education – An individual content course with a curriculum designed to provide students with quality technological experiences (Bailey, 2004).

Database – A collection a data arrange for ease of search and retrieval (Lockhard and Abrams, 2004).

School Selected Technology Procedures – Rules or guidelines that teachers follow while using the schools technology.

Summary

The phrase "Knowledge is power" has been use from generation to generation and in some instances was seen as the key to success. Today's generation revolves around the acquisition of knowledge or information ranging from struggling family owned local businesses to multi-billion dollar corporations. Technology was the resource that helped provide the requisite information needed for government, business and education.

Today's society was going through a major change process that was allowing its citizens to see first hand the technologically advances that were being made and in what direction the changes will take them. People need to be prepared and trained to use this future technology in order to meet the demands of the workplace. New generations of people to be successful productive citizens and to make the transition to the technical environment of the workplace was both the mission and the responsibility of educational school systems.

The public educational school system was the first line of training the youth of today to be technology literate for the future, however, programs must first be in place and policies consistently implemented in all Georgia schools. The school principals were key players in this process and were ultimately responsible for directing the implementation, operation, and evaluation of the technology use, curriculum and programming within their schools.

Computers along with other technologies can be effective tools for instruction to help increase student achievement and performance. Some teachers were adequately trained and prepared to use technology in their classrooms. Other teachers have only a superficial technology background and therefore, were able to teach using the latest technology effectively and they were uncomfortable using it.

However, a key to having more teachers use technology on a regular basis in their classrooms was for principals to identify the barriers that were preventing or hindering their teachers from using the technology. When these barriers are identified, principals must provide adequate treatment and services the help them overcome those barriers. Principals must make arrangements for their teacher to have professional development training and plan for these situations when they begin the process of implementing new technology into their schools (Cuban, 2001).

When incorporating or implementing new technology into a school or system, it was very important that the goal and vision of principal was known and shared by co-workers and teachers. It should be clear how the computers and other technologies were to be used and how the technology was going to benefit the school. It was imperative that the technology was purchased with the purpose of achieving the schools goal or vision and not because a technology sales man gave the school a good deal (Picciano, 1994).

The planning for implementing technology was a long term process that will require principals to lead their faculty through phases of change beginning with letting go of past traditions and embracing this new technological era (Gatlin, 2004). Going through the process of change was a long term progression of steps and procedures. Principals directing their schools through a change process must confront the reality of their current situation and be fully committed to the conversion if they expect to facilitate the transformation of their schools (Collins, 2001).

CHAPTER II

REVIEW OF RESEARCH AND RELATED LITERATURE

Introduction

The technology age (information age) is no longer coming; it is here and rapidly changing. Computers have become pervasive in today's world. No matter what business or occupation you examine, you will most likely find computers playing an important role in their day to day functions. In the past decade, a new urgency for technology education has emerged. While complex factors have influenced the decisions for where, what, and how technology is introduced into our nation's school systems, ultimately, the schools will be held accountable for these investments. In order for schools to make good of or a realization of the promise technology may hold on student achievement, several factors need to be in place to encourage, influence and support the effective use of technology by teachers in their classrooms.

History of Technology in Education

Technology can legitimately be traced back five or six thousand years ago to a calculating device developed by the Chinese called the abacus which still used today. Technology used in education could be trace back as far as the mid seventeenth century. John Amos Comenius illustrated the first text book which was considered visual educational material (Small, 1990).

In 1671, the first digital adding, subtracting, multiplying and dividing machine were developed by Baron Gottried Wilhem von Leibnitz. His machine led to the construction of the desk top calculator developed by the Earl of Stanhope in the late 1700's and eventually to

the portable hand held solar and graphing calculators that are used in schools across the world today (Burke, 1986).

Due to technological advance in the early 1900's in radio broadcasting, sound motion pictures and sound recording, interest in the educational community grew thus sparking the audiovisual instruction movement. During this movement, many textbook on the topic of audiovisual technology were published. During World War II, the purchasing and use of audiovisual equipment slowed in the field of education, but was purchased and used extensively by the military to train new recruits, plain strategic attacks and for communication purposes (Reiser and Dempsey, 2002).

Motion pictures (films) were introduced into the classroom in the early 1900's. Films were seen as an alternative way to interpret the spoken and printed word. Instructional films stirred emotions and interest while taking up less instructional time and provided a concrete medium for the students. In early1910, a 336 page catalogue of educational motion pictures was published by George Kleine. This catalogue listed over 1000 films that could be used in the field of education. Thomas Edison owned a rental library that contained most of the suggested films by Kleine. The first school use of films was in late 1910 in a New York public school. Over the next ten years, black shades, silver screens and 16mm projectors became standard educational technology tools in classrooms all across America (Mehlinger, 1996)

In the early 1920's, a conscious effort was made to incorporate the radio as an instructional tool in the educational system. School systems all across America encourage their local radio stations to set aside 30 minutes each day to promote educational programs and discuss educational platforms. The educational broadcast programs included historical

biographies, book discussions, civic lessons, current events aimed at elementary and secondary students, farming, science programs and music appreciation (Mehlinger, 1996). The State Departments of Education from some states including California, New York, Puerto Rico and Massachusetts joined in on trying to educate students, parents and communities over the radio waves by broadcasting regular weekly programs which focused on school curricula, programs, and tests (Cuban, 1986).

The radio as an educational technology device did not become a standard tool of instruction in many American school classrooms. Federal regulation problems, commercial development of the airwaves, school schedule difficulties along with 50% of the school systems across the nation not able to afford radio-receiving equipment and the emergence of the television as an educational tool led to the demise of the radio in education by the late 1950's. Very few radio stations still broadcast educational programming in the United States today. (Cuban, 1986)

In 1953, the Federal Communications Commission (FCC) allocated 242 television channels for educational purposes. This came about because of the pressure that was put on the FCC by educators who saw a strong promise for the new medium and radio station's concern for the amount of television channels being allocated for commercial interest. In 1962, President Kennedy secured appropriations from congress allocating $32 million dollars for the development of classroom television. By 1971, over $100 million dollars were spent by public and private sources for the development of classroom television (Cuban, 1986).

When the interest in instruction television began to fade, the next break through technology that sparked the interest of the educational community was the computer.

In the field of science and technology, it was not uncommon for different scientist and inventors to be working on the same concepts, finish its development, and had it operational unknowingly to each other. This was the case in trying to determine who was or should have been credited with the creation of the first electronic digital computer. The first computer-based education programs were developed on mainframe and minicomputers in 1959 on the campus of the University of Illinois (Merrill, 1992). Most of the computer assisted instruction (CAI) programs designed for use in public schools were developed by researchers at IBM during this time. By the January of 1983's, computers were in 40% of all elementary schools and 80% of all secondary schools in the United States. The invention of the computer brought drill and practice applications, problem solving, simulations, games, word processing, graphics drawings and presentation software in the classroom for teachers to use when and how they chose to (Reiser and Dempsey, 2002).

Educational technology has advanced so much that educators can teach classes live without being in the same room as the student. Educators today can use Internet-based learning and distance education as methods for delivering courses. WebCT and Blackboards (Active board) are only a few software packages that can be used for electronic learning (e-learning). Internet-based learning allows the instructor to use web pages along with sound, video and interactive hyper-media to deliver instruction (Burgess, 2003).

A research study was conducted in an optional microbiology course by a professor at Nottingham Trent University in Britain. He wanted to know what effect internet-based leaning have on student performance compared to traditional methods of teaching a course. The researcher in this study used three sample cohorts with similar educational backgrounds. Cohort one had 38 students and was taught in a traditional classroom method where the

professor lectured and used transparencies. Cohort two had 37 students. They were also taught in a traditional classroom method of lectures and transparencies, but they were also strongly encouraged to go on-line to download and use the power point lecture notes that their professor published on a limited internet site. The third cohort had 27 students. This sample group was told to just download the power point lecture notes their professor published on-line. Using the end of the year final exam to compare the three cohorts, the results of this study showed that there was no significant difference in examination mark between the three cohorts. Therefore, the researcher in this study concluded that internet-based classes are just as effective as the traditional methods of teaching (Hammonds, 2003).

Distance learning is the transporting of instruction from one place to a multiple of other places via telecommunications. Universities have moved to Internet-based courses to attract students not able to attend traditional classes for various reasons. In public schools, video conferencing technology was use for special projects. Instructors from places like Fort Discovery or Sea World could use a video camera to teach a class on marine life and the students could actually see the animals live (Hazari, 1998).

The rapid development of new technology was challenging school systems to adopt this information and communication technology to support teaching and student learning (Kankaanranta, 2004). This rapid growth in technology made it hard to find instructors who can utilize it effectively. A lack of infrastructure (network wiring, computers, and electrical outlets) and program software made it very hard for teachers to incorporate technology into their daily lessons (Kankaanranta, 2004).

Federal Policies Related to Technology in Education

Throughout American history, there have been many cases in which the federal government has developed or established programs that had a major effect on the educational system. The federal government's emphasis on technology in education began with the Reagan administration. The Star Schools Program was launched in 1988 and focused on improving student learning in disadvantaged and underserved communities through the use of telecommunications. The program was funded $34 million in fiscal 2000 (Read, 2002).

The federal government began to emphasize technology in education even more during the Clinton administration. The Clinton administration established four goals under the President's Clinton's Educational Technology Initiative. The first goal was all the teachers in the nation would have the training and support they needed to use the latest technology in their classrooms and to help students learn using computers. The second goal was all teachers and students would have access to modern multimedia computers in their classrooms. The third goal was every classroom would have internet capability and the last goal was effective software and on-line learning resources would be an integral part of every school's curriculum (Chapman, 2000).

The United States Department of Education under the direction of Linda Roberts had developed several technology grant programs. The programs supported technology use in U.S. pubic schools and used President Clinton's initiatives as a criteria base. One of the first programs established was the Technology Literacy Challenge Fund. It was launched in fiscal 1997. This program provided grants to schools that were trying to pursue the four initiative established by President Clinton. Over one billion dollars in grants were awarded from 1997 to 2000. Preparing Tomorrow's Teachers to Use Technology was a grant program for

supporting new teacher training. Different groups and institutions that received this grant were required to work with school districts or nonprofit organizations to train teachers in the latest technology. This program issued about $75 million in grant money in the year 2000 alone. The Technology Innovation Challenge Grants was established in 1998. The grant supported innovative and effective uses of technology in classrooms in mostly low income areas. The program was funded $333 million from 1998 to 2000 (Chapman, 2000).

Many other federal grant programs assisted K-12 schools in technology and were found in agencies as diverse as the National Science Foundation, the Department of Energy, the National Aeronautics and Space Administration, the Department of Energy, and the Department of Commerce. The federal technology budget for K-12 education was immense and diverse, but only a small part of the picture, as the federal government has traditionally left most education funding to states (Coppa, 2004).

No Child Left Behind

Two National Technology Plans were produced under the Clinton administration. One plan was released in 1996 and the other in 2000. As a reauthorization of the Elementary and Secondary Education Act, congress passed the No Child Left Behind Act of 2001 (NCLB). It was signed into law by President Bust in January of 2002. NCLB was the first National technology Plan released under President Bush's administration. It was released a month after he signed a spending bill cutting the main federal block grant by 28 percent. The grant was used to purchase technology by schools by. The grant dispensed $692 million to states and school districts in fiscal 2004 (Trotter, 2005).

The technology part of The NCLB Act of 2001 (also known as Enhancing Education Through Technology) has many goals and standards which emphasizes the improvement of

student achievement in academics with the use of technology in elementary and secondary schools through integration initiatives, building access, accessibility and parental involvement (Cunningham, 2003).

Building a technology infrastructure was essential for effective technology use in schools. This infrastructure included integrating technology into the classrooms, media center, administrative offices and district offices. It allowed for technology integration in the school's curriculum and communication of information to the public. The school's access standards emphasized communication between educators. This standard also called for public access to student data such as student achievement evaluation results through the use of electronic assessment methods. The NCLB stressed the importance of providing technology integration and technology literacy for all students, including students with disabilities, racial and ethnic minorities, low-income students, and English language learners (Cunningham, 2003).

Another goal of NCLB was to provide technology training and accessibility for parents, so they may support the academic achievement of their children. Electronic access to student data would be available to parent and in turn would promote family involvement in student's education. NCLB also emphasized the effective integration of technology into the professional development for teachers, principals and other school staff. The training from instructional staff would establish research-based methods that can be replicated as best practices. State and local educational agencies would provide professional development so all educational staff can integrate technology effectively into their jobs. The educational staff was comprised of in-service and preservice teachers, paraprofessional, library media specialist and administrators (Lemke, 2003).

Some specific goals of NCLB were to improve student academic achievement through the use of technology in elementary and secondary schools, and to establish research-based instructional methods that could be widely implemented as best practices by state and local educational agencies. Another specific goal of NCLB was to ensure that every student was technology literate by the time they reached the eighth grade regardless of their race, gender, ethnicity, family income, disability or geographic location. The standards for this goal were called the National Educational Technology Standard for Student and were developed by the U.S. Department of education and the International Society for Technology in Education (ISTE). The standards for this goal focused on creativity, and innovation, communication and collaboration, research and information fluency, critical thinking, problem solving and decision making and technology operations and concepts. Each standard contained specific proficiencies necessary for a student to be considered technologically literate (Lemke, 2003).

In an effort to determine the effectiveness of educational technology on student performance, The United States Department of Education has invested more than $56 million to study the conditions and practices under which technology was used to document its impact on student performance. No study on educational technology has used experimental methods on such a large scale. Technology was constantly changing at a fast rate and was very expensive. Therefore, a goal of the studies was to ensure that knowledge gained from them was immediately useful for contributing to schools and teachers (Bailey, 2004).

Federal, state and local educational technology communities began to invest in research and evaluation studies to better guide the effective use of their investment, as well as, to demonstrate to policy-makers the impact technology on teaching and learning. The

results of these efforts should enable the educational technology community to be in the forefront of evidence-based research on educational practices involving technology. In an effort to help address this need for the data, the U.S. Department of Education invested more than $56 million to study the conditions and practices under which technology was used to document its impact on student performance (Bailey, 2004).

