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An Assessment of Influences Which Affect Teachers' Use of Technology

Bryan K. Stewart
University of Tennessee - Knoxville

To the Graduate Council:

I am submitting herewith a dissertation written by Bryan K. Stewart entitled "An Assessment of Influences Which Affect Teachers' Use of Technology." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Education.

Edward L. Counts, Major Professor

We have read this dissertation and recommend its acceptance:

John Ray, Mary Jane Connelly, Karen Adsit

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

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Anne Mayhew

Vice Chancellor and Dean of

Graduate Studies

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An Assessment of Influences Which Affect Teachers' Use of Technology

A Dissertation presented for the Doctor of Education Degree

The University Of Tennessee, Knoxville

Bryan K. Stewart

December 2005

Dedication

A dedication for the amount of time and energy accumulated into this dissertation communicates not only admiration, but also adoration. This dissertation is dedicated to my family and friends who have toiled with me through my education and beyond.

First and foremost, I dedicate this dissertation to my mother, Sara Duncan, for her never-ending love and understanding of my need to keep learning. She is a true inspiration of persistance and perserverence in the face of life's obstacles. As her "baby" son, it is my honored privilege to be the first in our family to complete graduate studies and finish this disseration. My mother never gave up on my completing this doctoral study. Through continual urging, she saw the culmination of my goal. Though she often underestimates her own knowledge and experience, her example of living guides me daily. I love you and thank you for who you are!

Without the constant nagging of my sister, Robin Stewart, and my brothers, Joe and Todd Stewart, the journey to my finishing would have been unexciting. As the youngest, I have learned from their experiences and their knowledge about how to be a better person. The relationships that we have not only serve as strength, but also fortitude. Each one of you are distinct indivduals and you have taught me that it is "OK" to be me. Thank you!

Friendship in word is easy, but when it is in deed, it is wonderful. Rick Simerly you have been my friend through this excursion. Your patience and

selflessness have been a grounding force for me. Words cannot express my gratitude for all of your support. I hope that through our friendship you have grown as I have.

One last person who has made a impact on my finishing is Dr. Rebecca Everett. As my colleague, friend, principal, mentor, and shoulder, Rebecca has extended my circle of friends. Never giving a negative thought, but always positive in knowing that I could achieve this dream. Our friendship means so much to me.

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Abstract

An Assessment of Influences That Affect

Teachers' Use of Technology

by Bryan K. Stewart

Current literature is plentiful on computer-based technology's positive influence on students. There are only a few studies that have considered the influence that technology has on teachers. This is a study about influences, which affect teachers' use of technology. It is based on inconsistencies in previous studies, areas not addressed in previous surveys, and the dramatic changes in technology and Internet access using Web browsers since the previous surveys on technology were conducted.

As new technologies make their way into instructional settings, effects of teachers' use of technology can be dynamic. This study examined particular areas of teachers' use of technology. The scope of this study does not provide exhaustive information, but as it unravels, its beginnings create a foundation to understand the role of technology in teaching and learning.

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CHAPTER I: INTRODUCTION

Background of the Problem

Technology is transforming American society. Current advancements in electronic technology are driving an "information revolution" much like advances in mechanical technologies precipitated the industrial revolution at the turn of the 20th Century. America's shift from an industrial society to an "information society" is steadily becoming reality as technological advances begin to affect every aspect of our lives. In light of these changes, our society increasingly requires members who are *information literate* to recognize the need for information, are able to identify and locate it, gain access to it, and then evaluate the quality of the information received before organizing it and using it effectively (Hancock, 1993). These changes have prompted our education system to restructure schools that were designed to meet the needs of an industrial age. Simply installing technology in schools has done little to promote the kinds of changes that our schools require (Stoddart & Niederhauser, 1993). This effort is the professional development of teachers. Only through extensive preservice and inservice activities will teachers acquire the understanding, skill, and confidence they need to use technology in their classrooms and prepare their students for life in an information-based society.

Technology can be defined as the human process of applying resources to satisfy our wants and needs in order to extend our capabilities. Technology can also be thought of as knowledge and as hardware or artifacts that have

always been with humans (National Science Foundation, 1992). This era in history will be known as the information age. Unlike any other force, technology will continue to have a significant influence on our world (McCormick, 1990).

Since the beginning of the twentieth century, educators have deliberated the use and value of technology as an instructional tool. A decent portion of the century passed as educators watched technology infiltrate every aspect of society except education. Even though, technology has become an accepted part of our society, the educational community has not embraced technology in the same way (Barron & Orwig, 1993).

With technology's entrance into the classroom, the accolades for using computers for instruction and learning, and the steady decrease in the prices of computers, there has been a steady growth of the number of computers purchased for classroom use. Quality Education Data (QED), a data marketing company that has tracked educational technology data since 1981, reported that the student-computer ratio in the early 1990s was nine to one (QED, 1995). However, relatively few teachers are using computers, as reflected in the question by Cuban (1993):

> Today, computers and telecommunications are a fact of life as basic as electricity. They have altered the daily work of large businesses and industry. Yet why is it that with all the talk of school reform and information technologies over the last decade, computers are used far less on a daily basis in classrooms than in other organizations? (p.185).

Becker (1994a, p. 38) stated, “About three-fourths of elementary school teachers of grades 4 through 6 were reported to use computers in various academic subjects in 1992.” Users were liberally defined as those using the computer on at least several occasions during the year. In his analysis of computer-using teachers, Becker (1994a) used several surveys. They included: the 1992 Computers In Education Study of the International Association for the Evaluation of Educational Attainment (IEA), the 1993 Communications Survey of Member Teachers of the National Education Association, and the 1990 “First Follow-up” of the National Educational Longitudinal Survey (NELS, 1990).

In the IEA (1992) survey, the percentage of teachers who used computers with students, at least minimally, was divided by subject and by school level. This survey seemed to indicate that almost half of middle/junior high and high school mathematics, language, and science teachers used computers, with about 70% of elementary teachers in these areas using computers. But “minimally” was defined as “at least several times during the year.” With the increased number of computers in public schools, the acceptance and use of computers would appear to be widespread. However, “several times” a year seems to indicate a deficiency by teachers to fully infuse technology into the classroom.

In 1996, the CEO Forum on education and technology was founded. It was a rare partnership between businesses and educational leaders who committed themselves to appraising the integration of technology in America’s schools. The five year partnership’s goal was to attempt to ensure achievement

at higher standards in order to produce and expand citizenship into the 21st century (CEO Forum,1996).

According to William Pfluam (2004), measurable results of technology use have been insufficient. When addressing the question of technology's meagerness, Pfluam suggests two assertions: measurable results of technologies use were meager and should those results be considered.

> The reality of schools today is that they are all about measurement. Whether one supports or opposes the standards movement and the testing that accompanies it, it is impossible to ignore that testing drives school behavior and finances. Logically, unless the billions invested in school technology over the past two decades have measureably improved student performance, I do not believe we can expect future investment to approach this level (Pfluam, 2004. p. 5).

Pfluam continues to suggest that unless the investments of finances show measureable improvement in student achievement, future investments are not likely to meet the investments's level of the beginning funding in technology (Pflaum, 2004).

Statement of the Purpose of the Study

With the rapidly changing nature of technology, much information on the use of technology is outdated and incomplete. The research on technology's influence on students is abundant; however, existing research on the influence of teachers using technology is limited and in the last two decades has been quite

narrow. This purpose of this study is to update and explore aspects that influence teachers' use of technology.

Research Questions

For this study the following research questions will be asked:

1. What influences do the processes and/or resources of technology have on teachers' use of technology?
2. What influence does preservice, inservice, and other professional development have on technology use?
3. What influences does adminstration and support of technology have on teacher's use of technology?
4. To what extent does the relation of a comprehensive qualitative study, published by ASCD (Association for Supervision and Curriculum Development), on computers in schools, *The Technology Fix* (2004), relate to quantifiable data analysis about teachers' use of technology?

Significance of the Study

As the numbers of technology devices and the Internet access in schools have grown, questions have arisen about the extent to which this technology is utilized in classroom environments. Numerous studies have examined the relationship of student achievement and technology, but few have examined factors that impact teachers' use of technology.

The information gathered from this study should: (1) provide school administrators and districts with data findings to help them make more informed

decisions on the placement of computers and appropriate teacher training and support for the use of technology for instructional purposes in public schools; (2) provide more up-to-date information on the current technology uses today; (3) provide information that will give educators an understanding of what influences teachers to use technology; (4) provide a forum, through extended research, for generating discussion about educational technology as well as areas for further research. The study will also attempt to identify current practices in the use of technology.

Delimitations and Limitations

The delimitations of the study are as follows:

1. The study is purposely delimited to the teaching and learning, professional development, and leadership of technology by school systems in one state, Tennessee.
2. Individual schools or school systems will not be identified in the study.

The limitations of the study are as follows:

1. The study is limited to the honesty and perceptions of public school personnel who completed the survey.
2. This study is limited to the questions asked on the E-TOTE online survey completed by schools. E-TOTE has been used for examining technology use in the State of Tennessee for the school years 2003-2005.
3. The qualitative examination utilizing *The Technology Fix* is limited to only those regions Pfluam observed, Massachusetts, New Hampshire,

Pennsylvania, North Carolina, Ohio, Georgia, and northern and southern California.

Assumptions of the Study

For use in this study, assumptions are as follows:

1. Schools were required and encouraged by the State of Tennessee to complete the E-TOTE online survey for the school years 2003-2005.
2. Participants provided honest answers and were qualified by identification at the school level as being technologicaly astute.
3. The survey closely measures factors for analysis.
4. School districts provide staff development and training for using technology.
5. The ISTE, International Society for Technology in Education, computer competencies and skills guidelines provide a dependable list of skills for elementary, middle, and high schools.
6. Observations made by Pflaum (2001-2002) are provided with accuracy.

Definitions of Terms

The following terms are defined as they apply to this study.

21st Century Skills: The new set of skills necessary to prepare students for life and work in the digital age. These skills include digital literacy, inventive thinking, effective communication and high productivity abiliites.

Access: ability to use computer-based technology without constraints of location, time schedule, or availability.

Accountability: Holding people and institutions responsible for their, or their institution's performance in meeting defined objectives.

Alignment: The clear lineation and linkage of instructional resources and tools and assessment to support standards and educational objectives.

Assessment: The means of evaluating performance, skills and knowledge.

Continuous training: training conducted on an ongoing basis throughout the year to provide the teachers with the necessary competencies for employing computer-based technology in instruction.

Digital Content: The digitized multimedia material that calls upon persons to seek and manipulate information in the collaborative, creative and engaging ways that make digital learning possible.

Exemplary practices: practices that have broken with traditional practice and that employ computers largely as substitutes for paper-and-pencil worksheets and for "enrichment" to reward the completion of other work. The use of a wide variety of computer software--including simulations, programming languages, spreadsheets, database programs, graphing programs, logic and problem-solving programs, writing tools, and electronic bulletin-board communications software-- often working collaboratively, to directly address class curricular goals (Becker, 1994b).