State Government Policies Related to Technology in Education

After operating under the Quality Basic Education Act for more than ten years, Georgia educators found themselves facing a new roadmap for the improvement of teaching and learning in public schools. The unveiling of Governor Roy Barnes's Education Reform Act of 2000 also known as House Bill 1187 was met with concerns from teachers and administrators in the public schools of Georgia. (Jacobson, 2001).

Georgia Governor Roy Barnes assembled a commission known as the Education Reform Commission of 2000. Governor Roy Barnes, in a speech delivered to the Georgia Education Reform Commission of 2000, said:

My simple charge to you is this: Let us come to the table and pool our best ideas, let us bring our best-hearted intentions, and let us steel up our best resolve to ensure for our children tomorrow a better system of public education than we find today. (Georgia Education Reform Commission, Governor Roy Barnes's Charge, 2000)

House Bill 1187 was passed by the Georgia General Assembly in March 2000. The bill was intended to be a comprehensive education reform statute designed to increase student academic performance. The bill was also designed to hold local school systems accountable for student academic achievement. There were numerous provisions of House

Bill 1187 regarding teachers. The reforms in technology stated that all certificated personnel must meet the technology requirement of House Bill 1187 by June 30, 2006 (Eady, 2002).

New teachers and current teachers seeking recertification would have to demonstrate competence in technology use through a computer skills competency test. In lieu of this test, teachers may participate in the state's 50 hours model Integrating Technology (InTech) training programs at one of the state's technology training centers or from and InTech training team approved by the state board of education (Eady, 2002).

The goal of the InTech project was to offer teachers an extensive, curriculum-based professional development program that provided them with the training they needed to successfully incorporate technology into the Georgia K-12 curriculum. The program also trained and assisted administrators as they supported and encouraged their teachers in that endeavor. InTech project was designed to enhance the existing K-12 curriculum using modern technologies as a catalyst for fundamental changes in the teaching and learning process. Using professional development to redesign teacher's delivery of instruction and build teacher's skills, the InTech project focused on five critical areas of technology to improve. Georgia's Five technology professional development target improved student achievement by: 1) focusing on Georgia's Quality Core Curriculum Standards, 2) using modern technological resources, 3) incorporating these technological resources into new designs for teaching and learning, 4) developing and using classroom management strategies which enable effective use of technology in the classroom, and, lastly, 5) blending these components into a new and enhanced classroom pedagogy (Georgia Department of Education, 2002).

The entire InTech program was built upon the theme of curriculum integration. Each activity during the InTech training was related to a model lesson based upon Georgia's Quality Core Curriculum (QCC) objectives. The model lessons demonstrated technology integration in science, mathematics, social studies, and language arts. InTech taught teachers how to use technology in their classrooms. The activities throughout the InTech training provided teachers the opportunity to use presentation software to display and present information, use e-mail to expedite professional communication and collaboration, select and use appropriate peripherals to support instruction (printers, projection devices, digital cameras, scanners), apply technologies to provide whole group, small group and individual instruction, use technology-based activities to facilitate active student learning and many more opportunities (Georgia Department of Education, 2002).

In 2004, Traci Redish (researcher) the director of the Educational Technology Training Center on the campus of Kennesaw State University conducted a research study on Georgia's one year technology professional development program known as InTech. The purpose of the research was to determine effective integration training methods and content for use in technology professional development programs designed to train teachers to use computers and related technologies (Redish, 2004).

Some research questions that were addressed in her study were, what effect did the InTech Project have on the number of times and the amount of time per week the teachers let the students use computer technology?, and what effect did the InTech Project have on the number of minutes spent planning, and preparing for technology use in the classroom by the teacher? Other research questions addressed in the study were, what effect did the InTech Project have on teachers' self-reported skill level with computers and related technologies?,

and what effect did the implementation of technology have on the overall teaching and learning process (Redish, 2004)?

Third, fourth and fifth-grade teachers in 359 elementary schools in 12 school districts in Georgia were given the opportunity to apply to participate in the InTech Project Study. Once applications were received and qualifications verified schools were contacted to confirm their participation. The final sample population consisted of 71 third, fourth and fifth grade school teachers from 28 schools representing 7 school districts in the state of Georgia. The subjects were divided into three groups based on the dates they attended the summer training. Three different training approaches applied to the three different groups of teachers. The three training groups were (a) Skill/Integration Group (S/I), (b) Integration/Skill Group (I/S), and (c) Skill and Integration Group (S&I). Group 1 (S/I) included 25 participants, Group 2 (I/S) included 23 participants, and Group 3 (S&I) included 23 participants. All three groups received two weeks of training during the summer augmented by four additional training days during the following school year. The first week of training for the S/I group focused on the development of skills with various pieces of hardware and software. The second week for the S/I group focused on curriculum integration. The content for the I/S group was reversed. The first week of training for the I/S group focused on curriculum integration. The second week focused on the development of skills with various pieces of hardware and software. For the S&I group, skill development and curriculum integration were combined during both weeks of training (Redish, 2004).

A pretest-posttest, nonequivalent multiple-group quasi-experimental design was used in this study. Quasi- experimental research involves the "use of intact groups of subjects in an experiment, rather than assigning subjects at random to experimental treatments. The

teachers who participated in the InTech Project were "intact" in the sense that they were self-selected and chose to apply to participate in the project study.

Five instruments were used to collect data for this study. Four of the instruments were developed by the researcher, field-tested, and revised according to relevant findings. A Demographics Questionnaire was developed to collect data that would provide a description of the sample population such as, gender, age, educational level, and teaching experience. The Teacher Questionnaire was a self-report survey developed by the researcher to assess the level of technology implementation demonstrated by the participants. A Skills Survey was developed for this study to assess the participants' perception of their hardware, software, and integration skills. A Microcomputer Utilization in Teaching Efficacy Beliefs Instrument (MUTEBI) was used in this study to assess the participants' computer self-efficacy. An InTech Project Summative Evaluation was used to determine what components of the InTech Project participants viewed as the most useful in enabling them to integrate technology into their curriculum (Redish, 2004).

Data were derived from pretest measures given at the beginning of the InTech Project Study using the Teacher Questionnaire, Skills Survey, and MUTEBI instruments. The same three instruments, along with the InTech Project Summative Evaluation, were used at the completion of the InTech Project as posttest measures. Data were analyzed using Statistical Programs for the Social Sciences. A 2 x 3 repeated measures factorial analysis of variance (ANOVA) was used to analyze the data. The between subject variable (GROUP - S/I, I/S, S&I) had three levels corresponding to the three types of training approaches. The within variable represented the number of repeated measures (TIME -pre/post) (Redish, 2004).

After conducting the study and analyzing all the data, the researcher found no significant interactions for any of the dependent variables (research questions), but found that all the dependent variables yielded significant main effects for TIME (pre/post). The researcher made the following conclusions based on the study findings and other related finding. All three training approaches (S/I, I/S, S&I) proved to be equally effective in their impact on all the dependent variables (research questions) under investigation. Teachers dedicated more class time to the overall use of computers and related technologies. Teachers increased the number of different types of software programs used in their classroom. Teachers increased the amount of time they spent planning and preparing for the use of technology in the classroom. Teachers experienced an improvement in their overall hardware, software, and integration skill levels. Teachers experienced an increase in their self- efficacy beliefs concerning the use of computers in their classrooms. The nine major components of the InTech Project were considered vital to the success of the program. Teachers considered the InTech Project to be one of the most valuable professional development programs they have ever experienced (Redish, 2004).

Georgia's State Technology Plan

In the fall of 2001, Georgia's State Board of Education began working on the rough draft of a new Educational technology plan spurred on by the passing of No Child Left Behind Act of 2001 and Georgia's House Bill 1187 (Georgia Department of Education, 2004).

The purpose of the technology plan was to:

1. Establish how technology can contribute to statewide goals of improving student achievement in Georgia's K-12 public schools.

2. To publish common goals that will unite efforts of the Georgia Department of Education other state-funded education agencies and local school systems charged with improving education through technology.
3. To describe strategies that the Georgia's Department of Education will deploy toward goal attainment.
4. To outline an evaluation plan by which statewide progress toward common goals will be measured.
5. To serve as required documentation to the United States Department of Education (US DOE) for federal technology funding.

At the public meeting sessions, around 200 attendees consisting of state education agency staff, school system employees, parents, business representatives, and not-for-profit partners worked in groups to describe specific conditions, behaviors, and results related to instructional technology they hoped would become a reality in Georgia's schools over the next three to five years. The collaboration of different groups resulted in the developing of the visions, goals and objectives for the technology plan (Georgia Department of Education, 2004).

With the implementation of the technology plan, Georgia's State Department of Education envisioned that technology would be used in its schools across the state on a frequent basis. They also envisioned school systems using a full range of technological tools appropriately integrated into all grade levels and content areas to support learning. The technological tools used would focus on the Quality Core Curriculum (QCC), the Georgia Performance Standards (GPS) and core academic standards, especially in areas which promote higher-order thinking and problem solving. Georgia educators would use

technology to find new ways of teaching and assessing learning, develop instructional strategies targeted toward the needs of their students, and to enhance their own professional skills and knowledge. Parents could use technology to conduct basic business operations, such as registration and consent transactions, with the school, communicate with local educators, and monitor their children's academic progress.

Some of the goals and objectives of the technology plan were to:

1. Increase effective instructional uses of technology to address QCC and GPS learning standards in elementary and secondary schools.
2. Increase effective administrative uses of technology to monitor student achievement of QCC and GPS learning standards and to manage business operations in school systems.
3. Increase access for students, educators, parents, school board representatives, and other community members to information technology resources that can enhance student learning.
4. Increase educators' proficiency to use technology effectively to enhance student learning and business operations in elementary and secondary schools.
5. Increase broad-based community support for Georgia's vision for effective technology use in schools.
6. Increase the capacity of school systems to provide the high-quality system support necessary to realize effective technology use.
7. Achieve and/or maintain equitable access to high-quality technology programs for all students.

Some of the strategies that Georgia's State Department of Education used to meeting the goals and objectives of their new technology plan were to:

1. Establish a stable funding source for previously-funded instructional technology programs in Georgia public schools.
2. Fund one local technology specialist in each Local Education Agency (LEA) for each 1100 Full-Time Equivalency (FTE) Teachers.
3. Provide Title IID (Ed Tech) Formula Funds to LEAs for use in Title I schools.
4. Maintain and upgrade state network for Internet access.
5. Fund a full-time DOE position for management and development of statewide network and operate administration.
6. Fund staff and programs at 13 Educational Technology Training Centers (ETTCs).
7. Expand Georgia Learning Connections content to include a database of technology-based learning resources aligned to the QCCs and GPSs.
8. Support and monitor Professional Standards Commission's existing technology proficiency requirements for certification and re-certification.
9. Provide technical support and tools to enhance system-level technology planning processes and to enhance program evaluation at the local and state levels.

In order to determine progress as outlined the State of Georgia Technology Integration Plan, a three-part evaluation plan was developed. Part one focused on measuring progress for the major objectives of the plan such as, instructional uses, administrative uses, access, educator proficiency, and system support. Part two of the evaluation plan monitored equitable growth in these major objectives for all students in Georgia. The last part of the evaluation plan focused on measuring technology's contribution toward student achievement

in settings where the main objectives were being met. Georgia's state board of education began collecting data for the evaluation process in the fall of the 2006. The data is still being analyzed. The information gained from the results of the data will be used to reinforce, modify and improve on the next state k-12 technology plan (Georgia Department of Education, 2004).

Local Government Policies Related to Technology in Education

In December of 2000, the U.S. Department of Education established these National Educational Technology Goals:

Goal 1: All students and teachers will have access to information technology in their classrooms, schools, communities and homes.

Goal 2: All teachers will use technology effectively to help students achieve high academic standards.

Goal 3: All students will have technology and information literacy skills.

Goal 4: Research and evaluation will improve the next generation of technology applications for teaching and learning.

Goal 5: Digital content and networked applications will transform teaching and learning.

As the Department of Education prepared to issue new National Educational Technology Goals, school districts across the nation were trying to envision educational possibilities in the 21st Century by using technology more productively and weaving it more thoroughly into daily learning and teaching (U.S. Department of Education, 1998).

School districts all across America depend on multiple sources on federal, state, and local levels and the private sector to help fund technology programs within their schools. The combination of the various funding sources used on educational technology by public schools

in the United States reached a peak of $5.6 billion in 2001-2002. It was spending around $88.59 per student (Market Data Retrieval, 2004).

Having multiple funding sources lead to an overabundance of programs directed at and by different personnel in the educational system. The personnel in charge of those different funding sources have little overall strategic direction for technology infusion into their schools. Technology spending was declining and with a pending reduction in the number of technology dollars available, it was even more crucial for school districts to home in on the most critical factors affecting effective technology used with in their schools (Market Data Retrieval, 2004).

School systems across the nation began implementing official district wide technology policies. These policies consisted of technology plans with goals and objectives envisioning educational possibilities going into the 21st Century. School systems considered aiding their students and teachers to become skilled and knowledgeable in using technology in all its forms as a way to create a new environment where teachers, students, parents, and business can take part in the expansion of the human minds. School districts wanted the people in this new learning community to evolve into technological literate life-long learners and for their students to be able to interact successfully in a technological environment to achieve their personal, education, and workplace goals (Kent School District, 2007 and Bellingham Public Schools, 2007).

Local school boards of education recognized that as telecommunications and other new technologies shifted the way information was accessed, communicated and transferred by members of the society, those changes may also alter instruction and student learning. Specifics goal and objectives developed by local school boards of education

consisted of financing and building the proper infrastructure to incorporate the latest technology. School boards were also making a wide variety of media resources available to their students and faculty such as, computers, software, network connections, internet connections, and e-mail systems which were to be used solely for the purpose of supporting the educational mission of the school system and conducting the business of the school system (Jefferson County School System, 2007).

While implementing new technology into their school systems, local school boards of education were incorporating school expectation requirements for teachers and students in order to try and meet federal and state technology standards (Franklin Elementary School, 2007and Zwolle Elementary School, 2007).