Influence: factors that have an affect on the decision of teachers to use technology for instruction.

Initial training: training provided at a time when equipment or software is new to teachers for use in instruction.

Inservice: professional development for educators during the school calendar year.

Integration: the act of forming or blending educational content areas into a whole.

Just-in-time training: training provided only at the time and in the amounts that are necessary, not overloading an individual with more information than what is needed at a particular time.

Practice: to exercise, train, drill, or carry on an activity that gives the teacher experience.

Preservice: Teacher preparation development in college coursework as students.

Professional development: The act or process of extending educational understandings through collegial collaborations.

Technology: computers or any device connected to and controlled by the computer such as CD-ROMs, Internet access, LANs, laserdisc, dvd, modems, scanners, televisions, and video cassette recorders.

Use: the customary practice of using computer-based technology for instruction, which is described as low, medium and high use.

Workshop: Training provided school systems that are one to three days in length and do not carry any academic credit.

Web/WWW: World Wide Web / Internet

Organization of Study

The dissertation is organized in the following chapter format:

I. Overview of the Study

II. Review of Related Literature and Research

III. Methods and Procedures

IV. Presentation and Discussion of the Findings

V. Summary, Conclusions, and Recommendations

This study is presented in five chapters. Chapter 1, the introduction, is composed of the background, the statement of the purpose, the research questions, the significance of the study, the delimitations and limitations, the assumptions, definitions, and organization of the study. Chapter 2, the review of related literature, includes a review of teacher technology use in a historical sequence, teacher attitudes regarding the use of technology, and updates of teacher technology use in quantitative and qualitative quality. Chapter 3 describes the methodology of the study, including the identification of subjects, plan for collecting data, and the statistical analysis to be used in interpreting the data. Chapter 4 includes the findings and the analysis of survey data. Chapter 5 concludes the study with a summary of findings, a discussion of conclusions, and implications for further research. Following chapter 5 is a bibliographic and supplemental materials section.

CHAPTER II: REVIEW OF RELATED LITERATURE

In order to wholly gain numerous understandings of the teachers' influence of technology use in the classroom, an examination of current, recent, and earlier inquiries is required. The continuum presented represents over two decades of information about teachers and the influence of technologies in the classroom.

Review of Related Literature

Current Inquiries

Education is the cornerstone of the millienia. Educators must be prepared to educate tomorrow's child with the necessary tools to become citizens in this technological era. According to the International Society for Technology in Education NETS, (National Educational Technology Society), Project, a combination of essential conditions is required for classroom teachers to create learning environments conducive to powerful uses of technology. The most effective learning environments meld traditional approaches and new approaches to facilitate learning of relevant content while addressing individual needs (NETS, 2000).

The NETS Project considered the following elements necessary for achieving excellence in technology and they are (1) shared vision, (2) access, (3) skilled educators, (4) professional development, (5) technical assistance, (6) content standards, (7) student-centered teaching, (8) assessment, (9) and

community support (NETS, 2000). (See Appendix B for a chart describing each element and profiles.)

The foundation of ITSE (International Society for Technology in Education) is that technology is a powerful tool with enormous potential for paving high-speed highways from outdated educational systems to systems capable of providing learning opportunities for all, to better serve the needs of 21st century work, communications, learning, and life (ITSE, 2000).

Teachers must be zealous in educating. The influences that sculpt their instructional practices must be dynamic in disposition toward technology. In 1999, the U.S. Congress established the Web-based Education Commission. The commission was established to develop specific policy recommendations geared toward maximizing the educational promise of the Internet for pre-K, elementary, and postsecondary education learners. The overearching goal of the commission is to establish a "policy roadmap" that will help education and policy officials at the local, state, and national levels to better address the critical "digital age" challenges brought about by the Internet and other emerging technologies (WEC, 2000).

A continuing concern with such visions for reinvention of instructional practice is whether schools (and students) are ready technologically and, in particular, what to do about technology differences across social groups. The National Center for Education Statistics (NCES) reports that as of September 1999, 95% of schools were connected to the Internet, up from 35% in 1994

(NCES, 2000). Schools in *all* categories (i.e., grade level, poverty concentration, and metropolitan status) were equally likely to have Internet access. Further, most schools had dedicated lines with only 14% using dial-up modems, which tend to be slower and less reliable as access methods.

According to Randy Bennet of Educational Testing Services (2000), many of these schools could have only a single Internet-connected machine and that single machine could be the one sitting on the principal's desk. How many classrooms were actually wired? Again, according to NCES, as of September 1999, 63% of all instructional rooms had Internet access. The ratio of students to Internet-connected computers was 9:1, down from 12:1 only one year earlier. These are staggering numbers, for they imply that classrooms are connecting to the Internet at a very rapid rate. Table 2.1 represents the growth of the Internet connectivity from 1994 through 2003. It depicts the percentage of public schools with Internet access, including standard error (NCES, 2005). This successful increase in technology access is due in no small part to federal efforts. The government's *e-rate* program, now in its seventh year, has been giving public schools and libraries discounts of up to 90 percent on phone service, Internet hook-ups, and wiring ("FCC: E-rate subsidy funded," 2000). In 1999, 82% of public schools received *e-rate* funds, including more than 53,000 urban and 25,000 rural schools.

In 2003, the state of Tennesse established a statewide yearly snapshot of the use of technology in K-12 public schools. Its data will help measure

Table 2.1 NCES(2000) School Internet Connectivity									
1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
35%	50%	65%	78%	89%	95%	98%	99%	99%	100%

development in specified areas. The ETOTE, Tennessee Online Technology Evaluation System, will help school districts evaluate specific needs to be used during planning and school improvement. A significant element within the ETOTE system is the Tennessee STAR (School Technology and Readiness) Chart Assessment. The STAR chart assessment identifies four areas that are then divided into focus areas of indicators. The scoring table indicates the level of progress within schools, districts, and state (http://tn.ontargetus.com/, Tennessee Department of Education, 2004).

Throughout the five year partnership of the CEO Forum, six distinct reports were published to explore the integration of technology in America's schools. The forum created a STaR Chart and a STaR Assessment to be utilized to gauge technology integration. The STaR Chart examined the hardware and connectivty with profiles of users. The STaR Assessmnet focused on the developmental stage of technology integration in schools and colleges (CEO Forum, 2000).

The year one report (1997), *The School Technology and Readiness Report: From Pillars to Progress*, concentrated on the importance of integrating all elements of educational technology. It was during year one that the School

Technology and Readiness assessment was utilized. The elements considered for integration of technology ranged from hardware and connectivity to professional development and content of curriculum. Through the use of the STaR Chart, schools had a indicatior of progress toward integration. The STaR Assessment became a
benchmark of national progress toward measuring integration of technology (CEO Forum, 1997).

In 1999, the report, *Professional Developmnet: A Link to Better Learning*, directed its span toward educator professional development. The key indicator of this report reflects that educator professional development is the foundation of effective use of technology. Included in findings were ten principles for effective professional development and updates to the STaR Chart and STaR Assessment (CEO Forum, 1999).

Year three yielded two reports from the CEO Forum. The first report, *The Teacher Preparation STaR Chart: A Self-Assessment Tool for Colleges of Education*, was directed at awareness the self-assessment for colleges to ascertain the level of readiness in the preparation of future teachers. The report explored the level of readiness that preservice teachers have to integrate technology into instruction (CEO Forum, January 2000). The second report, *The Power of the Digital Learning: Integrating Digital Content*, presented a visualization of digital learning that focused on how the actions of schools, teachers, students, and parents understanding the need integrate digital content

into the curriculum to foster learning environments that develop 21st century skills. Also included in this report was a strategy for creating digital content and an update to the STaR Chart (CEO Forum, June 2000).

The final year four reports are divided into a policy paper and a concluding report. The policy paper, *Education Proposals Must Be in Comprehensive Education Legislature*, provided recommendations for the federal government. These recommendations were issued to sustain the work of integrating technology into legislation (CEO Forum, 2001). The concluding report, *Key Building Blocks for Student Achievement in the 21st Century: Assessment, Alignment, Accountablity, Access and Analysis*, reviewed the important objectives that could be achieved through the effective use of educational technology. The report stressed changes in each key area and offered suggestions for further research to ensure that technology produces positive educational results. Again, a STaR Chart update was provided (CEO Forum, 2001).

One of the key target goals specified by the Enhancing Education Through Technology Act of 2001 (Title II Part D of No Child Left Behind) is "encouraging effective integration with teacher training to establish instructional methods and best practices," (http://www.ed.gov/legfislation/ESEA02/pg.34.html) . In order for this goal along with others to be met, teacher competence must be developed utlizing technology to meet instructional goals and standards (http://tn.ontargetus.com, TDOE, 2004). Educators have at their disposal the

resources that can make a difference in their use of technology. Teachers' influences in the use of technology in the classroom must be adapted to meet the needs of every student.

The use of technology by teachers has undergone few inquiries over the past decade. Bebell, Russell, and O'Dwyer (2004) suggested that research into teachers' use of technology is not clearly defined. They indicate that multiple measures must be utilized to ascertain an authentic view of technology use by teachers. Findings by Bebell, Russell, and O'Dwyer provide insight into improving approaches for measuring teachers' use of technology. In his ASCD book, *The Technology Fix* (2004), Pflaum suggests, based on the results of a qualitative study, that technology is not the promised solution it had seemed. He suggests clarifications of what must be accomplished to create benefits for schools utilizing technology.

Recent Inquiries

As early as 1993, Means concluded that a number of schools and teachers today have at least some access to multiple kinds of video and computer-based technologies. Yet much of this technology is not being used to its potential, and most classroom environments are still not significantly influenced by technology. Teacher's access and attitudes are perhaps the biggest aspects limiting effective use of computer networking in many of the nation's classrooms. Although years ago, some computer enthusiasts may have imagined that computers would take over many of the tasks of teachers, it is now

widely accepted that technology actually puts more demands than ever on classroom teachers. There are several reasons for this. Learning the mechanics of using hardware and new software is just one challenge. More difficult yet is the development of lesson plans, available over the Internet, that incorporate the resources into the curriculum. In addition, teachers who are accustomed to teacher-centered classrooms have to learn a new set of techniques to manage the transition to student-centered learning. Teachers are agreed in concluding that, in the early phase of technology implementation, teaching becomes harder, concluded Barbara Means one of the authors of the Department of Education-sponsored report, *Using Technology to Support Education Reform* (1993).

Despite these findings, most schools cut corners on teacher training, making the teachers' task of utilizing technology even more difficult. In a 1995 report, *Teachers and Technology: Making the Connection,* the now-closed Office of Technology Assessment suggested that schools should be devoting at least 30% of their technology spending to training. But Quality Education Data, the Denver-based research firm, estimated that school districts devoted only five percent of their technology budgets to training in the 1996-97 school year (QED, 1995). Moreover, just 13% of public schools require teachers to obtain training in advanced telecommunications, according to the National Commission of Educational Statistics, and while some schools offer teachers incentives to seek training on their own, 51 percent leave the matter entirely up to teachers.