Some specific policies and requirements passed by local boards of education and schools that influence technology use in the school by teachers were:

- Teachers must keep School Talk Recording System updated on a weekly basis in order to communicate with parents and the public about what is going on in their classrooms.
- All communications during school hours between the principal, faculty and staff will be done through email in order to reduce classroom disruption with the classroom loud speaker unless absolutely necessary.
- The school principal must observe each teacher using technology in a lesson at least two times during a school year as part of their yearly evaluation.
- Teacher's will the computer to keep student attendance and students grades.
- Teachers will successfully integrate technology into every curriculum area.

- All staff will demonstrate a proficiency in the use of word processing, spreadsheets, and student information systems.

Some policies and standards of expectation passed by local school boards of education and local schools focused on meeting state and federal technology standards. These standards not only influenced teachers to use technology, but they in a way forced teachers to teach students how to use technology because the students had to demonstrate that they can use it (Daniel Elementary School, 2007, Kent Public Schools, 2007 and Zwolle Elementary School, 2007). Some of these standards of expectation were:

- Every student entering grade four will possess and demonstrate basic keyboarding skills which will enable her/him to navigate through a web page and to construct and edit a basic word processing document.
- Every student will have equal access to an online experience on a weekly basis.
- Every student in grades 4-8 will demonstrate the ability to complete a research project utilizing technology and electronic and/or internet resources.
- Every student at the end of Grade 8 will demonstrate basic computer competencies including but not exclusive to the legal and moral ethics of technological sharing and transfer of information.
- All Students must demonstrate a sound understanding of the nature and operation of technology systems, including networked environments.

It does not matter if they are called rules, regulations, requirements, standards, policies or laws, in the field of education technology was seen as a valuable tool and all levels of government and the private sector have begun promoting and mandating its use by principals and teachers in the school and classroom.

Principal's Attitudes Towards and Support of Technology

School principals were now realizing that if change was going take place and the culture of their schools were going to become technology-rich, the use of technology must first start with them. Many principals embraced change by implementing the new technology and creating informational databases on their students (Flaherty, 2004).

Too much data can pose as much of a problem as not having enough. Being overwhelmed with data causes educators to lose focus and miss out on some valuable information (Golden & Erb, 2001). The assessment and reporting provisions of the No Child Left Behind Act (NCLB), along with the law's accountability provisions, have expanded the need for data collection, analysis, and reporting (Golden & Erb, 2001). Therefore, many principals were not only turning to databases to compute the numbers and interpret all the data collected, but they were letting the results of the data drive the school's curriculum and the teacher's classroom instruction in order to increase student achievement (Decker, 2003).

In a northern school system, the local schools gave a pre-standardized test at the beginning of the school year. The results of the test were input into their school's database where it processed the data by grade level and classroom teacher (Coppa, 2004). Each teacher was called in to meet with the principal and the school's improvement committee where they discussed what each classroom of students needed based on the database results. The teachers as a grade level developed simple curriculums and individually developed lessons to use for that particular school year. At the end of the school year, student test scores for the district increased more that year than it did any other year before they started using their database results (Coppa, 2004).

In a school system in Illinois, twelve teachers out of the district were selected to administer standardized tests provided by Achievement Builders Corp to their students.

Within twenty-four hours, statistical reports of the results were available and identified the student's weak area is math. The principals of the schools worked with teachers to help them tailor their instructions based on the results of the data. The computerized practice test was given four times throughout the year before the students took the real standardized test. At the end of the school year, all twelve teachers reported a class room average increase of at least 18 percentile points from the previous year. Some individual classes had increases of 34 percentile points, moving from the 40th percentile to the 74th percentile (Coppa, 2004).

All school principals do not have the same perceptions or attitudes about technology. Some principals believed that technology can be a major factor in increasing student achievement. These principals not only used computers on a daily basis, but they stressed the importance of and their support for computer usage within their school. They established long-term goals and implementation strategies for the technology and devised specific tactics to accomplish them. They tried to persuade their staffs to accept computer education as a priority and expected all of them to become computer users in their classrooms. They stressed classroom applications of technology during staff meetings, provided professional development training, ensured that their teachers have adequate time and resources for in-class computer use, and monitored every teacher's progress by reviewing instructional lesson plans and other written materials. These principals spent time in the classrooms, observed and talked with pupils and teachers as they used the computers and other technology (Gurr, 2001).

(Schiller, 2000) conducted a study on technology integration and stated that the key responsibilities of the principal were to develop a school vision that included integrating technology and to facilitate investment in the appropriate school infrastructure. Many of the

principals in his study stated that professional development on technology use was a major contributor to technology use within their schools. The consensus was that large workshops were of limited use in preparing teachers for technology integration in their classrooms, unless they were supplemented with individual tutorials and small-group interaction on a continuing basis.

The principals in the study reported that the following interventions were also helpful in getting their teachers to use technology in their schools:

- regular discussion about technology and frequent, brief workshops during staff meetings;
- one-on-one practice sessions during lunch breaks or after school;
- peer tutoring;
- team teaching with, and shadowing of, more experienced colleagues;
- encouragement to attend computer courses offered within the system and by other providers, such as technical colleges and private training companies;
- assistance from friends and colleagues who were more computer literate;
- use of "train the trainer" approaches; and
- Clear identification/appointment of a technology leader or leaders in the school.

Some principals were not sure about the roll that technology played in increasing student achievement and therefore, tended to just lay back and let nature take its course. They used technology in some instances, but have not stressed or suggested its importance of lack of importance to their teachers. In other words, the technology was available to the teachers and was up to them whether or nor to use it (Gurr, 2001).

Teacher's Attitude Towards and Uses of Technology

Despite the increasing presence of technology in schools and countless professional development classes for teachers, the consistent integration technology into daily classroom lessons was still a far cry from reality (CEO Forum, 2000). Many teachers used computers and other technology only as an addition to regular instruction or as a reward for pupils after their work was completed. They used the technology to extend traditional pedagogical practices (Riffel & Levin, 1997).

Budin (1999) stated that the placement of technology into classrooms without teacher preparation and curriculum considerations has produced high levels of anxiety among teachers. Most research on technology-related anxiety has been conducted in the area of computer anxiety and using computers as program or instructional management tools (word processors, grade books, databases, presentations, etc.)

Teacher's used computers to store and interpret benchmarking data such as standardized test scores, online assessment test, performance tasks and individual test constructed by the teachers' themselves. Teachers used this information to identify the best teaching methods and strategies utilized and incorporated them into their daily teachings. Teachers also used computers and other technology for things such as; to keep attendance, student's grades, to communicate with other teachers (email) and to look up resources to help them with lesson plans and other school activities (Epper and Bates, 2001).

Some teachers suggested that using technology effectively would increase student achievement. They also realized that seeing positive results were not immediate, it took time. Each technology was likely to play a different role in students' learning. Rather than trying to describe the impact of all technologies as if they were the same, researchers needed

to think about what kind of technologies were being used in the classroom and for what purposes (Reeves, 1998).

Two general distinctions were made. Students could learn "from" computers-where technology was used essentially as tutors and served to increase students' basic skills and knowledge; and students could learn "with" computers-where technology was used a tool that could be applied to a variety of goals in the learning process and could serve as a resource to help develop higher order thinking, creativity and research skills. Teachers have stated that the more students used educational computer software, especially self pacing software, the greater increase in their progress there should be; Teachers stated that this type of educational technology also affected the way they taught material. Self pacing educational technology such as reading and math software caused teachers to lecture less and to become more of a facilitator because the students were more likely to be working on their own (Ringstaff & Kelley, 2002).

Math and science teachers from earlier and recent technology studies indicate apprehension toward technology use in the classroom. Schmidt & Callahan (1992) indicated that many teaches feared that using technology would harm students' understanding of basic math concepts, make them overly dependent on technology and not be effective as an instructional tool. More recent findings (Guerrero, Walker, & Dugdale, 2004) summarized teachers' attitudes toward the use of technology in mathematics classrooms as "apprehensive". Many teachers' indicated that they had not observed any software that really helped learning and using software did not save time in teaching and evaluation.

Introducing new technology into a classroom could influence change. Use of technology tended to foster collaboration among students, which in turn could have a positive

or negative effect on student achievement. Teachers' perceptions of their students' capabilities could shift dramatically when technology was integrated into the classroom. Because technology could foster a complex network of changes, some teachers suggested that its impact cannot be reduced to a simple cause-and-effect model that would provide a definitive answer to how it has improved student achievement. Therefore, technology used in a school or classroom that had shown an increase in student achievement may not yield the same results for other schools in the same district or classroom teachers in the same school building. Even as facilitators, teachers should determine an effective way to incorporate technology into their lessons in order to maximize the chance that it would increase student achievement (Bitner & Bitner, 2002).

Christensen (2002) investigated technology attitudes of sixty Texas public elementary school teachers who received needs based instruction on integrating computers into classroom lessons over the course of a school year. At the end of the year, teachers' responses on an attitude questionnaire revealed increased positive feelings toward classroom computers uses as well as a more defined perception of the importance of technology in education. However, teachers expressed fears concerning their ability to stay one step ahead of technology savvy students. Christensen suggested a need for ongoing technology integration education to reduce teachers' anxiety levels as student's technology skills continue to advance.

A study conducted by (Yuen & Ma, 2002) examined pre-service teachers acceptance and concluded that the perceived usefulness of technology had a significant positive effect on teachers' intentions to use computers in the classroom. Teachers that reported high levels of computer at home were likely to use the computers at school. When the technology was

perceived as easy to use, teachers' tended to think that it was useful and tended to use it in their classrooms. Piper (2003) reported in his study on teachers' perceptions of their computer competency and the adequacy of their technology preparation that self-efficacy had a significant influence on the academy use of technology for beginner computer users but, technology experience and perceptions of technology leadership were the most reliable predictors of technology use for experienced computer users.

Teachers have argued that they needed more time during the day to allow them to work with their students on engaged learning with technology. Longer class periods allowed for more team teaching and interdisciplinary work. Schools were continuing to acquire more technology for student use. Teachers were learning how to incorporate the technology into their daily lessons in more ways, but were finding out that they do not have enough time use if effectively (Becker, 1999).

How Principals Deal with Teachers' Reaction to Technology Change

Despite the increasing presence of computer hardware, software and other technology in schools over the pass couple of years and the countless workshops on skill acquisition for teachers, the consistent integration of technology into teacher's regular classroom lessons was still a far cry from reality (CEO Forum, 2000). There may be a variety of reasons why this was so, but Byrom and Bingham (1999) indicated that most educators were "talking the talk" and were not "walking the walk". Most teachers were hesitant or resistant to change.

Everett Rogers (1995) defined five types of adopters of change. He categorized the people into groups based on how having to make a change affected them. The five groups were innovators, early adopters, early majority, late majority and laggards. The people in the innovator group were willing and excited to trying something new. They embraced change. The early adopters were part of a social system and they accepted new ideas. They eventually

convinced other to join them in the change process. The early majority group deliberated for long periods of time. They were not the first or the last to commit to change. The late majority group was skeptical about accepting new ideas. The laggards were usually the last ones to change because of their refusal to change their behaviors and beliefs. After everyone has committed to the change process, the laggards may then eventually change also.

Going through the process of change is a long term progression of steps and procedures. Principals directing their schools through a change process must confront the reality of their current situation and be fully committed to the conversion if they expect to facilitate the transformation of their schools (Collins, 2001).

Collins (2001) identified five components of effective leaders during a time of change. The first component was moral purpose. This component stated that all the decisions made by leaders of organizations were made in the best interest of the organization as a whole and with individuals in mind. Computers were expensive. Some schools purchased their technology in stages. Therefore, some moral decisions made by the principal would be what technology to purchase now, what can wait, and which teachers get the new technology first? Collins', second component states that change was not perfect and would not go smoothly even with the best planned process. There would always be resisters and bumps in the road. The third component suggested that leaders establish and build relationships with outside organizations and other diverse groups. Principals would be working directly with people from other companies and should have a positive working relationship with them. Because educational leaders were not experts in all matters of running a school, Collins' forth component advised that the principal create an atmosphere where their co-workers or employees were willing to share their expertise in certain areas

even if they were not going to benefit from the transaction the leader was planning on making. The last component of a leader going through a change process was called coherence making. This was when leaders were able to sift through all of the disruptions, chaos, and confusion and find something beneficial that the organization could use and improve upon (Collins, 2001).

When incorporating or implementing new technology into a school, it was very important that the goal and vision of the principal was known and shared by co-workers and teachers. It should be clear how the computers were to be used and how the computers were going to benefit the school. The planning for this was a long term process. It is imperative that the technology was purchased with a purpose for it and not because a sales man gave a good deal (Picciano, 1994).

Technology used today not only does assessments, but the programs had activities could be used by the teacher for remedial work that was more fun and interesting to students. Technology could involve students in alternative methods of teaching and learning tailored to their individual learning styles and standards most appropriate for each student. Technology was here to stay and the more educators can learn to manipulate it, the more effective it would become when used in the classroom (Bailey, 2004).

A major priority of a principal or a technology leader was to identify the barriers that were preventing his or her teachers from using technology in their classrooms and to find adequate treatment and services to help them overcome those barriers (Adams, 1985). Some of the barriers or situations that prevent teachers from using technology in their classroom were:

- Not knowledgeable about computers in general

- Were not trained or were not trained properly on newly implemented software and hardware programs
- Have little or no technical support at their school
- The computer to student ratio is not good
- Not having access to software and other technologies
- Some teachers are close to retirement.
- Teachers relate them to video games and don't see the value in them.
- Teachers must realign their curriculum and change their lessons to incorporate the computer creating more work for them.
- No evidence that using computers and other technology will increase student achievement.

With the barriers identified, principals could begin to plan for those situations when they began the process of implementing technology into their schools (Cuban, 2001).

Many studies have been and are being done to answer the question of "Is there evidence that using technology will increase student achievement?" New technological programs and equipment that were specifically designed to increase student achievement were being tested to see if they really worked (Rigeman & McIntire, 2005).

A study was done that focused on an algebra computer tutorial program that was designed to increase the percentage points on standardized test of students in both the high and intermediate math performance groups (Rigeman & McIntire, 2005). A quantitative research method was used. 17 out of 21 school districts in Mississippi participated in the implementation of the tutorial program. 2,250 students took an algebra pretest in the early fall of the year. In the classrooms where the program was implemented, the teacher spent

60% of their time teaching. The students spent the other 40% on the self-paced algebra tutorial computer program. In early April, the students took a post test similar to the pretest. The results of the study showed an increase in student percentage points across each district. (Rigeman and McIntire, 2005)

In Florida, researchers explored the value of the Florida Comprehensive Assessment Test (FCAT) Explorer computer tutorial program. This study was to determine if student who used the FCAT Explorer tutorial program would score higher on the math and reading FCAT standardized test than the students who do not use the tutorial program (Martindale, Pearson, Curda and Pilcher, 2005).

A quantitative research method was used. Twenty-four schools participated in the study. A control school was matched with an experimental school based on size, performance grade by state and same district). Twelve schools used the FCAT tutorial programs as part of their lessons, placing the students in the self-paced program at least two times a week. The other twelve schools did not have the tutorial program (Martindale, Pearson, Curda and Pilcher, 2005).

In the elementary schools, the finding revealed that the students who used the FCAT Explorer tutorial programs scored much higher than the students that did not use the FCAT Explorer program. In the middle and high schools, results showed no significant difference between the students that used the FCAT Explorer tutorial program the students who did not use the program. Even though there was no significant difference found between the middle and high school participants, there was an overall increase of test scores on the FCAT from the previous year (Martindale, Pearson, Curda and Pilcher, 2005).

Principals have a key role to play in the facilitation of educational change. At a time when information and communication technologies are being integrated into the classroom as learning tools, and when teachers are being asked to incorporate technology into their teaching practices, principals are more likely to achieve success in their schools by taking an active approach to innovation. Principals can foster an environment in which such innovation has greater benefits for their staff and students (Bailey, 2004).

Summary

Using technology in education was not a new concept. Calculators were used in schools since the 1700's. Instructional motion picture films, radio broadcasting and television were also used in schools for educational purposes in the early 1900's.

With the latest technology, many people could see the potential educational benefits it offered to increase student achievement. Politics were and still is a major influence on how technology would to be used in the school system. All levels of governments, private businesses and organizations, along with private citizens weighed in on how technology should be incorporated and used in the educational system. From the federal government's No Child Left Behind Act of 2001 to Georgia's House Bill 1187 and InTech program, principals and teachers were strongly encouraged and in some situations forced to learn how to use and incorporate the latest technology into their schools and classroom.

Many school principals had a positive attitude about what technology could do for them and their school. School principals were using technology to create data bases to input, store, and translate student information. Some principals were using that information to develop and redesign their school curriculums and to help their teachers focus in on student's educational needs. Principals also realized that just having the latest technology was not

enough. Technology was only as good as the teachers whom knew how to use the technology and could effectively incorporate it into their lessons.

Several barriers were identified that kept teachers from not only using technology, but also kept them from using it effectively. Those barriers included lack of computer knowledge in general and lack of professional development training on the technology used by teachers. Some other barriers were poor student/computer ratio, the lack of time they have to learn how to incorporate the technology into their lessons and the lack of time during the day to effectively use the technology in their class with the students. Therefore, teachers tended to use technology more for drill and practice and as a reward for doing well in class.

Change within schools would occur with the implementation of technology. Principals needed to lead their faculty through phases of change beginning with letting go of past traditions and embracing the new informational era. Collins identified five components of effective leaders during a time of change which were moral purpose, to remember that change was not perfect, to established and build relationships with outside organizations, to create an atmosphere where their co-workers or employees were willing to share their expertise in certain areas and coherence making.

Computers along with other technologies were recognized as important components to educational change. Technology could be an effective tool for instruction, and may help increase student achievement and performance. Technology was seen as the future of education. All teachers needed to be adequately trained and prepared to use technology in their classrooms if they were to have a positive effect on the student achievement.

CHAPTER III

METHODOLOGY

Research Questions

To investigate the relationship of several factors, including leadership, on elementary teachers' technology use, the researcher developed five questions to guide the study:

1. What technology equipment was available for use in the delivery of classroom Instruction?

2. To what degree was technology being used by teachers in Georgia public schools for the delivery of classroom instruction?

3. What was the relationship between teachers' attitudes toward technology and the use of technology within their school?

4. What was the relationship between principals' attitudes toward technology and support of technology use within their school?

5. What was the relationship between schools selected technology procedures and the use of technology within their schools?

Research Design

The study was designed as a quantitative study, as the researcher surveyed 355 teachers in Georgia to determine the relationship of elementary teachers' use of technology and teachers' technology autonomy, teachers' technology self-efficacy, teachers' technology anxiety, teachers' technology experience and school principals' support for technology. A researcher-developed instrument was distributed as an online and hard copy questionnaire. The correlational design was suited for the purpose of the study, as the researcher sought to

determine which variables were related to technology. Correlational research may be used to make predictions, but it does not determine cause and effect (Gall, Gall, & Borg, 2003).

A correlation is a quantitative measure of the degree of correspondence between two or more variables which is called the correlation coefficient and in the case of regression analysis, the regression coefficient. The coefficient may show that two variables have a positive, negative, or no relationship. If the coefficient shows a positive relationship between two variables, then as one variable increases the other variable also increases. If the coefficient shows a negative relationship, then as one variable increases, the other variable decreases. These types of design were an effective way to determine if there were any relationships between the independent variables (teachers' attitude, principals' attitude, school technology procedures, availability of technology) and the dependent variable (technology use). Even though non-experimental designs do not allow for the determination of cause and effect, the results can still be used to predict the direction of the correlation of the independent variable with the dependent variable (Gay & Airasian, 2000).

Population

The population in this study consisted of third grade elementary teachers from public schools in Georgia. The Georgia public schools were identified using the 2008 Georgia Public Education Directory. This directory listed the school's name, address, telephone, the principal of the school and the school's email address. The entire directory consisted of 180 school systems and over 1,900 public schools. There were approximately 1,250 elementary schools listed in the directory, and the researcher estimated that four third grade teachers populated the 1,250 schools, for an estimated population of 5,000 third grade elementary teachers.

Sample

The researcher used a systematic sampling technique to determine the sample of the study. From the list of 1,250 elementary schools, the researcher selected 156 elementary schools by choosing every eighth school on the list. The 156 schools were placed into an alphabetized list and were given a number ranging from (1 to 156). The researcher used the first 150 schools to participate in the study. The schools numbered from 151 to 156 were used as backup schools for the purpose of replacing schools that were unable to be part of the sample. The researcher approximated that each school averaged four third grade teachers and therefore, approximated the total sample of this study was 600 (n=600) teachers (4 teachers x 150 schools).

Instrument

The researcher was unable to locate a technology use questionnaire in the literature to meet the needs of the study. Therefore, the researcher chose to develop an instrument in order to conduct the study for the purpose of surveying elementary teachers concerning technology availability, their use of technology for instructional purposes and factors the correlate with technology use. In the process of developing the instrument, the researcher reviewed the literature to determine major uses of technology appropriate and useful for elementary teachers. The researcher was able to draw some items from Harrison and Rainers' self-reporting Computer Anxiety Scale and from Spreitzer's autonomy scale, as well as Compeau and Higgins' (1995) task-focused, ten questions Likert-scale self-efficacy measure. Harrison and Rainer (1992) used a self-reporting Computer Anxiety Rating Scale (CARS) to evaluate computer anxiety in their study on factor structures and concurrent validities on computer attitude scales, anxiety scales and self-efficacy scales. Their instrument was

analyzed and reported a reliability coefficient of (.87). The validity of the Computer Anxiety Rating Scale was established by comparing its relationship with a computer attitude instrument and a computer self-efficacy instrument. All correlations were determined to be significant at the .001 levels. (Harrison, A and Rainer, R., 1992).

Gretchen Spreitzer (1995) developed an autonomy scale, which was adapted from Hackman and Oldham's (1985) autonomy scale. The purpose of her study was to develop and validate a multidimensional measure of psychological empowerment in the work place. Her primary sample group (393 managers from a Fortune 50 organization) was used to construct validation. They had a Cronbach's alpha reliability coefficient of (.72). The primary group's data were compared to a second sample group of lower level employees to cross-validate the results of the measured instrument. Second-order confirmatory factor analyses were conducted to demonstrate the convergent and discriminant validity of the overall construct of psychological empowerment measures.

Compeau and Higgins' (1995) self-efficacy measure was referenced from existing measures that were developed by Gist, et al., (1989), Burkhardt and Brass (1990), and Webster and Martocchio (1992; 1993). A survey of 100 Canadian managers and professionals were used to develop and validate the measure and 1000 participant were used in their main study. They adopted some of the questions from the other instruments directly in their measure with moderate adaptations. The reliability and discriminant validity coefficients for their measure exceeded (.80) for internal consistency. The path coefficients for their measure were also assessed and each path was determined to be statistically significant at ($p < 0.01$). Based on their analysis from a measurement standpoint, Compeau and Higgins data provided evidence of the construct validity of their computer efficacy

measure. It demonstrated high internal consistency (reliability), empirical distinctness (discriminant validity) and is related as predicted by literature to other constructs (nomological validity), and therefore appears to be a useful measure of computer self-efficacy.

After a review of these instruments and a review of the literature, the researcher developed a six-item questionnaire (Technology Use and Views in Georgia Public Schools) from this review of the literature (see Appendix A). During a professional development training session (Electronic Math) held in Georgia on June 14, 2007, the researcher asked eighteen participants consisting of third through eighth grade teachers from Jefferson, McDuffie, Burke, Columbia, and Richmond County school systems to respond to the six-item questionnaire in order to provide data to develop the instrument for the study.

The six-item questionnaire was designed to gain information on the different types of technology that were available to teachers participating in professional development, how they used the available technology at their school and to identify school technology procedures they followed or used at their school. From the responses to the six-item questionnaire, the researcher learned that technologies available to teachers consisted of desk top computers, laptop computers, active/smart boards, digital cameras, video cassette recorders, email, internet, overhead projectors, compact disc players, memory sticks, scanners, and video cameras. Results from the questionnaire indicated that seven teachers used technology for the delivery of instruction almost always, four used technology often, six used technology regularly and one used technology rarely. The teachers used technology for instructional purposes with the students (drill and practice, student research and student presentations) and for administrative purposes (the computer to keep students' attendance

and students' grades, word processor software to type weekly or monthly newsletters and printers to print them out). School procedures regarding technology use consisted of keeping school talk communication system updated, communicating with board of education and school principals through email, typing weekly or monthly newsletters for students and their parents, and school principals observing their teachers using technology while teaching as part of the teachers' yearly evaluation. Twelve of the eighteen teachers indicated that their principal was supportive of technology use and had regular discussions with their principal about technology whether in staff meetings, grade level meeting or in the school hallways. The other six teachers indicated that their principal supported technology use, but did not discuss or talk about technology use on a regular basis.

The researcher used the information from the Technology Use and Views in Georgia Public Schools Questionnaire to develop a Technology Availability and Utilization Questionnaire (TAUQ). The TAUQ questionnaire consisted of five sections (see Appendix B). Section one of the TAUQ questionnaire was designed to determine the availability of specific technology and equipment at the teachers' schools. It was also designed to determine how often the teachers used the technology in their classrooms.

Section one of the TAUQ questionnaire had fifteen Likert-scaled items. The five-point Likert scale allowed the participants to respond to the items as follows: 1 = not utilized, 2 = used very rarely, 3 = used regularly, 4 = used often, and 5 = used almost always. The number "0" was not part of the Likert-scale. If participants chose the number "0", then that particular technology was not available to them. Munshi (1990) indicated that the use of a five-point Likert scale allowed participants to make a more precise delineation of their answers to the questionnaire, which they may not be able to make using a four-point scale.

The five-point Likert scale was useful in the questionnaire developed by the researcher because it allowed teachers to express whether the technology was available, and if so, the extent to which they used the technology. Responses to the questions in section one were used by the researcher to answer research questions one and two.

Section two of the TAUQ questionnaire included eight different scenarios about use of technology with a checklist of available options for respondents to designate their responses to the scenarios. The scenarios were developed from the Technology Use and Views in Georgia Public Schools Questionnaire in which one of the questions asked the participants to describe how they used technology available to them in their school. For example, one of the responses to the question was "I use the school talk communication system to keep the parents or guardians of my students informed about what is going on in my class and at school in general." The researcher developed a scenario from this response to read, "Do you use a school talk communication system to communicate with your students' parents and the community?" The TAUQ had scenario responses that related to school procedures that influenced teachers to use technology at school and in their classrooms. The respondents were asked to respond to the scenarios by checking off all the school procedures that forced them to use technology from a designated list of options. The options were developed by the researcher from the literature review and from responses to the original six-item questionnaire. One of the options was "Do you use the computer in your classroom to keep student grades or student attendance?" This section was used to determine two aspects of technology use, including what particular technology was used most by the participants and how they were using the technology within their classrooms. Responses to the scenarios in

this section of the questionnaire were used to answer research question number five, on school-selected technology procedures and the use of technology within their school.

Section three of the TAUQ questionnaire consisted of a mixture of nineteen Likert-scaled items. This section was designed for teachers to provide responses that allowed the researcher to answer research questions three and four. The items addressed teachers' attitudes about technology in reference to teachers' technology anxiety and technology autonomy. These Likert-scaled items also addressed school principals' attitude and support of technology use. The five-point Likert-scale provided the participants with the following response options: 1 = Strongly Disagree, 2 = Slightly Disagree, 3 = Agree, 4 = Slightly Agree and 5 = Strongly Agree. The participants were asked to respond to questions and statements such as, "I have plenty of time to use technology in my lessons during the day," "my principal encourages me to integrate technology into my teaching and learning," and "I have been thoroughly trained on how to work the technology at my school." The questions from this section were adapted from Harrison and Rainers' self-reporting Computer Anxiety Scale and from Spreitzer's autonomy scale.