Traditional training methods are unlikely to fill the gap anytime soon. The Office of Technology Assessment (OTA) found that most teacher-training programs at colleges make little use of technology. The report, *Advanced telecommunications in U.S. public elementary and secondary schools* (1996), also suggested that the typical approach to in-service teacher training, short courses on specific computer applications or other single topics, may be particularly ineffective in preparing teachers to use computer networking in their classrooms. As most computer users can testify, learning a new software program requires hands-on practice. Continuing support from a good mentor is also important, yet only six percent of elementary schools and just three percent of secondary schools employ computer coordinators (OTA, 1995).

Teachers who go online can find support, including a wide range of resources, discussion groups, lesson plans, and other teachers eager to exchange ideas or launch collaborative learning projects. Once a teacher knows enough to tap into these resources, attitudes can change positively. But another problem arises. According to Margaret Honey, deputy director of the Center for Children and Technology in New York, one of the biggest issues for teachers is time. Ms. Honey further elaborates that with the enthusiasm teachers have about the plethora of resources on the Internet, finding useful choices for curriculum can take huges amounts of time (Honey, 1994). Teachers need time to understand new concepts, learn new skills, develop new attitudes, research, discuss, reflect, assess, try new approaches and integrate them into their

practice and time to plan their own professional development (Cambone, 1995; Corcoran, 1995; Troen & Bolles, 1994; Watts & Castle, 1993). Cambone (1995) points out that teachers, as adult learners, need both time setaside for learning (e.g., workshops and courses) and time to experience and digest new ideas and ways of working. A major theme in *Prisoners of Time* (1994), the National Education Commission on Time and Learning report, is that U.S. students and teachers are victims of inflexible and counterproductive school schedules. Professional development and collaboration generally must take place before or after school or in the summer, thus imposing on teachers' personal time; during planning or preparation periods, which cuts into time needed for other tasks; or during the limited number of staff development days. Teachers who sacrifice personal time or preparation time often experience burnout from trying to fulfill competing demands for their time.

The Office of Technology Assessment 1995 report also cited these key findings about technology and teachers: (1) Most teachers have not had suitable training to prepare them to use technology in their teaching. A majority of teachers report feeling inadequately trained to use technology resources, particularly computer-based technologies. (2) In a majority of schools, there is no onsite support person officially assigned to coordinate or facilitate the use of technologies. Even in schools where a technology coordinator exists, a majority of this professional's time is spent supervising students or selecting and maintaining software and equipment. Very little time goes directly to training or

helping teachers use technologies. (3) Currently most funds for technology are spent on hardware and software. Increasingly experienced technology-using sites advocate larger allocations for training and support. (4) Support for technology use from the principal and other administrators, from parents and the community, and from colleagues can create a climate that encourages innovation and sustained use. (5) Schools should avoid acquiring technology for technology's sake. Developing a technology plan thinking through the goals for technology use at the local site and involving teachers in the planning process – is an important step in ensuring that the technology will be used by those that it is intended to support. (6) Although sites have made significant progress in helping teachers learn to use generic technology tools such as word processing, databases, and desktop publishing, many still struggle with how to integrate technology into the curriculum. Curriculum integration is central if technology is to become a truly effective educational resource, yet true integration is a difficult, time-consuming, and resource-intensive endeavor (OTA, 1995).

The key to successful implementation of computer technology into the classroom is a well-trained staff that understands how to use the technology tools available to them and how that technology relates to the learning environment they have created in their classrooms. Teachers must be given the opportunity to learn a core set of "technology skills." As these skills are mastered, many opportunities must be provided for teachers to understand how to fully integrate

these technologies into the daily teaching and learning process in their classrooms (OTA, 1995).

Earlier Inquiries

What are the most influential factors that are related to the use of computers by teachers in classroom instruction? Two major factors are attitudes and access. In recent studies conducted, Jaber (1997) and Blankenship (1998) both concluded that teacher access and attitude contribute to implementation of technology in the classroom.

Defining computer access or use in classroom instruction is a relatively difficult task. A search of the literature regarding computer use reveals a wide variety of definitions and three main components involved with the definition of computer use in classroom instruction: frequency of use, amount of time used, and purpose (Jaber, 1997; Blankenship, 1998).

According to Blankenship, (1998) use is often defined as a frequency of use, shown as either actual number of occurrences or percentage of usage. Askov (1993), Henderson (1994), and the researchers at the Florida State Department of Education (1993) all reported the frequency of use by machine or software package.

Use can also be measured as an amount of time. Field Research Corporation (1995) researchers measured use as a percentage of time (hours) computers were used in a typical week. The research staff at the Center of Excellence for Computer Applications (CECA) (1988) used the number of hours

per student per semester as a measure of computer use at the college level. The amount of time computers were used in a curriculum area (i.e., math, social studies) was utilized as the measure of use in Field Research Corporation (1995), CECA (1988), and Kirby (1988).

The greatest variation of measurement of use is in the purpose of the use. Field Research Corporation (1995) researchers utilized the following concepts to explain use in the classroom: direct instruction, student monitoring, and other school activities.

Jaber's (1997) study concurs with Blankenship (1998) in that teachers have reacted both positively and negatively to technology in the classroom. Some of the positive reactions have resulted from: (1) exploiting the potential of interactive technology, (2) changing teaching style, (3) assisting classroom management, and (4) having greater feelings of self-worth (Baker, Gearhart, & Herman, 1990; OTA, 1988; Sheingold & Hadley, 1990).

Computers have the potential to help students to solve problems, to think for themselves, and to collaborate with others (OTA, 1988). Computer use also has the potential to influence and change the way teachers teach. Technology encourages teachers to move from the role of dispenser of knowledge to a facilitator or coach, allowing the teacher to encourage and guide students in becoming active learners. David (1991, p.39) stated, "Teaching must change from dispensing information and rewarding right answers to creating activities that engage students' minds and present complex problems with multiple

solutions." Spending more time with individual students was also cited as a reason for teachers to exploit the computer's potential. Technology use also permitted the teacher to present more complex material and expect more from the students (OTA, 1988).

Personal influences include improved classroom management and increased positive feelings of self-worth. Technology allows the teacher to easily keep track of grades and to average them for reports. Individual student reports can be generated very quickly. Gaining new technical skills, viewed as important and keeping current with developments in the teachers' field, results in increased self-worth (OTA, 1995).

There are several perceptions by teachers in the use of computer-based technology that seem to be significant: (1) technology will support superior forms of learning (Means, Blando, Olson, Morocco, Remz, & Zorfass, 1993), (2) computer-based technology can change the way teaching/learning occurs (Dwyer, Ringstaff, & Sandholtz, 1991; OTA, 1988, 1995; Sheingold & Hadley, 1990), (3) technology helps teachers to accomplish things that they cannot do by themselves (Albright & Graf, 1992), (4) computer-based technology enhances teacher/student productivity (OTA, 1995; Sheingold & Hadley, 1990), and (5) computer-based technology prepares students for the work world (Albright & Graf, 1992). Teachers who hold these views tend to be the most successful in adapting and implementing the use of technology (Albright & Graf, 1992).

The perception that technology will support superior forms of learning comes from cognitive psychology. Means, et al. (1993) concluded that advance skills of comprehension, reasoning, and experimentation are acquired through the learners' interaction with content. Drawn from the constructivist view of learning,

> ...teaching basic skills within authentic contexts (hence more complex problems), for modeling expert thought processes, and for providing for collaboration and external supports to permit students to achieve intellectual accomplishments they could not do so on their own, provides the wellspring of ideas for many of this decade's curriculum and instruction reform efforts (Means, et al., 1993, p. 2).

Technology can change the way teaching occurs (Dwyer, et al., 1990), including: (1) a move from the teacher as the dispenser of knowledge to the teacher as a facilitator or coach, (2)higher expectations and the inclusion of more complex material, (3) more opportunity for individualized instruction, (4) less time lecturing to the whole class, (5) more comfort for the teacher during small-group activities, (6) team teaching, (7) interdisciplinary project-based instruction, and (8) an altering of the master schedule. Dwyer, Ringstaff, and Sandholtz (1991) indicated that these changes took place in five phases: entry, adoption, adaptation, appropriation, and invention.

Lewis and Wall's study (Albright and Graf, 1992) stated that computer-based technology helps teachers to accomplish things that they cannot do by

themselves, such as helping students experience times, places, people, and events that cannot be otherwise incorporated into the class. Technology also helps teachers accomplish tasks better, such as helping students visualize phenomena that are too small or too dynamic to convey effectively with print or static models or handwaving.

Technology enhances teacher productivity (OTA, 1995; Sheingold & Hadley, 1990) and administrative and management tasks. For example, record keeping improvements allowed teachers to provide students with more information in a more efficient manner that improved student motivation.

Technology also prepares students for the work world (Lewis and Wall (as cited in Albright & Graf, 1992). How to use and apply spreadsheets, word processing, or computer-aided design technologies were viewed as needed skills which students would need in the work world.

Successes reported by teachers using computer-based technology include: (1) being able to give more individualized attention to their students, (2) seeing their students accomplish tasks using computers as tools, (3) helping to make a subject more interesting using computer-based technology, (4) providing a means of expanding and applying what has been taught, (5) presenting more difficult concepts, (6) expecting more from their students, and (7) covering more material in a shorter period of time (OTA, 1988, 1995; Sheingold & Hadley, 1990; Dwyer, Ringstaff, & Sandholtz, 1991).

According to Sheingold and Hadley (1990) computers allow students to work without constant direction from the teacher, while freeing teachers to give more individualized attention to their students. This allows the teacher more time to individualize instruction. Second, teachers are able to see students apply what they have been taught by using computers as tools to accomplish difficult tasks, to solve difficult problems, and to produce more work in a shorter period of time. Third, teachers are then able to present more material because they are able to cover the material in a shorter amount of time. Fourth, teachers are able to make a subject more interesting by varying the way the material is presented and offering students a variety of ways in which they may accomplish their work (e.g., word processors, spreadsheets, databases, etc.). Dwyer, Ringstaff, and Sandholtz (1991) state, "....their students produced more, faster. In a self-paced, computational math program, for example, 6th grade students completed the year's curriculum in 60% of the time normally required, and test scores remained as strong as in previous years (p. 48)."

Time is an obstacle to the use of technology in the classroom (OTA, 1995; Sheingold & Hadley, 1990). Teachers are not provided with sufficient time or training to learn hardware and software operation (Becker, 1994b). Teachers also do not have an abundant amount of time to develop lessons using technology. Without ample time utilizing technology, educators cannot see the instructional potential of technology (Newman, 2000).