Section four of the TAUQ questionnaire was designed to answer research question three and the participants of the study to responded to one five-point Likert-scaled question. The question asked the participants "How do you rate your experience with the technology available to you at your school?" The participants were able to respond to this question as follows: 1 = none, 2 = very little, 3 = some, 4 = quite a lot and 5 = extensive.

Section five of the TAUQ questionnaire (see appendix B) was designed to gather information on teachers' technology self-efficacy and also answer research question three. The teachers were asked to respond to questions about their confidence level if they had to

complete a job using a new technology package for the first time. Some of the statements in this section were "I could complete the job using the new technology package if there was no one around to tell me what to do as I go" and "I could complete the job using the new technology package if I had only the software manuals for reference." Section five of the questionnaire was adapted from Compeau and Higgins' (1995) task-focused, ten questions Likert-scale self-efficacy measure. A four-point Likert-scaled provided the participants in the study with the following response options: 1 = not at all confident, 2 = slightly confident, 3 = moderately confident and 4 = totally confident.

Pilot Study

The directions for the pilot study (see Appendix C) and the TAUQ questionnaire were administered to thirty elementary school experts: principals, media specialists, instructional lead teachers, and grade level chair teachers for review. The reviewers were asked to check the questionnaire for consistency, clarity, and content validity. The reviewers completed the questionnaires and informed the researcher about administering time and recommended changes to improve the instrument. The researcher refined the questionnaire based on the recommended changes suggested by the reviewers. Cronbach's Alpha was conducted on the TAUQ questionnaire and all the factors were determined to be statistically significant and reliable ranging from alpha = .77 to .92.

Data Collection

A cover letter (see Appendix D), four self-addressed stamped envelopes, four TAUQ questionnaires, and a registration page for a $100 drawing were mailed to the address of 150 schools in order to reach the respondents, who were third grade elementary teachers. The envelope packages were addressed to each school and to the attention of third grade teachers

of each participating school. The researcher requested that the recipient at the school place the questionnaire packages in the third grade teachers' coordinators mail box and for the grade coordinator to pass out the TUAQ questionnaires to the rest of the third grade teachers. The cover letter explained the study, gave instructions on how to proceed with the completion of the questionnaire and assured that the participants' responses would be kept confidential.

In order to maximize the return of the questionnaires, the researcher provided two ways for the participants in the study to return them. First, the researcher provided a pre-stamped self-addressed envelope for each participant to return his or her questionnaire and registration for the $100 drawing by mail. The return envelopes were part of the questionnaire package. Each school was given an identification number ranging from (1 to 150) based on the participants list created by the researcher. The researcher included a registration page for a $100 dollar drawing. The registration page was separate from the questionnaire. Second, the researcher created a web page with the technology questionnaire on it. The participants were advised of the option to take the questionnaire on-line. The web address was provided on the cover letter in the questionnaire package. The participants were asked to type in the identification number of their school which was located on the return envelopes in order for the researcher to track the questionnaires on line. At the end of the online questionnaire, the researcher had a registration page for a $100 dollar drawing. The registration page was separate from the questionnaire. The participants were asked to put their name and their school's name on the registration page. This information was also used to track the returned questionnaire as a backup measure from each school. Because this page

was separate from the rest of the questionnaire pages and was transferred to a separate section of the Microsoft Excel database, the participants' responses were kept confidential.

When the participants completed the questionnaire and registered for the drawing, they clicked on the submit button located at the end of the questionnaire. Some teachers indicated that they had more than four third grade teachers by making a copy of the questionnaire and the registration for the drawing and sending it in an envelope with another third grade teacher from their school. Some teachers did not get a paper copy of the questionnaire. Those teachers took it online and typed in the remarks section that they were also third grade teachers who taught at one of the participating schools. A total of 293 teachers registered for the $100 drawing. There were 197 (67.24%) to register online and 96 (32.76%) to register through mail.

Two questionnaire packages were returned to the researcher as undeliverable. Therefore, the researcher chose two schools from the six in the back up list (schools 151 and 152) and mailed the undeliverable questionnaire packages to them. From the original 150 schools that were sent questionnaire packages, two school districts responded that district policies prevented their teachers' participation, as the researcher had not gone through the district Institutional Review Board (IRB) process for approval. Two teachers from those school districts respectively emailed the researcher stating that they had received the questionnaire, but they were not able to complete it because of district policy concerning research. The researcher did not replace the two teachers from those districts which changed the approximate sample group from 600 to 598 (n=598).

In a cover letter (see Appendix D) enclosed in the survey packages, teachers were provided two options in completing the questionnaire. The teachers could either complete the

hard copy of the questionnaire (see Appendix B) and return it in the envelope provided or they could log onto the online version (see Appendix B) located at: (https://www.surveymonkery.com/s.aspx?sm=Te_2beQNxrEyNBgctvA3kRyw_3d_3d). The participants were provided a range of dates from May 8, 2008, to June 20, 2008, to return the questionnaire or complete the questionnaire online.

The researcher mailed the questionnaires on May 8, 2009. After two weeks (May 8, 2008, to May 21, 2008), the researcher crossed-referenced the schools' identification numbers from the return envelopes through the mail and the identification numbers from the online questionnaires to the school participant list to identify schools that did not have any teachers to return a questionnaire. One hundred eight-eight teachers from seventy-two different schools returned their questionnaires during the first two weeks. As a reminder, a second letter was mailed to schools that had not responded. The second letter emphasized the importance of the requested information. It encouraged participants to go online and complete the questionnaire. After two more weeks (May 21, 2008, to June 7, 22, 2008), the process of identifying schools that returned the questionnaires was repeated again. Ninety-six teachers from twenty-three different schools had returned questionnaires. A third reminder letter was sent out two weeks after the second reminder letter. The third letter emphasized the importance of the requested information. It encouraged participants once again to go online and complete the questionnaire and it emphasized that the deadline for completing the questionnaire was June 20, 2008. Seventy-one teachers form thirteen different schools returned questionnaires during the last two weeks for a total participation rate of 108 schools (72%) and 355 teachers (59.36%)

Data Analysis

After a third attempt to increase the response rate, the researcher accepted the 355 teachers (59.36%) return rate and conducted initial data analysis using SPSS. In section one of the TUAQ questionnaire if the teachers chose zero, it meant that a particular technology was not available at their school or to them for use in their classrooms. In order not to penalize teachers for technology that were not available to them when calculating the total technology utilization score, the researcher calculated a percentage score for each teacher based on how many of the fifteen different types of technologies and equipment indicated on the questionnaire were available to them. For example, if a teacher filled out the questionnaire and all the technologies on the list were available to them, then that teacher's lowest possible score would be 15 (choosing all ones) and the teacher's highest possible score would be 75 (choosing all fives). To calculate the percentage score, the researcher added up the circled Likert-scaled numbers to get a total score. The researcher then divided the total score by the highest possible score the teachers could have received (75) to get a percentage number. The percentage score was then adjusted by subtracting the total number of technologies that were available to them (15) to get the final adjusted percentage score which was entered as the data for analysis for each teacher's questionnaire.

If another teacher filled out the questionnaire and had only ten of fifteen technologies on the list available for use, then the questionnaire was calculated based on the ten types of technologies that were available. In this situation, the teacher's lowest possible score would be a 10 (choosing all ones) and their highest possible score would a 50 (choosing all fives). To calculate the percentage score, the researcher added up the circled likert scale numbers to get a total score. The researcher then divided the total score by the highest possible score

they could have received (50) to get a percentage number. The percentage score was then adjusted by subtracting the total number of technologies that were available to them (10) to get the final adjusted percentage score which was entered as data for analysis.

The data from the online questionnaires were automatically sent to a Microsoft Excel database. The researcher had to type in the data by hand for the questionnaires that were returned through the mail. Once all the data were placed in Microsoft Excel, they were transferred to a program named Statistical Package for the Social Sciences (SPSS). The data were analyzed using descriptive statistics, Pearson's Correlation and Regression Analysis.

Summary

This study analyzed the availability of technology in Georgia elementary public schools and the utilization of technology by teachers for delivery of instruction. This study also analyzed data on school principals' attitude and support for technology, teachers' attitudes towards technology and school selected technology procedures and how they relate to technology use.

While presenting in a professional development conference, the researcher asked teachers at the conference to complete a questionnaire he developed (Technology Use and Views in Georgia Public Schools Questionnaire). The questionnaire was designed to gathering information about different types of technology available to teachers, how teachers used the available technology in their school and classroom and school technology procedures that the teachers must follow while using technology at school. The researcher used the information he gathered from Technology Use and Views in Georgia Public Schools Questionnaire to develop a Technology Availability and Utilization Questionnaire (TAUQ).

The researcher used the TAUQ questionnaire which was determine to be statistically significant and reliable to collect data from a sample of 355 Georgia's elementary school third grade teachers. A pilot study conducted by elementary school experts to determine the readability and content validity of the TAUQ questionnaire. The questionnaires were mailed to schools selected to participate in the study to the attention of the third grade teachers. The researcher provided two ways for the participants to take the questionnaire. Return envelopes with each school's identification number were provided and used to track the questionnaires that were returned through the mail. Teachers that took the questionnaire online were asked to type in their identification number before they submitted the questionnaire and the online $100 registration form was also used to track the online returned questionnaires. Two hundred seven participants returned the questionnaire online and one hundred forty eight returned the questionnaire through the mail. A registration form for the $100 dollar drawing was provided separately for the both the mailed and online questionnaires. The participants that mailed their questionnaires put their registration form in the same return envelope. The participants that took the questionnaire online had to fill out the online registration form and submit it. The collected data were organized and coded in a spreadsheet and then entered in the SPSS statistical package. The data were analyzed using descriptive statistics, Pearson's Correlation and Regression Analysis.

CHAPTER IV

REPORT OF DATA AND ANALYSIS

The researcher of this study investigated the relationship of specific factors that correlated with third grade teachers' use of technology in Georgia's elementary schools. The researcher focused on technologies and equipment that were available to elementary teachers and how often those teachers used the technology for the delivery of classroom instruction. The researcher also investigated school principals' attitude and support for technology use, and elementary teachers' attitude (technology autonomy, technology self-efficacy, technology experience, and technology anxiety) in relation to technology use. Technology procedures in relation to technology use for the delivery of classroom instruction were also studied. In this chapter, the researcher presented the findings of the study.

Introduction

Out of approximately 1,250 elementary schools in Georgia, 156 (150 to participate in the study and 6 backup schools) of the schools were selected by the researcher by placing all the elementary schools on an alphabetized list and picking every fifth school. Each school on the list was given a tracking number ranging from (1 to 156). The researcher approximated that each school averaged four third grade teachers and therefore, approximated the total sample of this study to be 600 teachers (4 teachers x 150 schools). The selected schools were sent a questionnaire package addressed to the attention of the third grade teachers. The questionnaire packages contained a cover letter with instructions, four technology questionnaires, and four self-addressed envelopes for teachers to return the questionnaires and a $100 drawing registration form.

A follow up letter (see Appendix D) was mailed to the schools of those participants who did not return their questionnaires within two weeks. The letter emphasized taking the questionnaire online and the importance of the requested information. Using this procedure, the researcher was able to obtain usable data from 108 schools and resulted in a 72% return rate. Out of the 108 schools that returned questionnaires, 30 schools had at least one person to return their questionnaires, 10 schools had two participants to return their questionnaires, 14 schools had three participants to return their questionnaires, 23 schools had four participants to return their questionnaires, 15 schools had five participants to return their questionnaires and 16 schools had six participants to return their questionnaires for a total of 355 questionnaires returned which was a return rate of (59.36%). More questionnaires were returned online, 207 (58.31%) than were returned by mail 148 (41.69%).

Table 1

Number of Questionnaires Returned

Questionnaires Returned	Number of Questionnaires	Percentage
U.S. Mail	148	41.69%
Online	207	58.31%

Research Questions

To investigate the relationship of different factors, including leadership, on elementary teachers' technology use, the following questions guided this study:

1. What technology was available for use in the delivery of classroom Instruction?

2. To what degree was technology being used by teachers in Georgia public schools for the delivery of classroom instruction?

3. What was the relationship between teachers' attitudes toward technology and the use of technology within their school?

4. What was the relationship between principals' attitudes toward technology and support of technology use within their school?

5. What was the relationship between schools selected technology procedures and the use of technology within their schools?

Data Analysis

The elementary schools' data were collected and organized in a spreadsheet. In section one of the Technology Utilization Questionnaire (fifteen items), research questions one and two were answered by coding the results of the participant's responses and calculating the mean scores and final percentages from the data collected.

Research questions three and four were analyzed by using descriptive statistics, and Pearson Correlations and regression analysis to determine relationships between the independent and dependent variables. To answer research question five, descriptive statistics and Pearson's partial correlation were used to analyze partial relationships, in order, to examine how utilization relates to school procedures while controlling for the

other predictors (anxiety, autonomy, self-efficacy, etc.). After the answers were coded, the data were entered into Statistical Package for Social Studies (SPSS, 2007).

Survey Item Responses

Research Question 1: What technology was available for use in the delivery of classroom Instruction?

Table 2 presents information on the availability of technology equipment in Georgia elementary schools. Results indicated that the computer and internet were the technologies most often available (99.72%). The second most available technologies were email and printers (99.15%). Active/Smart boards (53.11%) and laptop computers (66.36%) were the least available technology among those reported. The reason for this may be that Active/Smart boards were relatively new in school settings and schools' technology budgets could not afford to purchase them. Ten out of the fifteen technologies listed were available to 90% or more of the teachers in this study.