Access is also another problem. Teachers find it difficult to schedule access to computers for classes. Although the number of computers has grown in schools, these computers are frequently located in computer labs and scheduling access is difficult if not impossible (Becker, 1994; Sheingold & Hadley, 1990). The researchers at the Center for Applied Special Technology (1996) pointed out that schools are rapidly acquiring computers and networks, but that acquisition (access) is only the beginning. The definition of access to technology, as defined in the OTA report, has multiple connotations: computers in the classroom, ratio of students to computers, computers at home, current hardware and software, and location of computers. Reilly (1996) stated, “There are enough computers in schools in the United States to provide at least one for each classroom, but the reality is that the technology is not evenly distributed and much is already old” (p. 215). The researchers of Field Research Corporation (1995, pp. 3-11) surveyed 1,000 elementary (K-6) teachers in the United States and found access to computers to be distributed unequally. Many teachers (76%) have one computer in their classroom, but the number of teachers with more than one computer (36%) per classroom drops drastically. The findings are subject to sampling error estimates of plus or minus 3 percentage points at the 95% confidence level. Obviously, for teachers to use computers in classroom instruction, they must have access to computers (Blankenship, 1998).

Instructional philosophy is another barrier. Most teachers teach as they were taught. The teacher is viewed as the dispenser of knowledge, and the

student is the recipient of that knowledge. Studies (Dwyer, Ringstaff, & Sandholtz, 1991; OTA, 1995) have shown that technology allows the student to take an active role in the learning process and the teacher to act more as coach or facilitator. In the ACOT (Apple Classroom of Tomorrow) project for example, active participation usually takes place in collaborative learning projects that produces “noise” that is contrary to an effective learning environment in the traditional classroom. These differences prompt teachers to question the use of technology or their teaching methodology. In their report on the ACOT program, Dwyer, Ringstaff, and Sandholtz (1990) state,

> “... the direction of change towards child-centered instruction; towards collaborative rather than individual tasks; towards active rather than passive learning…Each of these dimensions brought deeply held beliefs about traditional schooling into conflict with what teachers witnessed in their classrooms” (Dwyer, et al. 1990. p. 12).

Other factors that have negatively influenced the use of computer-based technology are: (1) challenges to the teachers’ philosophy of teaching and learning, (2) the amount of time required to learn how to use computer-based technology, and (3) the lack of positive models (OTA, 1988, 1995; Sheingold & Hadley, 1990). When using computer-based technologies, students are encouraged to think, be creative and find alternate solutions to problems. This shift to a “student-centered” classroom, where there is collaboration, discussion, and excitement, sometimes seems chaotic to the teacher. It is this shift which

causes many teachers to rethink how they are teaching and how learning should take place.

Jaber suggested such factors cause many teachers to react negatively to technology (Jaber, 1997). One example is shown in recent research (Dwyer, Ringstaff, & Sandholtz, 1991) on the Apple Classroom of Tomorrow (ACOT). This study reported that when using technology, some teachers would vacillate between traditional methods used previously, “teacher-centered” and newer “student-centered” approaches. This vacillation, according to Dwyer, Ringstaff, & Sandholtz (1991), is due to the teachers’ beliefs and perceptions about how instruction and learning should occur. The conflict was in the mind of the teacher as he/she wrestled with how learning should occur. For example, collaborative learning groups, while using computers, grew noisy as they became excited over what they were finding and discussed these findings. From the teacher’s point of view, the noise indicated that there wasn’t any learning occurring. These teachers tended to revert back to the traditional lecture mode of instruction, their comfort zone, which resulted in student resistance to the traditional approach. Butzin (1992) suggested that if teachers looked carefully at the collaborative noise, they would find it actually served as a useful learning activity.

Teachers who stayed with the ACOT program and continued to use computers changed their teaching style to a student-centered classroom. These teachers became more innovative in the implementation of computer-based technologies into the instructional process and more comfortable in using

computer-based technology in the classroom. They began to expect more from their students and were able to engage students in higher order learning objectives (Baker, Gearhart, & Herman, 1990; Dwyer, Ringstaff, & Sandholtz, 1990). “Teachers who had regular access to computer technology in their classrooms over several years time experienced significant changes in their instruction, but not until they had analyzed and confronted deeply held beliefs about schooling” (Dwyer, Ringstaff, & Sandholtz, 1990, p. 45).

In 1990, the Bank Street College of Education’s Center for Technology in Education conducted a survey of 1200 teachers who used technology in grades 4 through 12 in all 50 states. From the 608 completed surveys, teachers reported changes similar to ACOT teachers in their expectations for their students (Sheingold & Hadley, 1990).

Sheingold and Hadley (1990) stated that text-processing tools, particularly word processors, were used by more than 90% of the teachers they surveyed. Means, et al, (1993) stated that the most frequent use of computer-based tools in U.S. education today was word processing software. Word processing programs have been used successfully in grammar classes to improve writing composition, spelling, and reading skills (Oakland County Schools, 1991). In addition to English teacher’s choice and use of word processors, Sheingold and Hadley (1990) report that the word processor is the most popular application for science and social studies teachers. Because of the versatility of word processors, they can be used across all areas of the curriculum.

From the Sheingold and Hadley study (1990) it is clear that spreadsheets assist teachers in classroom management and as analytical tools. Students' grades can be recorded and updated easily. Class projects, attendance, and daily participation can be easily recorded and updated as well. Spreadsheets allow students to perform analytical functions easily, and teachers are able to present realistic simulations to students (Jaber, 1997).

Databases are used to access information in an easy and rapid manner. There are numerous electronic databases with voluminous amounts of information. Teachers and students no longer have to manually look through card catalogs. They can query the database and retrieve the information. Databases, encyclopedias and other reference works on CD-ROM also allow the teacher to provide a means for interactive browsing (OTA, 1995).

Word processing, spreadsheet, and database software have been the key to attracting teachers to use computer-based technology in the classroom. Office of Technology Assessment (1995) stated that "gradebook or other record keeping software can provide a hook that gets otherwise reluctant teachers interested in using technology tools" (p. 71). Teachers report on how this technology has helped them and on the ways that students benefit from the technology (Greenfield, 1990; OTA, 1995).

Telecommunications provides a means for transcending school walls and accessing a wide range of local and global resources (OTA, 1995). The teacher and student have access to peers doing the same type of work and a means of

interacting with experts. It provides an opportunity to collect, share, and evaluate ideas and data with these individuals which before now was not easily possible. For many teachers, accessing telecommunications means doing so after school, at night, on their own time, and with their own money. Yet, these same teachers do not feel that telecommunications is too time consuming to use as a professional resource (Honey & Henriquez, 1993) and are unwilling to invest the time and money to have this valuable tool as an instructional resource.

The technology of telecommunication is changing rapidly. Modem connectivity is beginning to give way to direct connections using ethernet and other high bandwidth technology (National Center for Educational Statistics, 1996). The current trend in accessing the WWW, however, is by ethernet connections. Many school systems are investing large sums of money to “wire” their schools for Internet access. Many telephone companies are providing fiber optic cables to make direct access possible for public schools.

One incentive reported was increased communication among educators on such issues as sharing ideas, receiving rapid feedback on curricular issues and other topics, and keeping current on subject matter, pedagogy and technology trends. Similar findings were reported by Honey in 1994, involving telecommunications and the Mathematics Leadership Program to develop mathematical ideas and processes (Honey, et al, 1994). Other incentives to use telecommunications included accessing information and combating isolation. Student incentives for using telecommunications included: expanding student

awareness about the world, accessing information which would otherwise be difficult to obtain, and increasing students' inquiry-based and analytical skills (Honey & Henriquez, 1993; Schrum, 1993).

D'Souza (1992) conducted a case study with 24 students on "E-mail's Role in the Learning Process." Not one negative remark was given as a response. She concluded that the use of e-mail motivated students, led to greater communications among members of the class or group, and enhanced traditional classroom instruction by providing an alternate delivery system for classroom materials and information.

Despite the popularity of e-mail and the motivational benefits accompanying it, the current most popular Internet service is the World Wide Web (WWW or Web) (Hill & Misic, 1996). In 1995, the Survey of Advanced Telecommunications in U.S. Public Schools reported 50% of U.S. public schools have Internet access which is a 15% increase from 1994. Of those 50% with Internet access, 80% can browse the Web. Seventy percent of schools with World Wide Web access make it available to students, and 92% of schools with World Wide Web access make it available to teachers (Office of Educational Research and Improvement, 1996).

Summary

This review of literature covers some of the major influences that teachers encounter in the use of technology in the classroom. The review shows the variety of challenges and solutions that have transpired over the last decade in

the insurgence of technology. Tomorrow's advances will greatly enhance today's educators.

The research indicates:

Through current, recent, and earlier inquiries, from the late 1980's to the early 21st Century, into influences that affect teachers' use of technology dynamic, evolving, and inventive teachers are attempting to utilize technology for it potential. Several factors were identified frequently in the review that, though not inclusive of all influences, include include time, support, resources, instructional role changes, productivity, and dispositions.

CHAPTER III: METHODOLOGY OF THE STUDY

Methods and Procedures

To develop answers to the research questions, the researcher examined data using an element, the STaR Chart, of the online survey E-TOTE used by the State of Tennessee. This study will utilize participant survey data, which will be statistically analyzed as indicated. The subjects, the procedures, the instrumentation, and a method of statistical analysis are described.

Subjects

The population for this study is school systems in Tennessee that participated in the E-TOTE survey from 2003-2005. Population size for each school year is represented in the Table 3.1. Even though school systems were respondents to the survey, individual school level educators submitted answers. Based on the population size, the sample size is sufficiently representative of all school systems represented in the E-TOTE survey.

Table 3.1 E-TOTE Populations 2003-2005

School Year	Total Systems	Total Schools	Total Students	Total Teachers	Total Classrooms
2002-2003	142	1639	923,150	62,046	55,567
2003-2004	139	1600	924,198	59,341	54,768
2004-2005	138	1612	927,118	60,012	55,963

Procedures

The current Tennessee director of educational technology for K-12 schools, Mr. Johnny Crow, was contacted using email and phone communication. Permission was obtained for using the E-TOTE survey from the State of Tennessee's offical website. After permission was obtained from the Unversity to begin official research, the public data information was collected from the state website.

Instrumentation

Isaac and Michael (1990) state, "Surveys are the most widely used technique in education and behavioral sciences for the collection of data. They are a means of gathering information that describes the nature and extent of a specified set of data ranging from physical counts and frequencies to attitudes and opinions" (p. 128). Babbie (1990) stated that a survey has three general objectives: (1) describe a population, (2) explain differences in sub-groups, or (3) explore little known areas of a population. A survey instrument was selected (Appendix C, ETOTE Survey) based on the review of the literature, interviews, and existing surveys. The instrument used in this study was one portion of a survey used by the Tennessee Department of Education titled, "E-TOTE." The survey element used was the information collected under the Tennessee STaR Chart. The STaR Chart examines 22 indicators divided into four sections; Teaching and Learning, Educational Preparation and Development, Administration and Support, and Infrastructure and Technology (Appendix A).

Within the context of this research, only three of the four sections were analyzed. Infrastructure and Technology will be excluded.