Table 2

Technology Available in Georgia Public Elementary Schools for Use in the Classroom

Equipment	Availability		N
	Yes %	No %	
Computer	354 (99.72%)	1 (0.28%)	355
Internet	354 (99.72%)	1 (0.28%)	355
E-Mail	352 (99.15%)	3 (0.85%)	355
Printer	352 (99.15%)	3 (0.85%)	355
Overhead Projector	343 (96.89%)	12 (3.11%)	355
Compact Disc (CD player)	339 (95.48%)	16 (4.52%)	355
Video Cassette Recorder (VCR)	331 (93.22%)	24 (6.78%)	355
Word Processor (Word / Word Perfect)	329 (92.65%)	26 (7.35%)	355
Digital Camera	320 (90.11%)	35 (9.89%)	355
Flash Drive / Memory Stick	320 (90.11%)	35 (9.89%)	355
DVD Player	297 (83.61%)	58 (16.39%)	355
Scanner	267 (75.14%)	88 (24.86%)	355
Camcorder	245 (68.92%)	110 (31.08%)	355
Laptop Computer	243 (68.36%)	112 (36.64%)	355
Active / Smart Board	188 (53.11%)	167 (46.89%)	355
Mean	87.02		

Research Question 2: To what degree was technology being used by teachers in Georgia public schools for the delivery of classroom instruction?

Table 3 presents information on the utilization of technology by Georgia elementary school teachers. Frequency distribution was used to analyze the collected data. The technology mostly used by teachers in their classrooms was email. It was used almost always or often by 81.62% of the respondents. Other technologies that were almost always or often used were printers (80.92%), the smart/active board (79.28%) computer (78.19%), memory stick (73.81%), internet (71.89%) and word processor (66.88%). The technologies that were either not utilized or used vary rarely were the camcorder (88.89%), the scanner (62.21%) and DVD player (60.25%). In schools that had smart/active boards available, teachers were using them at a high rate.

Table 3

Technology Utilization by Georgia Public School Third Grade Elementary Teachers

	Utilizations							
	Not Utilized	Used Vary Rarely	Used Regularly	Used Often	Used Almost Always	Response Count	Mean	STD Deviation
Technology	1	2	3	4	5	N		
Printer	3 (0.85%)	15 (4.27%)	49 (13.96%)	73 (20.80%)	211 (60.12%)	351	4.35	1.09
E-mail	9 (2.58%)	21 (6.03%)	34 (9.77%)	60 (17.24%)	225 (64.38%)	350	4.34	1.11
Computer	3 (0.85%)	15 (4.26%)	59 (16.7%)	60 (17.04%)	215 (61.15%)	352	4.33	.98
Memory Stick	11 (3.46%)	27 (8.49%)	58 (18.24%)	91(28.62%)	142 (45.19%)	318	4.13	1.58
Internet	3 (0.85%)	29 (8.23%)	67 (19.03%)	103 (29.26%)	150 (42.63%)	352	4.04	1.03
Smart Board	29 (10.98%)	15 (5.63%)	11 (4.11%)	75 (28.69%)	133 (50.59%)	263	4.02	2.14
Word Processor	15 (4.60%)	33 (10.12%)	60 (18.40%)	85 (26.07%)	133 (40.81%)	326	3.88	1.54
Laptop Computer	35 (14.87%)	43 (18.01%)	30 (12.61%)	38 (15.97%)	93 (39.08%)	239	3.46	2.04
CD player	32 (9.58%)	59 (17.66%)	71 (21.26%)	86 (25.75%)	86 (25.75%)	334	3.40	1.48
Overhead Projector	58 (16.95%)	85 (24.85%)	73 (21.34%)	64 (18.71%)	60 (18.15%)	342	2.93	1.43
Digital Camera	33 (10.37%)	119 (37.34%)	78 (24.53%)	79 (24.84%)	22 (6.92%)	318	2.93	1.37
DVD Player	38 (12.88%)	119 (40.34%)	69 (23.39%)	47 (15.93%)	22 (7.46%)	295	2.62	1.44
VCR	44 (13.46%)	153 (46.79%)	84 (25.68%)	34 (10.40%)	12 (3.67%)	327	2.44	1.13
Scanner	68 (25.95%)	95 (36.26%)	53 (20.23%)	40 (15.27%)	6 (2.29%)	262	2.32	1.38
Camcorder	117 (48.15%)	99 (40.74%)	14 (5.76%)	12 (4.93%)	1 (0.42%)	243	1.69	1.03

Sections three and four of the technology questionnaire were designed to obtain information on the teachers' perception of their technology anxiety, classroom autonomy, self-efficacy and their principal's attitude about technology. Following the receipt of the questionnaires, the reliability of these four measures was calculated using the Cronbach's alpha reliability coefficient. The reliability of a questionnaire refers to the measurement error present in the scores yielded by the instrument. Gall, Borg, and Gall, (1996), indicated that Cronbach's Alpha coefficients greater than or equal to .80 were sufficient for most research purposes. In contrast, Dunteman (1989) submitted that factors possessing a Cronbach's Alpha of .70 or greater were satisfactory.

In the present study, Table 4 reports the reliability coefficient for the teacher technology anxiety questions which was (α =.82). For the principals' attitude towards and support of technology questions α =.87. The reliability coefficient for the technology autonomy questions was (α = .77) and was (α = .90) for the technology self-efficacy questions. These numbers indicate that internal consistency is acceptable for these four measures.

Table 4 also presents descriptive and correlational data on research question 3: What was the relationship between teachers' attitudes towards technology and the use of technology within their school, and research question 4: What was the relationship between principals' attitudes towards and support of technology and technology use within their school?

Data were analyzed from the Technology Availability and Utilization questionnaire using descriptive statistics for each individual variable question and the

variables questions as a group. The central tendency (mean) of a distribution is an estimate of the "center" of a distribution of values.

In table 4, the researcher used percentage values for descriptive statistics. To calculate the percentage score, the researcher first added up the circled Likert-scaled numbers to get a total score (ex. 7). The researcher then divided the total score by the highest possible score they could have received (50) to get a decimal number (0.14) and then multiplied by 100 to get a percentage number (14%). Lastly, the researcher added up all the mean percentage scores for all the teachers (n = 355) and divided that number by the number of teachers participating in the study to get an overall percentage mean score which was 3.78% for technology experience, 63.21% for technology autonomy, 77.49% for technology self-efficacy, 66.18% for principal attitude, and 32.35% for technology anxiety.

The spread of values around the central tendency is referred to as dispersion. One of the most common measures of dispersion is standard deviation. The mean for technology autonomy is 63.2 and the standard deviation for technology autonomy is 12.33. This indicates that all the teacher mean score that fell between 50.88 and 75.54 were within one standard deviation of the mean. The teachers mean scores that fell between 38.55 and 50.87 or 75.55 and 87.88 were within two standard deviations of the mean.

Pearson's Correlation Coefficients with technology variables were run to determine which factors were associated with technology use. The data in Table 4 indicated a significant positive relationship between teacher's technology experience at the .01 level of significance, principals' attitude and support for technology at the .01level of significance and technology self-efficacy at the .01 level of significance. This suggested

that technology use was more frequent in schools where teachers had experience using technology, the support of their principal and high self-efficacy. The findings also indicate that there was a definite but small negative relationship between teacher's technology anxiety at the .01 level of significance and technology use.

Table 4

Correlations and Descriptive Statistics for Technology Experience, Technology Autonomy, Technology Self-Efficacy, Principal Attitude and Technology Anxiety.

Variables	1	2	3	4	5	6
(1) Technology Use	-----					
(2) Technology Experience	.356**	-----				
(3) Technology Autonomy	.186**	.308**	-----			
(4) Technology Self-Efficacy	.278**	.491**	.203**	-----		
(5) Principal Attitude / Support	.267**	.361**	.487**	.151**	-----	
(6) Technology Anxiety	-.300**	-.476**	-.183**	-.447**	-.285**	-----
M	62.15	3.78	63.21	77.49	66.18	32.35
SD	12.11	.891	12.33	13.73	15.27	15.29
Scale Min/Max Values	-----	1 to 5	16 to 100	15 to 100	10 to100	5 to100
Cronbach's α	-----	-----	.773	.900	.871	.816

n = 355
M = percentage scores
** p <.01 (2-tailed).

Regression analysis is a statistical technique for determining relationships among different data in order to predict future behavior or results. Regression analysis is used when you want to predict a continuous dependent variable from a number of independent variables. Even though regression analysis is used to predict, it does not determine the cause (e.g. we say that X "predicts" Y, we cannot say that X "causes" Y).

Table 5 reports the multiple regression analysis of technology use (DV) and the (IV's) technology anxiety, principal attitude and support for technology, technology autonomy, technology experience and technology self-efficacy. The t-value for technology anxiety was significantly different from zero and the coefficient was negative which indicated that the relationship between technology anxiety and technology use was strong, significant and negatively related. This suggested that as teachers' anxiety levels rose, they used technology less or as technology anxiety levels rose, the use of technology went down.

The t-values and coefficients for principals' attitude towards and support for technology indicated a strong, significant and positive relationship to technology use. This suggested that if school principals had and demonstrated a positive attitude towards technology and provided support for it (purchased the technology, provided training on the technology, and encouraged implementation of technology into the curriculum) technology use by their teachers would increase.

T-values for technology autonomy and self-efficacy were not significantly different from zero which indicated that they were not related to technology use, while technology experience was strong and significantly related to technology use. The coefficient for teachers' technology experience was positive. This suggested that the

more experience with technology a teacher had, the more likely they were to use it. Technology self-efficacy was marginally related to technology use and the coefficient was positive which indicated that the model was fairly good at predicting technology use.

Table 5

Regression of Technology use on Technology Anxiety, Principal Attitude/Support, Technology Autonomy, Technology Experience and Technology Self-Efficacy

Variable		b	se	95%CI	t	Sig
1	(Constant)	39.738	5.749	28.43, 51.05	6.912*	.000
Technology Anxiety		-.093	.046	-.184, -.003	-2.022*	.044
Principal Attitude / Support		.112	.046	.020, .203	2.407*	.017
Technology Autonomy		.015	.056	-.094, .125	.272	.786
Technology Experience		2.616	.841	.962, 4.270	3.111*	.002
Technology Self-Efficacy		.094	.052	-.008, .195	1.816	.070

Note. $R^2 = .174$, adj $R^2 = .162$, $F = 14.71$, $df = 5$, $n = 355$, *P<.05. (**DV: Technology Use)**

Research Question 5: What was the relationship between schools selected technology procedures and the use of technology within their schools?

Data to address this question were collected in section two of the Computer Availability and Utilization Questionnaire. This section was designed as a checklist with eight different scenarios that required the use of technology by teachers. In this section of the questionnaire the respondents were asked to identify by checking off all the school selected technology procedures that forced them to use technology with in their school from the designed checklist. The data collected were organized into a spreadsheet, the results of the respondents were coded (0 = no and 1 = yes), and final percentages from the data collected were calculated.

The school procedure on e-mail use was the technology that 98.30% of the teachers used most. The teachers indicated that they used e-mail to communicate with their board of education, their principal, with their co-workers and with the parents of their students. The second most used technology was the computer (91.24%). It was used to keep the attendance of the students and to record grades for their student's report cards as required by their school. Technology was used the least when it was part of a requirement from of corporations and private foundations that provided equipment to conduct technology related research at their schools (15.82%). Principals' observations were also one of the least reasons why teachers use technology (see table 6).

Table 6

Descriptive Statistics for Schools Procedures on Technology and Its Use

District Policies on Technology and Use	Yes Responses	Yes %	No Responses	No %	N
Email - to communicate with colleagues and with principal	349	98.30%	6	1.70%	355
Grades for report cards and attendance kept on computer	324	91.24%	31	8.76%	355
Word processor to print weekly or monthly newsletters to communicate with parents	292	82.20%	63	17.78%	355
CRCT on-line practice/testing	287	80.79%	68	19.21%	355
School talk - to communicate with parents and the public	265	74.58%	90	25.42%	355
Teacher license / recertification (InTech technology training)	187	52.54%	168	47.46%	355
Principal observations of teachers using technology	126	35.59%	229	64.41%	355
Requirements of corporations and private foundations that provided Equipment to conduct technology related research at your school	56	15.82%	299	84.18%	355

Pearson's partial correlation between schools technology procedures and technology use were run to determine which factors were associated with technology use. A partial correlation controlling for the predictors (anxiety, self-efficacy, autonomy and principal support) is reported in Table 7. Partial correlation analysis is aimed at finding correlation between two variables after removing the covariance of other variables (the correlation of two variables while controlling for a third or more other variables.) This type of analysis helps spot phony correlations (correlations explained by the effect of other variables) as well as to reveal hidden correlations (correlations hidden by the effect of other variables.) Table 6 showed that there were no statistically significant correlations of interest. All relevant coefficients were very weak and non-significant at the .05 level of significance.

Table 7

School Procedures on Technology Variables: Partial Correlations

Control Variables	Variables	1	2	3	4	5	6	7	8
Technology Anxiety	(1) Technology Use	1							
Principal Attitude / Support Technology Autonomy	(2) Communication-School Talk to communicate with parents and the community	.034							
Technology Experience Technology Self-Efficacy	(3) Communication-Word Processor to print weekly or monthly newsletters - to communicate with parents	.031	.999*						
	(4) Communication-email – to communicate with colleagues and with principal	.030	1.000*	1.000*					
	(5) Teacher Evaluation – principal observations of teachers using technology	.034	.997*	. 998*	.998*				
	(6) CRCT on-line practice and testing	.035	.999*	.999*	1.000*	.998*			
	(7) Grades for report cards and attendance kept on computer	.030	.999*	1.000*	1.000*	.998*	1 .000*		
	(8) Teacher license/ recertification (InTech technology training)	.040	.999*	.999*	.999*	.997*	.999*	.999*	
	(9) Requirements of corporations and private foundations that provided equipment to conduct technology related research at your school.	.033	.993*	.993*	.993*	.993*	.993*	.993*	.993*

*P<.05

Summary

This study focused on the relationship of the availability and utilization of technology equipment, the attitudes of school teachers and principals and school selected technology procedures and technology use. The collected data were analyzed to address five stated research questions. The results of the frequency distribution analysis indicated that the computer and internet were the technology equipment most available and email was almost always utilized in the delivery of classroom instruction. In schools where smart boards/active boards were available, teachers reported using this technology, even more than the internet.