The qualitative analysis used was the categories described by Pfluam, *The Technology Fix* (2004). In his book, he qualitatively construed four categories from his observations of technology use in schools. The four categories are computer as teaching machine, as an Internet portal, as a test giver, and as a data processor.

Statistical Analysis

The data collected is in the form of nominal data. The research questions were tested and analyzed using chi-square as the appropriate statistical method. Chi-square is a test used with frequency data and requires that the data are classified according to categories. Chi-square was used to determine if there is a significant relationship of the influence of : 1) progress and/or resources of teachers' use of technology, 2) preservice, inservice, and other professional development on technology use, and 3) administrative support of technology on teachers' use of technology. The data, once collected, was entered into the computer using spreadsheet software (Microsoft Excel). A chi-square was used to analyze the data by using the statistical software package SPSS 13™.

The statistical analysis was used to test the following hypotheses statements for each question:

<u>Question 1: What influences do the processes and/or resources of technology have on teachers' use of technology?</u>

H_o: There are no influences from processes and/or resources of technology on teachers' use of technology.

Question 2: What influence does preservice, inservice, and other professional development have on technology use?

H_o: Preservice, inservice, and other progessional development does not have influence on technology use.

Question 3: What influences does adminstration and support of technology have on teacher's use of technology?

H_o: There are no influences from administration and support of technology on teachers' use of technology.

Question 4: To what extent does the relation of a comprehensive qualitative study, published by ASCD (Association for Supervision and Curriculum Development), on computers in schools, *The Technology Fix* (2004), relate to quantifiable data analysis about teachers' use of technology? This question was not tested using statistical analysis.

The chi square independence test is used to decide whether an association exists between two variables of a population; the null hypothesis is that the two variables are not associated. If the null is rejected, other conclusions can be made.The p-value for a chi square test is computed by assuming the null is true and then determining the liklihood of observing data that would produce a chi square statistic as large or larger. The data from Chi square was tested at the 0.05 level of significance or p-value of 5%.

Summary

The population, the procedures, the instrumentation, and the statistical analysis have been described in chapter 3. The researcher describes the findings and the analysis of survey data in chapter 4 and concludes the study with a summary of findings, a discussion of conclusions, and implications for further research in chapter 5.

CHAPTER IV: FINDING OF THE STUDY AND ANALYSIS OF DATA

Findings of the Study

Although existing research on the influence of teachers using technology is limited and in the last two decades has been quite narrow, multiple appraisals have been created to gauge integration of technology into classroom. The majority of these evaluations are lacking the authentic measurement of use by teachers (Pflaum, 2004).

This chapter presents the findings of the study. The collection of data from the E-TOTE online survey was analyzed as described in the previous chapter. The analysis of the data was completed primarily through descriptive statistics. The findings are communicateed in narrative and tabular form.

Discussion of the Findings of the Study

Through a focused analysis of each research question and its hypotheses, the following findings are described. Each research question is presented with results from statistical analysis. The findings for the first three research questions are by no means exhaustive of all teachers' uses of technology, but a snapshot of the State of Tennessee.

Analysis of Findings of the Study

Research Question # 1: What influences do the processes and/or resources of teachers' have on technology use?

To answer this question, the indicators for the processes and/or resources of teachers' using technology were analyzed with frequency by year

table (4.1-3), crosstabulation table table (4.4), and Chi square table table (4.5). The information was used to test the following hypotheses statements:

H_o: There are no influence from processes and/or resources of technology on teachers' use of technology.

H_μ: There is influence from processes and/or resources of technology on teachers' use of technology.

Reviewing the analysis suggests trends in processes and/or resources teachers utlize in technology use. The frequency tables (4.1, 4.2, 4.3) show that the majority of respondents considered themselves to be developing. In the crosstabluation table (4.4), a trend emerges that an increase by year is evident for respondents having upward shifts in indicators. The Pearson Chi Square test was used to test the hypotheses. The result of the Pearson Chi Square tests can be viewed in table (4.5). The result showed there is a no significant difference at the p-value of 0.05, but at the 0.005 level the p-value, 14.178, shows a slight significant difference. Therefore, the null hypotheses is rejected and there is an influence of processes and/or resources on teachers' use of technology.

<u>Research Question # 2: What influence does preservice, inservice, and other professional development have on technology use?</u>

H_o: Preservice, inservice, and other progessional development does not have influence on technology use.

H_μ: Preservice, inservice, and other progessional development does have influence on technology use.

Table 4.1 Frequency Table Teaching and Learning 2003

Teaching and Learning		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Advanced	11	7.7	7.7	7.7
	Developing	127	89.4	89.4	97.2
	Early	4	2.8	2.8	100.0
	Total	142	100.0	100.0	

Table 4.2 Frequency Table Teaching and Learning 2004

Teaching and Learning		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Advanced	22	15.8	15.8	15.8
	Developing	115	82.7	82.7	98.6
	Early	2	1.4	1.4	100.0
	Total	139	100.0	100.0	

Table 4.3 Frequency Table Teaching and Learning 2005

Teaching and Learning		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Advanced	32	23.2	23.2	23.2
	Developing	105	76.1	76.1	99.3
	Early	1	.7	.7	100.0
	Total	138	100.0	100.0	

Table 4.4 Crosstabulation Teaching and Learning 2003-2005

Teaching and Learning * year			Year			Total
			2003	2004	2005	
Teaching and Learning	Advanced	Count	11	22	32	65
		Expected Count	22.0	21.6	21.4	65.0
	Developing	Count	127	115	105	347
		Expected Count	117.6	115.1	114.3	347.0
	Early	Count	4	2	1	7
		Expected Count	2.4	2.3	2.3	7.0
	Target	Count	142	139	138	419
		Expected Count	11	22	32	65
Total	Count		22.0	21.6	21.4	65.0
		Expected Count	142.0	139.0	138.0	419.0

Table 4.5 Chi-Square Tests Teaching and Learning 2003-2005

Chi-Square Tests	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.178(a)	4	.007
Likelihood Ratio	14.750	4	.005
N of Valid Cases	419		
a 3 cells (33.3%) have expected count less than 5. The minimum expected count is 2.31.			

Assessing preservice, inservice, and other professional development indicate a possible trend in the effect of technology use. The frequency tables (4.6, 4.7, 4.8) show that the majority of respondents considered themselves to be developing with a higher number of respondents at the advanced stage, than in processes and/or resources. In the crosstabluation table (4.9), a trend emerges that an increase by year is evident for respondents having upward shifts in indicators and that early technology has made a downward turn. The Pearson Chi Square test was used to test the hypotheses. The result of the Pearson Chi Square tests can be viewed in table (4.10). The result showed there is a no significant difference at the p-value of 0.05, but at the 0.003 level the p-value, 15.970, shows a slight significant difference. Therefore, the null hypotheses is

Table 4.6 Frequency Table Educational Preparation and Professional Development 2003

Educaitonal Prep/PD		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Advanced	18	12.7	12.7	12.7
	Developing	116	81.7	81.7	94.4
	Early	8	5.6	5.6	100.0
	Total	142	100.0	100.0	

Table 4.7 Frequency Table Educational Preparation and Professional Development 2004

Educational Prep/PD		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Advanced	34	24.5	24.5	24.5
	Developing	102	73.4	73.4	97.8
	Early	3	2.2	2.2	100.0
	Total	139	100.0	100.0	

Table 4.8 Frequency Table Educational Preparation and Professional Development 2005

Educational Prep/PD		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Advanced	39	28.3	28.3	28.3
	Developing	98	71.0	71.0	99.3
	Early	1	.7	.7	100.0
	Total	138	100.0	100.0	

Table 4.9 Crosstabulation of Educational Preparation and Professional Development 2003-2005

Ed Prep and Dev * year			Year			Total
			2003	2004	2005	
Ed Prep and Development	Advanced	Count	18	34	39	91
		Expected Count	30.8	30.2	30.0	91.0
	Developing	Count	116	102	98	316
		Expected Count	107.1	104.8	104.1	316.0
	Early	Count	8	3	1	12
		Expected Count	4.1	4.0	4.0	12.0
Total	Count		30.8	30.2	30.0	91.0
		Expected Count	142.0	139.0	138.0	419.0

Table 4.10 Chi-Square Tests Educational Preparation and Professional Development 2003-2005

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.970(a)	4	.003
Likelihood Ratio	16.779	4	.002
N of Valid Cases	419		
a 3 cells (33.3%) have expected count less than 5. The minimum expected count is 3.95.			

rejected and there is an influence of educational preparation and professional development on the use of technology.

Research Question # 3: What influences does adminstrative support of technology have on teacher's use of technology?

H_o: There are no influence from administration and support of technology on teachers' use of technology.

H_μ: There is influence from administration and support of technology on teachers' use of technology.

The influence of administration and support of technology appears static. The frequency tables (4.11, 4.12, 4.13) show that the majority of respondents considered themselves to be developing. In the crosstabluation table (4.14), a

Table 4.11 Frequency Table Administration and Support 2003

Administration and Support		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Advanced	17	12.0	12.0	12.0
	Developing	117	82.4	82.4	94.4
	Early	6	4.2	4.2	98.6
	Target	2	1.4	1.4	100.0
	Total	142	100.0	100.0	

Table 4.12 Frequency Table Administration and Support 2004

Administration and Support		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Advanced	29	20.9	20.9	20.9
	Developing	107	77.0	77.0	97.8
	Early	3	2.2	2.2	100.0
	Total	139	100.0	100.0	

Table 4.13 Frequency Table Administration and Support 2005

Administration and Support		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Advanced	29	21.0	21.0	21.0
	Developing	108	78.3	78.3	99.3
	Early	1	.7	.7	100.0
	Total	138	100.0	100.0	

Table 4.14 Crosstabulation of Administration and Support 2003-2005

Administration and Support * year			Year			Total
			2003	2004	2005	
Admin and Sup	Advanced	Count	17	29	29	75
		Expected Count	25.4	24.9	24.7	75.0
	Developing	Count	117	107	108	332
		Expected Count	112.5	110.1	109.3	332.0
	Early	Count	6	3	1	10
		Expected Count	3.4	3.3	3.3	10.0
	Target	Count	2	0	0	2
		Expected Count	.7	.7	.7	2.0
Total	Count		142	139	138	419
		Expected Count	142.0	139.0	138.0	419.0

trend emerges that an increase from 2003-2004 is evident, but for the 2004-2005 data, the frequency remains the same. The Pearson Chi Square test was used to test the hypotheses. The result of the Pearson Chi Square tests can be viewed in table (4.15). The result showed there is a significant difference at the p-value of 0.05, the p-value is 0.061, giving the value 12.043. Therefore, the null hypotheses is accepted and there is not an influence of administration and support on teachers' use of technology.

Research Question #4: To what extent does the relationship of a comprehensive qualitative study, published by ASCD (Association for Supervision and Curriculum Development), on computers in schools, *The Technology Fix* (2004), link to quantifiable data analysis about teachers' use of technology?

To make associations between quantitative data and qualitative data is not straightforward. Conjecture about the relationship must be stated. In Pfluam's (2004) four categories are: computer as teaching machine, as an Internet portal, as a test giver, and as a data processor. Two distinct categories that align together with the one quantitative aspect and qualitative research are teaching machine and Internet portal to teaching and learning. Utilizing *Education Weekly's*, 2005, website, data sources from *Technology Counts* and *Quality Counts*, tables (4.16) and (4.17) were created to view Pfluam's states of observation with the State of Tennesee. The Education Counts database contains more than 250 state-level K-12 education indicators, many spanning multiple years. Included are data collected for *Education Week*'s annual reports,

Table 4.15 Chi-Square Tests Administration and Support 2003-2005

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.043(a)	6	.061
Likelihood Ratio	12.993	6	.043
N of Valid Cases	419		
a 6 cells (50.0%) have expected count less than 5. The minimum expected count is .66.			

Table 4.16 Percent of Teachers Using Internet for Instruction 2001-2004

	2001	2002	2003	2004
California	61	66	65	66
Georgia	66	72	80	82
Massachusetts	67	64	71	72
New Hampshire	68	69	72	75
North Carolina	69	73	79	81
Ohio	73	78	76	77
Pennsylvania	64	69	72	73
Tennessee	71	73	73	74
U.S.	Average: 69	Average: 73	Average: 74	Average: 77

Table 4.17 Percent of teachers using computers for planning and/or teaching

	2000	2001	2002	2003
California	66	64	77	49
Georgia	84	89	89	70
Massachusetts	78	68	74	44
New Hampshire	54	88	71	24
North Carolina	76	80	86	54
Ohio	83	83	85	51
Pennsylvania	69	72	80	60
Tennessee	80	73	82	51
U.S.	Average: 76	Average: 78	Average: 83	Average: 58

Quality Counts and Technology Counts (www.edweek.org, 2005).Through inquiry of the states percentages for the years provided, a comparison of percentages can be examined. The range in each state with the corresponding year uncovers that all the states listed are in typical range of one another.

Summary

In analyzing the data and examining the results of the frequency, Pearson Chi Square tests, the results are discernible. Testing the null hypotheses with the statistical Pearson Chi Square gave statistical application to interpreting the results. The expected count and actual count figures relay information that can be interpreted as trends or patterns. In dealing with categorical data, the Pearson Chi Square conveyed significant results.

The analysis of the quantitative research with the qualtitative research conducted by Pfluam presented some distinctive results. If the cateogies Pfluam had distinguished were more in alignment with the STaR Chart indicators, more analysis could have been completed. Although only two aspects of Pfluams categories are examined, connections are apparent.

CHAPTER V: SUMMARY, CONCLUSIONS AND IMPLICATIONS FOR FURTHER RESEARCH

Summary of the Study

In examining the influences of teachers' use of technology, processes and/or resources, educational development and professional development, administration and support, and comparisons to a qualitative study, merely a snapshot was represented. As new technologies make their way into instructional settings, effects of teachers' use of technology can be dynamic. This study into particular areas of teachers' use detected that the teaching and learning field and educational preparation and professional development processes do in fact make a difference in teachers' use of technology. Although the administration and support of teachers' use of technology revealed no significance, underlying assumptions about this field are ambiguous. Along with the evidence presented by Pfluam, innovative approaches to foster teachers' use of technology are on the horizon.

Pfluam suggested four recommendations about "fixing" the computer problems of this generation. Teachers should 1) make the choice to focus computer use on students who would benefit most, 2) align curriculum, instruction, and evaluation using computers, 3) utilize computers for assessment, and 4) developmentally teach computer use, productivity tools and Internet, within and across grade levels. The recommendations are not the cure, but a path to understanding the potential of computer use in schools. These

recommendations could be a vehicle for continuity and sustained change in education as well as expectations of future workforce employers.

Conclusions

Teachers' use of technology is influenced by numerous factors. To limit those factors to a mere few would limit understanding of the nature of teaching and learning. With apt processes and/or resources, teachers' use of technology in teaching and learning can become an infinite avenue of varying instructional methods to meet the needs of all students. When those processes and/or resources are combined in effective education preparation programs and established quality professional development, not only can students benefit from the prosperous facilitation of learning, but also the teacher can become a catalyst of vital reinvention of teaching.

The administration and support of teachers' use of technology revealed that there was not a significant influence. Is this ambiguous? Yes. For without administration and support existing two steps ahead of teachers, the teachers' use of technology might be hampered or restricted. Although administration and support found a leveling place in the advanced indicator, the assessment tool did not factor the elevated benchmark of administration and support. This field could only respond to indicators and not provide additional documentation of growth or continuity of growth.

The applications for this study are limitless. The information gleamed from this study could be utilized to help states cooridnate connections between

education and the business sector. States could apply the implications for further research to aid in creating partnerships that foster not only higher expectations for the state, but also higher expectations for student achievement. The State of Tennessee could easily be in the forefront of teachers' use of technology if the research were extended and utilized. Developing state and federal guidelines for grants to implement technologies integration into the classroom may possibly be the alternative to general funding of technology resources, development, and administration.

Implications for Further Research

As the expansion of assessment tools surround the educational landscape, a return to basic understandings of influences of teachers' use of technology should be examined. Basic understandings encompass the ISTE and NETS standards for teachers, educational preparation programs, and students. The criteria for assessing influences of teachers' use of technology should stay within the standard boundaries. As stated in the conclusions, the dynamic implementation of technology should be examined closely to utilize research that makes technology a best practice in education. The workforce for the future could be substantially changed if teachers' use of technology were not only thought of as a vision for profiles, but a standard for teaching and learning.

Further research is needed to understand the influence of teachers' use of technology. Quantitative and qualitative studies should be conducted using triangulation of data with longitundal breadth and depth. With the advent and

often weary task of meeting the “No Child Left Behind” legislation, should technologies integration into classroom practice not be examined and expected as all other content areas?

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APPENDICES

Appendices

Appendix A

Tennessee STaR Chart

The Tennessee STaR Chart (School Technology and Readiness) is divided into 4 major sections, each having 5-6 indicators (A-V). Each Indicator has four scaled responses: early (6-8 points), developing (9-14 points), advanced (15-20 points), and target (21-24 points). Each major section is scored as the average of its individual indicators that determine the school's level of progress.

I. Teaching and Learning (A-F)

II. Educator Preparation and Development (G-L)

III. Administration and Support Services (M-Q)

IV. Infrastructure for Technology (R-V)

A. Impact of Technology on Teacher Role and Collaborative Learning

B. Patterns of Teacher Use of Technology

C. Frequency/ Design of Instructional Setting Using Digital Content

D. Curriculum Areas

E. Technology Applications Assessment

F. Patterns of Student Use of Technology

G. Content of Training

H. Capabilities of Educators

I. Leadership Capabilities of Administrators

J. Models of Professional Development

K. Levels of Understanding and Patterns of Use

L. Technology Budget Allocated to Technology Professional Development

M. Vision and Planning

N. Technical Support

O. Instructional and Administrative Staffing

P. Budget

Q. Funding

R. Students per Computer

S. Internet Access Connectivity/Speed

T. Distance Learning

U. LAN/WAN

V. Other Technologies

The Tennessee STaR Chart is modeled after the Texas STaR Chart, which is a specific adaptation of the original CEO Forum STaR Chart.

Appendix B

NETS for Teachers

Educational Technology Standards and Performance Indicators for All Teachers

Building on the NETS for Students, the ISTE NETS for Teachers (NETS•T), which focus on preservice teacher education, define the fundamental concepts, knowledge, skills, and attitudes for applying technology in educational settings. All candidates seeking certification or endorsements in teacher preparation should meet these educational technology standards. It is the responsibility of faculty across the university and at cooperating schools to provide opportunities for teacher candidates to meet these standards.

The six standards areas with performance indicators listed below are designed to be general enough to be customized to fit state, university, or district guidelines and yet specific enough to define the scope of the topic. Performance indicators for each standard provide specific outcomes to be measured when developing a set of assessment tools. The standards and the performance indicators also provide guidelines for teachers currently in the classroom.

TECHNOLOGY OPERATIONS AND CONCEPTS.

Teachers demonstrate a sound understanding of technology operations and concepts. Teachers:

demonstrate introductory knowledge, skills, and understanding of concepts related to technology (as described in the ISTE National Education Technology Standards for Students)

demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies.

PLANNING AND DESIGNING LEARNING ENVIRONMENTS AND EXPERIENCES.

Teachers plan and design effective learning environments and experiences supported by technology. Teachers:

design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners.

apply current research on teaching and learning with technology when planning learning environments and experiences.

identify and locate technology resources and evaluate them for accuracy and suitability.

plan for the management of technology resources within the context of learning activities.

plan strategies to manage student learning in a technology-enhanced environment.

TEACHING, LEARNING, AND THE CURRICULUM.

Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning. Teachers:

facilitate technology-enhanced experiences that address content standards and student technology standards.

use technology to support learner-centered strategies that address the diverse needs of students.

apply technology to develop students' higher order skills and creativity.

manage student learning activities in a technology-enhanced environment.

ASSESSMENT AND EVALUATION.

Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies. Teachers:

apply technology in assessing student learning of subject matter using a variety of assessment techniques.

use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning.

apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity.

PRODUCTIVITY AND PROFESSIONAL PRACTICE.

Teachers use technology to enhance their productivity and professional practice. Teachers:

use technology resources to engage in ongoing professional development and lifelong learning.

continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning.

apply technology to increase productivity.

use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning.

SOCIAL, ETHICAL, LEGAL, AND HUMAN ISSUES.

Teachers understand the social, ethical, legal, and human issues surrounding the use of technology in PK-12 schools and apply those principles in practice.

Teachers:

model and teach legal and ethical practice related to technology use.

apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.

identify and use technology resources that affirm diversity

promote safe and healthy use of technology resources.

facilitate equitable access to technology resources for all students.

NETS for Teachers

Profiles for Technology-Literate Teachers

Today's teacher preparation programs provide a variety of alternative paths to initial licensure. They address economic conditions, needs of prospective teachers, and the demands of employing school districts. Regardless of the configuration of the program, all teachers must have opportunities for

experiences that prepare them to meet technology standards. The existence of many types of programs virtually ensures that there will be no one method for providing learning experiences to meet these standards.

The Technology Performance Profiles for Teacher Preparation suggest ways programs can incrementally examine how well candidates meet the standards. The Profiles correspond to four phases in the typical preparation of a teacher. The Profiles are not meant to be prescriptive or lockstep; they are specifically designed to be fluid in providing guidelines for programs to create a set of benchmarks in planning and assessment that align with unique program design.