Technology anxiety was found to be significant and negatively related to technology use. This finding suggested that as teachers' technology anxiety level rose, their technology use would decline. School principals' attitude towards technology and support was significant and was positively associated with technology use, which meant that teachers were likely to use technology if they knew they had the encouragement and support of their principal. Technology autonomy was not significantly related to technology use.

Technology experience was significant and was positively associated with technology use. This suggested that the more experience with technology a teacher had, the more likely they were to use it. Technology self-efficacy was marginally related to technology use and the coefficient was positive which indicated that the model was fairly good at predicting technology use. There were no statistically significant correlations of interest between schools selected technology procedures and technology use. All relevant coefficients were very weak and non-significant at the .05 level of significance.

Findings of the Study

- Ten out of the fifteen technologies listed on the questionnaire were available to ninety percent or more of the participants in this study, with the computer and internet being the most available resources. Teachers were using technology 68% of the time while at school, with a heavy emphasis on email as a communication tool.
- Teachers who experience high technology anxiety were least likely to use technology. In schools where the principals supported technology, more technology use was occurring. The more experience the teachers had with technology, the more likely they would use it in their classrooms.

CHAPTER V

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Introduction

The technological advances in America have left a clear distinct implication for the educational system. Students who graduate from high school in the United States today should be proficient in the use of the latest technology in order to realistically compete for the fast growing occupations requiring the use of technology and many other job positions (Brown, 2001). American students need a strong foundation in technology education starting in their elementary school years and continuing throughout their college years (Su, 2006). Based on teachers' integration of technology in their classrooms, students may build this necessary foundation. However, educators' use and value of technology as an instructional tool in 21st century schools remains somewhat elusive. Technology is an accepted part of society, but the educational community has not fully embraced technology in the same way (National School Board Foundation, 2002).

Purpose of Study

The purpose of this study was to investigate the relationship of several factors, including leadership, on elementary teachers' technology use and to determine views on their value of technology as an instructional tool.

The literature and experiences of elementary teachers informed the researcher of relevant variables for this study, including applications of technology, principal support, technology self-efficacy, technology anxiety, and technology use. This study is important because the researcher found several factors that correlate to use of technology in school classrooms by teachers for the delivery of instruction.

Research Questions

In order to address the research questions of this study, the researcher utilized a quantitative non-experimental correlational research design. Through a questionnaire, data were generated for the purpose of investigating the relationship of several factors, including leadership, on elementary teachers' technology use. The following sub-questions guided the study:

1. What technology is currently available for use in the delivery of classroom Instruction?

2. To what degree is technology equipment being used by teachers in Georgia public schools for the delivery of classroom instruction?

3. What is the relationship between teachers' attitudes toward technology and the use of technology within their school?

4. What is the relationship between principals' attitudes towards and support of technology and technology use within their school?

5. What is the relationship between schools selected technology procedures and the use of technology within their schools?

Summary of Major Findings

The researcher identified the major findings of the study:

Findings of the study included:

- Teachers are using technology, mostly computers and internet, while at school, with a heavy emphasis on email as a communication tool.
- Teachers who experience more technology anxiety are less likely to use technology.

- In schools where the principals support technology, more technology use is occurring.

Discussion of Findings

Educators are embracing technology use in schools. The data in this study indicate a high degree of technology availability within the schools that participated in this study. The data indicate ten out of the fifteen listed technologies are available to 90% or more of the participants. This suggests that technology availability in Georgia schools have increased significantly over the last fifteen years from when the 1995 Georgia technology needs assessment was conducted and indicated that technology availability was low (Georgia Department of Education, 2005).

Not only are educational technologies available, but elementary teachers indicate they are using the technologies. Data indicate that third grade teachers are using technologies that are available to them 68% of the time while at school. It is rather distressing that the use of technology has not increased since 1995 when the Forum Report indicated that 60 % of the teachers indicated that their technology use at school ranged from medium to high. This suggests that teachers are using the technology available to them about the same now as when the 1995 CEO Forum report came out. (Georgia Department of Education, 2005).

Teachers are using smart boards in place of chalk boards. Smart boards allow teachers to save written content from flip charts and word processor programs for later use. Teachers also use smart boards to access presentation software such as power point, the internet for research purposes, and web videos for students to watch. Teachers are

using interactive websites from the internet for introduction and review of instructional lessons and for testing.

One of the major findings of the study is that there is a significant relationship between principal support and increased use of technology in the school. The researcher found a positive significant relationship between school principals' attitudes and support of technology and technology use. This finding suggests that, as principals encourage and support teachers' technology use, the use increases, which is instrumental in students' skills and applications of technology.

Gurr (2001) suggested as the technology leader, school principals needed to stress the importance of and their support for computer usage within their school. They should established long-term goals and implementation strategies for the technology and devise specific tactics to accomplish them. They should stress classroom applications of technology during staff meetings, provide professional development training, ensure that their teachers had adequate time and resources for in-class computer use. Piper (2003) reported in his study that technology experience and perceptions of technology leadership were the most reliable predictors of technology use for experienced computer users.

Results of this study indicate a positive significant relationship between technology experience and use of technology which confirm Piper's study results for technology experience and leadership perceptions. The data supports the actions of the school principals' in Schiller's (2000) study and contradict the principals' actions in Gurr's (2001) study. The principals in Schiller's study encouraged technology professional development, supported technology use in the classrooms, had regular discussion about technology with teachers and provided frequent, brief technology

workshops during staff meetings. The principals in Gurr's study purchased the technology, but did not encourage or suggest for teacher to or not to use it. These principals left it up to their teachers whether to or not to use the technology.

Christensen (2002) found that teachers expressed fears concerning their ability to stay one step ahead of technology savvy students even after going through a technology professional development. The researcher in this study found that technology anxiety is significant and negatively related to technology use. This suggests that as teachers' anxiety level goes down, the more teachers will use technology in their classroom. The data supports Christensen's suggestion for ongoing technology integration education to reduce teachers' anxiety level.

Results of this study confirm Piper's results for technology experience. Results of this study also indicated a positive significant relationship between technology experience and use of technology. Sixty-nine percent of the participants indicated they have quite a lot or extensive experience with using technology.

The researcher found no statistically significant correlations of interest between schools selected technology procedures and technology use. All coefficients were very weak and non-significant associations. This indicates that specific school procedures on how technology should be used within the school do not influence teachers to use the technology on a consistent basis in their classrooms for instruction.

Conclusions

Based on the findings of this study, the following conclusions were drawn:

1. Technology is available in elementary schools, but integration for instructional purposes lags behind the accessibility.

2. School leaders need to advocate and support technology use, including funding for future technology purchases (hardware and software) and to keep infrastructures updated and compatible with technology they already have.
3. Even though teachers are using technology for administrative and instructional purposes, principals need to provide time for teachers to be able incorporate technology use into the curriculum and to develop technology-centered lessons to increase student-centered learning requiring technology applications.
4. School principals need to support and encourage their teachers to use the available technology and to participate in professional development technology training provided outside of what the school and district offers. Continuous professional development will increase teachers' knowledge and experience of technology, and reduce teachers' technology anxiety.
5. School selected technology procedures do not lead to technology use for instructional purposes. Providing teachers with multiple experiences of technology use in different settings will increase their knowledge of how to use technology leading to its use in the classroom.

Implications

One of the major findings is the importance of the principal as a technology leader. If educators in schools are going to help students grow in technology savvy ways, then principals are key to the increased use and applications of technology in the classroom. Principals need to continue to encourage technology integration. Continued funding for technology equipment

and professional learning that focuses on instructional application of technology is needed in Georgia public schools.

As colleges and universities continue to prepare principals in formal training programs, educational leadership departments must include educating aspiring school principals in their future roles as technology leaders. School principals need to know how to build a school culture with technology as its focal point.

Another implication is educators must continue to maintain risk-free technology training in schools. Teams of teachers may be consulted to work on support for teachers who need training and sustained coaching during integration of technology in student-centered classrooms. This practice may lead to reduced anxiety about technology integration, and increase opportunities for students to have learning centers where technology is expected to be used.

Recommendations

The following recommendations are results of the research finding and provide an agenda for further research.

1. The questionnaire should be administered to all Georgia public elementary school teachers including first through fifth grade regular education teachers, special education teachers, and resource teachers. It may be administered in five years for a comparative study to understand progress of technology integration in schools.
2. The questionnaire should be administered to Georgia public middle and high school teachers with a five-year follow-up to determine progress.

3. Further research should be conducted to include specific disciplines of teachers. This may help to ascertain if the discipline of the teacher (math, science, social studies, and language arts) is associated the utilization of technology.
4. The study should be replicated in the future to ascertain the progress which may have been made regarding the availability and utilization of technology equipment and applications in Georgia public schools.
5. This study should be replicated in states other than Georgia to compare what technologies are available, how often and how teachers are using technology in their classrooms and what factors correlate with technology use.

Summary

This study attempted to investigate the availability of technology to third grade teachers and the degree to which they use it. This study attempted to investigate whether technology use relates to school principals' attitudes towards and support for technology use, teachers' attitudes towards technology and schools technology procedures on technology. The analysis of the data indicated a significant and positive relationship between school principals' support for technology and teacher's technology experience and technology use. This suggests that the more school principals' support their teachers' use of technology and the more experience teachers have with using technology will lead to technology use in the classroom. Data indicated a significant negative relationship between teachers' technology anxiety and technology use. This suggests as teachers' anxiety level rise, the less they will use technology. Teachers'

technology autonomy and technology self-efficacy were not statistically related to technology use and all relevant coefficients for school selected technology procedures were very weak and non-significant associations. This suggests that specific school procedures on how technology should be used within the school do not influence teachers to use the technology on a consistent basis in their classrooms for instruction.

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APPENDICES

APPENDIX A:

TECHNOLOGY QUESTIONNAIRE

Technology Use and Views in Georgia Public Schools

Instructions: This questionnaire is designed to learn how school teachers view and use technology on their jobs. Please complete each question below to the best of your knowledge.

1. To the best of your knowledge, please list what types of technologies are available for you to use at your school for instruction (e. g., computers, software, and smart boards)?

2. Using the scale below, circle the answer that you feel most completely applies to how often you **utilize technology overall** for delivery of instruction in the classroom.

Not Utililzed	Used Very Rarely	Used Regularly	Used Often	Used Almost Always
1	2	3	4	5

3. Please list the different ways you use the technology available at your school.

4. Please list any district and school policies that require you to use technology.

5. If you do not use technology often at your school, what are some of the reason why you do not?

6. Does you principal do or say anything that shows or express how he or she feels about technology?

APPENDIX B:

TECHNOLOGY AVAILABILITY AND UTILIZATION SURVEY

(Paper Version and Web Based Version)

Technology Availability and Utilization Questionnaire

I. Instructions: This questionnaire is designed to learn how school teachers view and use technology on their jobs. Circle the answer that you feel most completely applies to how often you utilize the technology for delivery of instruction in the classroom **on a daily basis**. **All responses will be kept confidential.**

			Daily Utilization			
Technology	Not Available	Not Utilized	Used Very Rarely	Used Regularly	Used Often	Used Almost Always
1. Computer	0	1	2	3	4	5
2. Internet	0	1	2	3	4	5
3. E-Mail	0	1	2	3	4	5
4. Overhead Projector	0	1	2	3	4	5
5. Scanner	0	1	2	3	4	5
6. Active/Smart Board	0	1	2	3	4	5
7. Printer	0	1	2	3	4	5
8. Digital Camera	0	1	2	3	4	5
9. Camcorder	0	1	2	3	4	5
10. DVD Player	0	1	2	3	4	5
11. Videocassette Recorder	0	1	2	3	4	5
12. Word Processor	0	1	2	3	4	5
13. Laptop computer	0	1	2	3	4	5
14. Compact Disc (CD player)	0	1	2	3	4	5
15. Flash Drive / Memory Stick	0	1	2	3	4	5

II. Directions: From the list below, check all the situations that apply to how you use technology at school.

16. _____ school talk - to communicate with parents and the public
17. _____ email - to communicate with colleagues and with principal
18. _____ word processor to print weekly or monthly newsletters - to communicate with parents
19. _____ principal observations of teachers using technology
20. _____ CRCT on-line testing
21. _____ grades for report cards and attendance kept on computer
24. _____ teacher license / recertification (InTech technology training)
25. _____ requirements of corporations and private foundations that provided equipment to conduct technology related research at your school

III. Directions: Circle the answer in the space under the label which is closest to **your agreement or disagreement with the statements.**

	Strongly Disagree	Slightly Disagree	Agree	Slightly Agree	Strongly Agree
26. I hesitate to use school technology (e.g., computers, software, smart boards) for fear of making mistakes that I cannot correct.	1	2	3	4	5
27. The selection of technology specific student-learning activities in my class is under my control.	1	2	3	4	5
28. My principal encourages the staff to attend technology training on an on-going basis.	1	2	3	4	5
29. It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key.	1	2	3	4	5
30. My principal makes sure that the school has a technology support person available on a daily basis.	1	2	3	4	5
31. I have been trained how to incorporate technology into my daily lessons.	1	2	3	4	5
32. My principal provides instructions on how to use each technology tool that is integrated into our classrooms.	1	2	3	4	5
33. I feel apprehensive about using school technology.	1	2	3	4	5
34. My principal encourages me to integrate technology into teaching and learning.	1	2	3	4	5
35. My school has a good technical support system.	1	2	3	4	5
36. I have difficulty understanding the technical aspects of computers and other school technologies.	1	2	3	4	5

	Strongly Disagree	Slightly Disagree	Agree	Slightly Agree	Strongly Agree
37. The computer-to-student ratio at my school is not good.	1	2	3	4	5
38. In faculty meetings, my principal frequently discusses the subject of integrating technology into the school curriculum.	1	2	3	4	5
39. In my class, I select which content and skills are taught by use of technology.	1	2	3	4	5
40. I have been thoroughly trained on how to work the technology at my school.	1	2	3	4	5
41. My job does not allow for technology usage discretion on my part.	1	2	3	4	5
42. I have avoided school technology (e.g., computers, software, smart boards) because it is unfamiliar and somewhat intimidating to me.	1	2	3	4	5
43. I have considerable opportunity for freedom and independence in how I use technology to do my job.	1	2	3	4	5
44. I have plenty of time to use technology in my lessons during the day.	1	2	3	4	5

IV. Directions: Circle the answer that you feel most completely applies to your experience with school technology for delivery of instruction in the classroom.