General Preparation

Professional Preparation

Student Teaching/Internship

First-Year Teaching

GENERAL PREPARATION PERFORMANCE PROFILE

Students may be in their major or minor course of study. They may be at the lower division level or may have received skill development through on-the-job training, obtaining a degree or experience in a nontraditional program. Typically, the university arts and sciences areas provide the experiences defined in this Profile. Programs may have multiple ways for candidates to demonstrate that they are able to perform the tasks that go beyond the classroom setting. Upon completion of the general preparation component of their programs, prospective teachers should be able to meet the competencies described in this Profile.

Upon completion of the general preparation component of their program, prospective teachers:

demonstrate a sound understanding of the nature an operation of technology systems. (I)*

demonstrate proficiency in the use of common input and output devices; solve routine hardware and software problems; and make informed choices about technology systems, resources, and services. (I)*

use technology tools and information resources to increase productivity, promote creativity, and facilitate academic learning. (I, III, IV, V)

use content-specific tools (e.g., software, simulation, environmental robes, graphing calculators, exploratory environments, Web tools) to support learning and research. (I, III, V)*

use technology resources to facilitate higher order and complex thinking skills, including problem solving, critical thinking, informed decision making, knowledge construction, and creativity. (I, III, V)*

collaborate in constructing technology-enhanced models, preparing publications, and producing other creative works using productivity tools. (I, V)*

use technology to locate, evaluate, and collect information from a variety of sources. (I, IV, V)*

use technology tools to process data and report results. (I, III, IV, V)*

use technology in the development of strategies for solving problems in the real world. (I, III, V)*

observe and experience the use of technology in their major field of study. (III, V)

use technology tools and resources for managing and communicating information (e.g., finances, schedules, addresses, purchases, correspondence). (I, V)

evaluate and select new information resources and technological innovations based on their appropriateness to specific tasks. (I, III, IV, V)*

use a variety of media and formats, including telecommunications, to collaborate, publish, and interact with peers, experts, and other audiences. (I, V)*

demonstrate an understanding of the legal, ethical, cultural, and societal issues related to technology. (VI)*

exhibit positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity. (V, VI)*

discuss diversity issues related to electronic media. (I, VI)

discuss the health and safety issues related to technology use. (VI)

Numbers in parentheses following each performance indicator refer to the standards category to which the performance is linked. The categories are:

Technology operations and concepts

Planning and Designing Learning Environments and Experiences

Teaching, Learning, and the curriculum

Assessment and Evaluation

Productivity and Professional Practice

Social, Ethical, Legal, and Human Issues

* Adapted from the ISTE National Educational Technology Standards for Students.

PROFESSIONAL PREPARATION PERFORMANCE PROFILE

Students have been admitted to a professional core of courses or experiences taught by the school or college of education or professional education faculty. Experiences in this Profile are part of professional education coursework that may also include integrated field work. The school or college of education or professional development school is typically responsible for preservice teachers having the experiences described in this Profile. Prior to the culminating student teaching or internship experience, prospective teachers should be able to meet the competencies described in this Profile.

Prior to the culminating student teaching or internship experience, prospective teachers:

identify the benefits of technology to maximize student learning and facilitate higher order thinking skills. (I, III)

differentiate between appropriate and inappropriate uses of technology for teaching and learning while using electronic resources to design and implement learning activities. (II, III, V, VI)

identify technology resources available in schools and analyze how accessibility to those resources affects planning for instruction. (I, II)

identify, select, and use hardware and software technology resources specially designed for use by PK-12 students to meet specific teaching and learning objectives. (I, II)

plan for the management of electronic instructional resources within a lesson design by identifying potential problems and planning for solutions. (II)

identify specific technology applications and resources that maximize student learning, address learner needs, and affirm diversity. (III, VI)

design and teach technology-enriched learning activities that connect content standards with student technology standards and meet the diverse needs of students. (II, III, IV, VI)

design and peer teach a lesson that meets content area standards and reflects the current best practices in teaching and learning with technology. (II, III)

plan and teach student-centered learning activities and lessons in which students apply technology tools and resources. (II, III)

research and evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information resources to be used by students. (II, IV, V, VI)

discuss technology-based assessment and evaluation strategies. (IV)

examine multiple strategies for evaluating technology-based student products and the processes used to create those products. (IV)

examine technology tools used to collect, analyze, interpret, represent, and communicate student performance data.(I, IV)

integrate technology-based assessment strategies and tools into plans for evaluating specific learning activities. (IV)

develop a portfolio of technology-based products from coursework, including the related assessment tools. (IV, V)

identify and engage in technology-based opportunities for professional education and lifelong learning, including the use of distance education. (V)

apply online and other technology resources to support problem solving and related decision making for maximizing student learning. (III, V)

participate in online professional collaborations with peers and experts. (III, V)

use technology productivity tools to complete required professional tasks. (V)

identify technology-related legal and ethical issues, including copyright, privacy, and security of technology systems, data, and information. (VI)

examine acceptable use policies for the use of technology in schools, including strategies for addressing threats to security of technology systems, data, and information. (VI)

identify issues related to equitable access to technology in school, community, and home environments. (VI)

identify safety and health issues related to technology use in schools. (VI)

identify and use assistive technologies to meet the special physical needs of students. (VI)

Numbers in parentheses following each performance indicator refer to the standards category to which the performance is linked. The categories are:

Technology operations and concepts

Planning and Designing Learning Environments and Experiences

Teaching, Learning, and the curriculum

Assessment and Evaluation

Productivity and Professional Practice

Social, Ethical, Legal, and Human Issues

STUDENT TEACHING / INTERNSHIP PERFORMANCE PROFILE

Students have completed or are finalizing their professional education coursework and are out in the classroom completing their final student teaching or intern teaching experience with extensive time spent with students. These individuals will obtain their initial licensure or credential required for a teaching job at the completion of this phase of their education. They are being supervised by a mentor or master teacher on a consistent basis. Upon completion of the culminating student teaching or internship experience, and at the point of initial licensure, teachers should meet the competencies described in this Profile.

Corresponding Scenarios Corresponding Scenarios

Select Another Profile Select Another Profile

Essential Conditions Chart Essential Conditions Chart

Upon completion of the culminating student teaching or internship experience, and at the point of initial licensure, teachers:

apply troubleshooting strategies for solving routine hardware and software problems that occur in the classroom. (I)

identify, evaluate, and select specific technology resources available at the school site and district level to support a coherent lesson sequence. (II, III)

design, manage, and facilitate learning experiences using technology that affirm diversity and provide equitable access to resources. (II, VI)

create and implement a well-organized plan to manage available technology resources, provide equitable access for all students, and enhance learning outcomes. (II, III)

design and facilitate learning experiences that use assistive technologies to meet the special physical needs of students. (II, III)

design and teach a coherent sequence of learning activities that integrates appropriate use of technology resources to enhance student academic achievement and technology proficiency by connecting district, state, and national curriculum standards with student technology standards (as defined in the ISTE National Educational Technology Standards for Students). (II, III)

design, implement, and assess learner-centered lessons that are based on the current best practices on teaching and learning with technology and that engage, motivate, and encourage self-directed student learning. (II, III, IV, V)

guide collaborative learning activities in which students use technology resources to solve authentic problems in the subject area(s). (III)

develop and use criteria for ongoing assessment of technology-based student products and the processes used to create those products. (IV)

design an evaluation plan that applies multiple measures and flexible assessment strategies to determine students' technology proficiency and content area learning. (IV)

use multiple measures to analyze instructional practices that employ technology to improve planning, instruction, and management. (II, III, IV)

apply technology productivity tools and resources to collect, analyze, and interpret data and to report results to parents and students. (III, IV)

select and apply suitable productivity tools to complete educational and professional tasks. (II, III, V)

model safe and responsible use of technology and develop classroom procedures to implement school and district technology acceptable use policies and data security plans. (V, VI)

participate in online professional collaboration with peers and experts as part of a personally designed plan, based on self-assessment, for professional growth in technology. (V)

Numbers in parentheses following each performance indicator refer to the standards category to which the performance is linked. The categories are:

Technology operations and concepts

Planning and Designing Learning Environments and Experiences

Teaching, Learning, and the curriculum

Assessment and Evaluation

Productivity and Professional Practice

Social, Ethical, Legal, and Human Issues

FIRST-YEAR TEACHING PERFORMANCE PROFILE

Teachers have completed their formal teacher preparation program and are in their first year of independent teaching. They are typically in control of their own classroom and are under contract with a school district. Teachers at this stage, as with any teacher in the building, are supervised by their school administrator. The novice teacher may be part of a beginning teacher support program and may be receiving coaching and mentoring. Upon completion of the first year of teaching, teachers should meet the competencies described in this Profile.

Upon completion of the first year of teaching, teachers:

assess the availability of technology resources at the school site, plan activities that integrate available resources, and develop a method for obtaining the additional necessary software and hardware to support the specific learning needs of students in the classroom. (I, II, IV)

make appropriate choices about technology systems, resources, and services that are aligned with district and state standards. (I, II)

arrange equitable access to appropriate technology resources that enable students to engage successfully in learning activities across subject/content areas and grade levels. (II, III, VI)

engage in ongoing planning of lesson sequences that effectively integrate technology resources and are consistent with current best practices for integrating the learning of subject matter and student technology standards (as

defined in the ISTE National Educational Technology Standards for Students). (II, III)

plan and implement technology-based learning activities that promote student engagement in analysis, synthesis, interpretation, and creation of original products. (II, III)

plan for, implement, and evaluate the management of student use of technology resources as part of classroom operations and in specialized instructional situations. (I, II, III, IV)

implement a variety of instructional technology strategies and grouping strategies (e.g., whole group, collaborative, individualized, and learner centered) that include appropriate embedded assessment for meeting the diverse needs of learners. (III, IV)

facilitate student access to school and community resources that provide technological and discipline-specific expertise. (III)

teach students methods and strategies to assess the validity and reliability of information gathered through technological means. (II, IV)

recognize students' talents in the use of technology and provide them with opportunities to share their expertise with their teachers, peers, and others. (II, III, V)

guide students in applying self — and peer-assessment tools to critique student-created technology products and the process used to create those products. (IV)

facilitate students' use of technology that addresses their social needs and cultural identity and promotes their interaction with the global community. (III, VI)

use results from assessment measures (e.g., learner profiles, computer-based testing, electronic portfolios) to improve instructional planning, management, and implementation of learning strategies. (II, IV)

use technology tools to collect, analyze, interpret, represent, and communicate data (student performance and other information) for the purposes of instructional planning and school improvement. (IV)

use technology resources to facilitate communications with parents or guardians of students. (V)

identify capabilities and limitations of current and emerging technology resources and assess the potential of these systems and services to address personal, lifelong learning, and workplace needs. (I, IV, V)

participate in technology-based collaboration as part of continual and comprehensive professional growth to stay abreast of new and emerging technology resources that support enhanced learning for PK-12 students. (V)

demonstrate and advocate for legal and ethical behaviors among students, colleagues, and community members regarding the use of technology and information. (V, VI)

enforce classroom procedures that guide students' safe and healthy use of technology and that comply with legal and professional responsibilities for students needing assistive technologies. (VI)

advocate for equal access to technology for all students in their schools, communities, and homes. (VI)

implement procedures consistent with district and school policies that protect the privacy and security of student data and information. (VI)

Numbers in parentheses following each performance indicator refer to the standards category to which the performance is linked. The categories are:

Technology operations and concepts

Planning and Designing Learning Environments and Experiences

Teaching, Learning, and the curriculum

Assessment and Evaluation

Productivity and Professional Practice

Social, Ethical, Legal, and Human Issues

Appendix C

E-TOTE Tennessee Annual Technology Survey

(STaR Chart Component)

For each of the four key areas in the STaR Chart, a series of 5-6 indicators is provided for you to use to indicate your school's Level of Progress (1-4). It is possible that your school may have more than one Level of Progress. However, for each indicator, select the one Level that best describes your school.

Teaching and Learing

A. Impact of Technology on Teacher Role and Collaborative Learning.

1. Teacher-centered lectures; students use technology to work on individual projects
2. Teacher-directed learning; students use technology for cooperative projects in their own classroom
3. Teacher facilitated learning; students use technology to create communities of inquiry within their own community
4. Teacher as facilitator, mento, and co-learner; and student-centered learning, teacher as mento/facilitator with national/international business, industry, university communiites of learning.

B. What characterizes the overall pattern of teacher use of technology at your school?

1. Teachers use technology as a supplement.

2. Teachers use technology to streamline administrative functions (i.e., gradebook, attendance, word processing, e-mail, etc.)
3. Teachers use technology for research, lesson planning, multimedia and graphical presentations and simulations, and to correspond with experts, peers, and parents.
4. Integration of evolving technologies transforms the teaching process by allowing for greater levels of interest, inquiry, analysis, collaboration, creativity and content production.

C. The instructional setting where and frequency when digital content is used are characterized by

1. Occasional computer use in library or computer lab setting
2. Regular weekly computer use tro suppliem,ent classroom instruction, primarily in lab and library settings
3. Regular weekly technology use for integrated curriculum activities utilizing various instructional settings (i.e.,: classroom computers, libraries, labs, and poortable technologies)
4. Students have on-demand access to all appropriate technologies to complete activities that have been seamlessly integrated into all core curriculum areas

D. How is technology generally used within the curriculum content areas in your school?

1. No technology use of integration occurs in the core curriculum subject areas
2. Use of technology is minimal in core curriculum subject areas
3. Teachnology is integrated into core subject areas, and activities are separated by subject and grade
4. Technology is integrated within al subject areas

E. Technology Applications Assessment. (Select the best description)

1. Schools with Grades K-8: Within each grade level cluster (K-2, 3-5, 6-8), some but not all Technology standards are met. High Schools: At least 4 Technology Applications courses are offered
2. Schools with Grades K-8: Within each grade level cluster (K-2, 3-5, 6-8), most Technology standards are met. High Schools: At least 4 Technology Applications courses offered and at least 2 taught
3. Schools with Grades K-8: Within each grade level cluster (K-2, 3-5, 6-8), most Technology standards are met and Grade-level benchmarks (K-8) are established. High Schools: At least 4 Technology Applications courses offered and at least 4 taught
4. Schools with Grades K-8: Within each grade level cluster (K-2, 3-5, 6-8), most Technology standards are met and Grade-level benchmarks (K-8) are met. High Schools: All Technology Applications courses offered with a minimum of 4 taught, or included as new courses developed as local elective or included as indiependent study course

F. What is the typical pattern of student use of technology?

1. Students occasionally use software applications and/or use tutorial software for drill and practice
2. Students regularly use technology on an individual basis to access elctronic information and for communication and presentaition projects
3. Students work with peers and experts to evaluate information, analyze data and content in order to problem solve. Students select appropriate technology tools to convey knowledge and skills learned
4. Students work collaboratively in communities of inquiry to propose, assess, and implement solutions to real work problems. Students ocmmunicate effectively with a a variety of audiences.

Educator Preparation and Development

G. What is they typical training content in your teacher technology-related professional development?

1. Technology literacy skills including multimedia and the Internet
2. Use of technology in administratvie tasks and classroom management; use of Internet curriuculum resources
3. integration of technology into teaching and learning; regular use of Internet curriuculum resources to enrich instruction
4. regular creation and communication of new technology-supported, learner-centered projects; vertical alignmnet of all technology application

curriculum standards; anytime anywhere use of Internet curriculum resources by entire school community

H. What comes closest to the percentage of your educators who meet most of the ISTE technology proficiencies and implement them in the classroom?

1. 10%
2. 40%
3. 60%
4. 100%

I.Which description most closely characterizes your building administration's leadership with technology?

1. Recognizes benefits of technology in instruction and minimal personal use
2. Expects teachers to use technology for administrative and classroom management tasks; uses technology in some aspects of daily work
3. Recognizes and identifies exemplary use of technology in instruction; models use of technology in daily work
4. Ensures integration of appropriate technologies to maximize learning and teaching; involves and educates the school community around issues of technology integration

J. When technology-related professional development occurs for your teachers, which describes the model that is most often used?

1. Whole group

2. Whole group, with follow-up to facilitate implementation
3. Long term and ongoing professional development; involvement in a developmental/improvement process
4. Creates communites of inquiry and knowledge building; anytime learning available through a variety of delivery systems; individually guided activities

K. Where are most of your teachers in terms of their understanding level and patterns of technology use?

1. Most at entry or adoption stage (Students leraning to use technology; teachers use technology to support traditional instruction)
2. Most at adaptation state (Technology used to enrich curriuclum) Most beginning to use with students
3. Most at appropriation state (Technology is integrated, used for its unique capabilities)
4. Most at invention stage (Teachers discover and accept new uses for technology)

L. Considering all sources of technology funds that benefit your school, what percentage is allocated to technology professional development?

1. 5% or less
2. 6-24%
3. 25-29%
4. 30% or more

Administration and Support Services

M. Consider your School Improvement Plan (TSIP), other strategic vision documents, and the actual vision embodied in practice. Which of the following most accurately charaterizes your school?

1. Technology is only minimally addressed in our TSIP, technology used mainly for administrative tasks such as word processing, budgeting, attendance, gradebooks
2. Technology planning in TSIP aligns with the state long range technology plan and the district technology plan; technology used for internal planning, budgeting, applying for external funding and discounts. Teachers/adminstrators have a vision for technology use for direct instruction and some student use.
3. In addition to the above, the plan is collaboratively developed, and is used to guide policy and practice and is regularly updated. The school plan addressess technology curriculum standards and higher order teaching and learning. Administrators use technology tools for planning.
4. In addition ot the above, the plan is actively supported by the local and district administration and is updated at least annually. The plan focuses on student success; is based on needs, research, proven teaching and learning principles. Administrators use technology tools for planning and decision making.

N. At your school, what is the technical support situation?

1. No on-site technical support; technical support is by call-in with response time greater than 24 hours
2. At least one technical staff to 750 computers, with centrally deployed technical support call-in; response time lesss than 24 hours
3. At least one technical staff to 500 computers with central technology support that uses remote management softwawre tools. Tech support is centrally deployed with minimal campus-based technical support on-site; response time is less than 8 hours
4. At least one technical staff to 350 computers, both centrally deployed as well as dedicated campus-based. Central technology support uses remote management software tools. Ther is on-site technical support with response time is less than 4 hours

O. Instructional and Administrative Staffing

1. No full time dedicated district level Technology Coordinator; relay on campus educator serving as local technical support
2. Full-time district level Technology Coordinator. Centrally located instructional technology staff with one for every 5,000 or more students. Additional staff as needed, such as trainer, webmaster, network administrator
3. Full-time district level Technology Coordinator. Centrally located instructional technology staff iwht one for about every 1,000 students. Additional staff as needed

4. Full-time district level Technology Coordinator. Dedicated campus-based instructional technology support staff – one per campus plus one for about every 1,000 students. Additional staff as needed

P. Budget. Select the best descritpion of how your school spends its technoogy funds, whetehre from donation, building level funds or budget or district apportionment.

1. For hardware and software purchases and professional development
2. For harrdware and software purchases and professional development, minimal staffing support, and some ongoing costs
3. For hardware and software purchses and professional development, adequate staffing support and ongoing costs
4. For hardware and software purchses, sufficient stafing support, costs for professional development, facilities and other ongoing costs. Appropriate budget to suppor the technology in the TSIP

Q. Funding. What best describes the source ofr you school technology funding? (Consult with your district TC for advic on best answer.)

1. School level fundraisers only
2. Fund raisers, minor grants, minimal local funding managed at the district level
3. Grants, E-Rate discounts applied to technology budget, locally supplemented through tax dollars

4. Other competeivite grants. E-Rate discounts, locally supplemented through tax dollars. Other state and federal programs dierected to support technology funding, bond funds, business partnerships, donations, foundation, and other local funds designated for technolgoy

VITA

Bryan Keith Stewart was born in Chattanooga, Tennessee. He attended Soddy Daisy High School in Soddy Daisy, Tennessee. He received his Bachelor of Science Degree in Teaching from Univeristy of Tennessee at Chattanooga with a concentration in Elementary Education for grades K-8 in 1993.

Bryan has taught in three urban schools. Bryan began his teaching career at Henry L. Barger Elementary School in Chattanooga, Tennessee. During his six-year tenure at Henry L. Barger, Bryan taught multiage grades first through third, fourth and fifith, and self-contained classes in third, fourth, and fifth grades. In the course of his term, he completed International Montessori Certification through Saint Nicholas of London. After transferring to Lakeside Academy of Math, Science, and Technology, he taught third, fourth, and fifth grades and was grade level chair. Upon relocation to Hillcrest Elementary School, Bryan became the Title I Lead Teacher, Reading First Literacy Leader, and then appointed assistant principal.

Bryan received his Master's Degree in Administration and Supervision in 1999 from The University of Tennessee, Chattanooga. Following his master's degree, Bryan began his doctoral study. He completed coursework for the doctoral program in 2001.

Throughout his duration of working in urban schools, Bryan has coordinated and assisted in technology integration, curriculum alignment, data analysis, literacy, teacher professional development, grant writing and coaching

of an urban master's program, the Osborne Fellows' Program. He has also completed a leadership program through the Chattanooga Public Education Foundation and continues a monthly book club collaboration.

Bryan is currently working as an assistant principal, adjunct faculty, and lead coach for the Osborne Master's Program. He is assistant principal of Woodmore Elementary School which accommodates Pre-K through fifth grade. He teaches literacy courses as an adjunct faculty member with the Univeristy of Tennessee at Chattanooga. As a lead coach, he helps support cooridination of the master's program in Urban Education.

Bryan enjoys time with his family and has a passion for reading. His free time is spent with his mother and siblings. Reading is a unwinding exercise that he gets pleasure from as often as possible. Although he has spent the last several years multi-tasking many areas of his live, he thrives on each new challenge.