	None	Very limited	Some Experience	Quite a lot	Extensive
45. How do you rate you experience with technology (e. g., computers, software, smart boards) available in your school?	1	2	3	4	5

Technology Availability and Utilization Questionnaire (Continued)

V. Often in our jobs we are told about technology (e. g., computers, software, and smart boards) that are available to make work easier. For the following questions, imagine that you were given a new school technology package for some aspect of your work. It does not matter specifically what this technology package does, only that it is intended to make your job easier and that you have never used it before.

Directions: For each of the conditions listed below, please rate your confidence about being able to complete a job using the new technology package.

I COULD COMPLETE THE JOB USING THE NEW TECHNOLOGY PACKAGE….

	Not at all confident	Slightly confident	Moderately confident	Totally confident
46. ..if there was no one around to tell me what to do as I go.	1	2	3	4
47. ..if I had only the software manuals for reference.	1	2	3	4
48...if I had never used a package like it before	1	2	3	4
49...if I could call someone for help if I got stuck.	1	2	3	4
50...if someone showed me how to use it first.	1	2	3	4
51. ..if I had used similar packages before this one to do the same job.	1	2	3	4
52. ..if I had just the built-in help facility for assistance.	1	2	3	4
53...if I had a lot of time to complete the job for which the technology was provided.	1	2	3	4
54...if someone else had helped me get started.	1	2	3	4
55...if I had seen someone else use it before trying it myself.	1	2	3	4

THANKS FOR COMPLETING THIS QUESTIONNAIRE!
If you would like to make any comments, please write them here.

Technology Availability and Utilization Survey

Exit this survey

1. Default Section

1. Instructions: This questionnaire is designed to learn how school teachers view and use technology on their jobs. Select the answer that you feel most completely applies to how often you utilize the technology for delivery of instruction in the classroom on a daily basis. All responses will be kept confidential

	Not Available	Not Utilized	Used Very Rarely	Used Regularly	Used Often	Used Almost Always
Computer						
Internet						
E-Mail						
Overhead Projector						
Scanner						
Active/Smart Board						
Printer						
Digital Camera						
Camcorder						
DVD Player						
Videocassette Recorder(VCR)						
Word Processor						
Laptop computer						
Compact Disc (CD Player)						
Flash Drive/Memory Stick						

2. Directions: From the list below, check all the situations that apply to how you use technology at school.

- [ ] school talk - to communicate with parents and the public
- [ ] email - to communicate with colleagues and with principal
- [ ] word processor to print weekly or monthly newsletters - to communicate with parents
- [ ] principal observations of teachers using technology
- [ ] CRCT on-line testing
- [ ] grades for report cards and attendance kept on computer
- [ ] teacher license/recertification(InTech technology training)
- [ ] requirements of corporations and private foundations that provided equipment to conduct technology related research at your school

3. Directions: Select the answer in the space under the label which is closest to your agreement or disagreement with the statements.

	Strongly Disagree	Slightly Disagree	Agree	Slightly Agree	Strongly Agree
I hesitate to use school technology(e.g., computers, software, smart boards)for fear of making mistakes that I cannot correct.					
The selection of technology specific student-learning activities in my class is under my control.					
My principal encourages the staff to attend technology training on an on-going basis.					
It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key.					
My principal makes sure that the school has a technology support person available on a daily.					
I have been trained how to incorporate technology into my daily lessons.					
My principal provides instructions on how to use each technology tool that is integrated into our classrooms.					
I feel apprehensive about using school technology.					
My principal encourages me to integrate technology into teaching and learning.					
My school has a good technical support system.					

	Strongly Disagree	Slightly Disagree	Agree	Slightly Agree	Strongly Agree
I have difficulty understanding the technical aspects of computers and other school technologies.					
The computer-to-student ratio at my school is not good.					
In faculty meetings, my principal frequently discusses the subject of integrating technology into the school curriculum.					
In my class, I select which content and skills are taught by use of technology.					
I have been thoroughly trained on how to work the technology at my school.					
My job does not allow for technology usage discretion on my part.					
I have avoided school technology(e.g., computers, software, smart boards)because it is unfamiliar and somewhat intimidating to me.					
I have considerable opportunity for freedom and independence in how I use technology to do my job.					
I have plenty of time to use technology in my lessons during the day.					

4. Directions: Select the answer that you feel most completely applies to your experience with school technology for delivery of instruction in the classroom.

	None	Very Limited	Some Experience	Quite A Lot	Extensive
How do you rate you experience with technology (e. g., computers, software, smart boards) available in your school?					

5. Often in our jobs we are told about technology (e.g., computers, software, smart boards)that are available to make work easier. For the following questions, imagine that you were given a new school technology package for some aspect of your work. It does not matter specifically what this technology package does, only that it is intended to make your job easier and that you have never used it before.

Directions: For each of the conditions listed below, please rate your confidence about being able to complete a job using the new technology package.

I COULD COMPLETE THE JOB USING THE NEW TECHNOLOGY PACKAGE....

	Not at all confident	Slightly confident	Moderately confident	Totally confident
if there was no one around to tell me what to do as I go.				
if I had only the software manuals for reference.				
if I had never used a package like it before.				
if I could call someone for help if I got stuck.				
if someone showed me how to use it first.				
if I had used similar packages before this one to do the same job.				
if I had just the built-in help facility for assistance.				
if I had a lot of time to complete the job for which the technology was provided.				
if someone else had helped me get started.				
if I had seen someone else use it before trying it myself.				

6. THANKS FOR COMPLETING THIS SURVEY!
If you would like to make any comments, please write them here.

Next

4. Enter to Win $100 VISA Gift Card

7. To enter the drawing for a $100 VISA gift card, please enter your name and the name of your school. Winners will be notified by June 6th. Please be assured that your name and the name of your school name will remain confidential.

Name:	
School:	
Address:	
Address 2:	
City/Town:	
State:	– select state –
ZIP/Postal Code:	
Country:	
Email Address:	
Phone Number:	

Done

APPENDIX C:

PILOT STUDY INSTRUCTIONS

Instructions for Pilot Study

Factors the Influence and Promote the Use of Technology in Georgia's Elementary Schools

by Shelley A. Samon

I. Read the cover letter for clarity and understanding.

- Was anything left out that needs to be added?
- Is there any thing that needs to be explained that was not?
- Is there any thing that needs to be removed?

II. Read the directions for each section of the survey instrument (I-V).

- Were there any directions that were not clear?
- Is there any thing that needs to be added, changed or removed?

III. Complete the instrument.

- How long did it take you to complete the survey?
- Did anything confuse you – wording, meaning, ect?
- Does anything need to be changed?

IV. Return your completed survey and all comments.

- Send to Shelley A. Samon, 101 Jerry Road, Wrens Ga. 30833

APPENDIX D:

LETTERS REQUESTING PARTICIPATION IN STUDY

May 8, 2008 Original Letter

Shelley A. Samon
101 Jerry Road
Wrens, Ga. 30833
Home 706-547-2796
E-Mail: s_samon@yahoo.com

Dear Teacher,

My name is Shelley Samon. I am conducting a dissertation project for the Doctorate in Education (Ed.D.) degree at Georgia Southern University. This study will investigate the relationship between teachers' attitudes toward technology and school principals' support of technology and the use of technology by teachers for delivery of instruction.

The University has approved the study, and the survey should only take 10-15 minutes of your time. This letter is to request your assistance in gathering data to analyze this situation. There is, of course, no penalty if you decide not to participate. Completing the survey is strictly voluntary. If you agree to participate, please complete the attached survey by answering the items and mail it before **(June 20, 2008)** in the envelope provided or you can go on the internet to the following website **(**https://www.surveymonkey.com/s.aspx?sm=T5_2beQNxrEyNBgctvA3kRYw_3d_3d**)** and complete the survey on-line.

Completion of the survey will be considered permission to use your responses in the study. All surveys are identical and your responses will be kept confidential. Neither your school nor school district will be identified in the results.

Although none of the items on the survey are designed to solicit sensitive information, you may refuse to answer any of them. However, I would appreciate any comments you have about specific items or about the survey instrument. Please feel free to write your comments on the back of the survey.

If you have any questions about this research project, please call me at (706-547-2796) or e-mail me a s_samon@yahoo.com If you have any questions or concerns about your rights as a research participant in this study, they may be directed to the Institutional Review Board Coordinator at the Office of Research Services and Sponsored Programs, Georgia Southern University, at (912-681-5465)

Thank you for your assistance, and especially your time, in completing this survey.

Respectfully,

Shelley A. Samon

Follow Up Letter (#1)

May 23, 2008

Shelley A. Samon
101 Jerry Road
Wrens, Ga. 30833
Home 706-547-2796
E-Mail: s_samon@yahoo.com

Dear Teacher,

My name is Shelley Samon. I am conducting a dissertation project for the Doctorate in Education (Ed.D.) degree at Georgia Southern University. This study will investigate the relationship between teachers' attitudes toward technology and school principals' support of technology and the use of technology by teachers for delivery of instruction.

Packages containing the survey were mailed out during the week of May 9, 2008. The deadline for completing the survey is June 20, 2008. The survey should only take 10-15 minutes of your time. This letter is to request your assistance in gathering data to analyze this situation. There is, of course, no penalty if you decide not to participate. Completing the survey is strictly voluntary. If you agree to participate, please complete the survey which is located in the original package that was sent earlier on May 9th and mail it before **(June 20, 2008)** in the envelope provided. If you can not locate the original survey package, you can go on the internet to the following website **(**https://www.surveymonkey.com/s.aspx?sm=T5_2beQNxrEyNBgctvA3kRYw_3d_3d**)** and complete the survey on-line.

Completion of the survey will be considered permission to use your responses in the study. All surveys are identical and your responses will be kept confidential. Neither your school nor school district will be identified in the results.

If you have any questions about this research project, please call me at (706-547-2796) or e-mail me a s_samon@yahoo.com If you have any questions or concerns about your rights as a research participant in this study, they may be directed to the Institutional Review Board Coordinator at the Office of Research Services and Sponsored Programs, Georgia Southern University, at (912-681-5465)

If you have already completed the survey and the results have been returned, please disregard this letter and thank you for your participation, your assistance, and especially your time, in completing this survey.

Respectfully,

Shelley A. Samon

Follow Up Letter (#2)

June 7, 2008

Shelley A. Samon
101 Jerry Road
Wrens, Ga. 30833
Home 706-547-2796
E-Mail: s_samon@yahoo.com

Dear Teacher,

My name is Shelley Samon. I am conducting a dissertation project for the Doctorate in Education (Ed.D.) degree at Georgia Southern University. This study will investigate the relationship between teachers' attitudes toward technology and school principals' support of technology and the use of technology by teachers for delivery of instruction.

Packages containing the survey were mailed out during the week of May 9, 2008. The deadline for completing the survey is June 20, 2008. The survey should only take 10-15 minutes of your time. This letter is to request your assistance in gathering data to analyze this situation. There is, of course, no penalty if you decide not to participate. Completing the survey is strictly voluntary. If you agree to participate, please complete the survey which is located in the original package that was sent earlier on May 9th and again on May 23rd and mail it before **(June 20, 2008)** in the envelope provided. If you can not locate the original survey package, you can go on the internet to the following website **(**https://www.surveymonkey.com/s.aspx?sm=T5_2beQNxrEyNBgctvA3kRYw_3d_3d**)** and complete the survey on-line.

Completion of the survey will be considered permission to use your responses in the study. All surveys are identical and your responses will be kept confidential. Neither your school nor school district will be identified in the results.

If you have any questions about this research project, please call me at (706-547-2796) or e-mail me a s_samon@yahoo.com If you have any questions or concerns about your rights as a research participant in this study, they may be directed to the Institutional Review Board Coordinator at the Office of Research Services and Sponsored Programs, Georgia Southern University, at (912-681-5465)

If you have already completed the survey and the results have been returned, please disregard this letter and thank you for your participation, your assistance, and especially your time, in completing this survey.

Respectfully,

Shelley A. Samon

APPENDIX E:

INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

Georgia Southern University
Office of Research Services & Sponsored Programs

Institutional Review Board (IRB)

Phone: 912-478-0843
Fax: 912-478-0719 IRB@GeorgiaSouthern.edu
Veazey Hall 2021
P.O. Box 8005
Statesboro, GA 30460

To: Shelley A. Samon
101 Jerry Road
Wrens, GA 30833

Barbara Mallory
P.O. Box 8131

CC: Charles E. Patterson
Associate Vice President for Research

From: Office of Research Services and Sponsored Programs
Administrative Support Office for Research Oversight Committees
(IACUC/IBC/IRB)

Date: May 6, 2008

Subject: Status of Application for Approval to Utilize Human Subjects in Research

After a review of your proposed research project numbered: **H08231**and titled **"Factors that Influence and Promote the use of Technology in Georgia's Elementary Schools"**, it appears that (1) the research subjects are at minimal risk, (2) appropriate safeguards are planned, and (3) the research activities involve only procedures which are allowable.

Therefore, as authorized in the Federal Policy for the Protection of Human Subjects, I am pleased to notify you that the Institutional Review Board has approved your proposed research.

This IRB approval is in effect for one year from the date of this letter. If at the end of that time, there have been no changes to the research protocol; you may request an extension of the approval period for an additional year. In the interim, please provide the IRB with any information concerning any significant adverse event, **whether or not it is believed to be related to the study**, within five working days of the event. In addition, if a change or modification of the approved methodology becomes necessary, you must notify the IRB Coordinator **prior** to initiating any such changes or modifications. At that time, an amended application for IRB approval may be submitted. Upon completion of your data collection, you are required to complete a *Research Study Termination* form to notify the IRB Coordinator, so your file may be closed.

Sincerely,

Eleanor Haynes

Eleanor Haynes
Compliance Officer