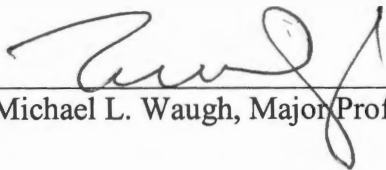
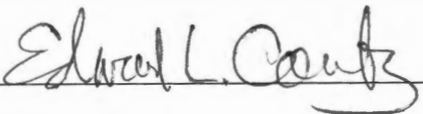
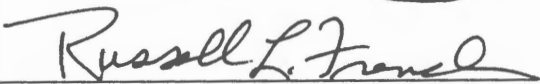


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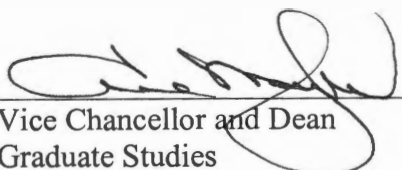
I am submitting herewith a dissertation written by Raj Kumar Rai entitled "Development and Implementation of Technology Plans in Tennessee Public School Systems." I have examined the final paper copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Education.


Michael L. Waugh, Major Professor

We have read this dissertation
and recommend its acceptance:


Accepted for the Council:


Vice Chancellor and Dean
Graduate Studies

Thesis
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**Development and Implementation of Technology Plans
in Tennessee Public School Systems**

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Raj Kumar Rai

December, 2004

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ABSTRACT

The purpose of this study was to investigate how public school systems in Tennessee developed and implemented their district technology. The target population of the study was all of the 136 public school systems in Tennessee. Data were collected using two methods: (1) content analysis of the district technology plans and (2) survey analysis of selected participants. A survey was administered to employees of the participating school districts who represented the following groups: (1) district technology coordinators, (2) principals, and (3) teachers who were involved in developing the district's technology plan. Those districts in the study which contributed a district technology plan and at least one complete survey form were included in the analysis. As a result, thirty-one school districts elected to participate in the study (23%).

The results of the study showed that the overall quality of the technology plans was inadequate. The technology plans examined were grouped into three categories: (1) TLEA - those plans that followed TLEA guidelines; (2) TPC - those plans that followed TPC guidelines; and (3) Others – those plans that did not appear to follow either set of guidelines. The most commonly included elements in the technology plan were timeline, goals and objectives, integration of technology into the curriculum, and professional development. A significant number of the technology plans from rural school systems did not appear to have followed the state guidelines. The entity that was most often identified as being responsible for developing district technology plans was the technology committee or district technology coordinator. District technology directors, principals, teachers, school level technology coordinators, and curriculum supervisors were found to

be the major stakeholders in district technology committees. In most suburban school districts, technology committees were responsible for implementing the plans. In most rural school districts, individuals, usually district technology coordinators, were responsible for implementing the technology plan.

Many of the school district technology plans appeared to have been recently updated or developed. All school districts sampled specified the intent to revise their technology plan at some point in the future.

Almost all of the school districts studied to some extent are making progress in implementing their technology plan. However, the implementation of technology plans was reportedly most often hampered by the lack of budget. Most of the school districts did not appear to be engaged in unplanned technology integration activities. The most frequently reported unplanned technology activities were grants that school districts received for professional development activities and integration of technology into the curriculum.

TABLE OF CONTENTS

CHAPTER I: INTRODUCTION	1
Statement of the Problem	5
Purpose of the Study	5
Importance of the Study	6
Assumptions	6
Limitations	7
Design of the Study	7
Definitions of Terms	8
Organization of the Document	11
CHAPTER II: REVIEW OF THE RELATED LITERATURE	12
Implementation of Technology in Schools	12
Historical Development of Technology Plans	22
Government Initiatives in Technology Planning	23
Technology Planning Initiatives in Tennessee	25
Technology Planning Guides	27
Related Issues in Technology Planning and Implementation	30
Evaluation Models for Technology Plans e.....	31
Comparison between Tennessee Guidelines (2002-2003 Checklist) and the Three Other Evaluation Models	34
CHAPTER III: METHODOLOGY	36
Target Population and Sample	36
Instrument Development	36
Data Collection	39
Data Analysis	46
Summary	56

CHAPTER IV: FINDINGS	57
Research Question 1	58
Research Question 2	63
Research Question 3	68
Research Question 4	78
Research Question 5	81
Research Question 6	83
Research Question 7	94
CHAPTER V: CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS.....	97
Conclusions	97
Discussion	104
Recommendations	106
REFERENCES	109
APPENDICES	117
Appendix A1: Tennessee Local Education Agency (LEA) plan for educational technology: <i>Checklist of required elements – 2002-2003</i>	118
Appendix A2: Technology Plan Criteria (TPC) for Tennessee’s Enhancing Education Through Technology (Title IID: <i>Ed Tech</i>) and E-rate Discounts	122
Appendix A3: Tennessee STaR Chart: A Tool for Planning and Assessing School Technology and Readiness	128
Appendix B1: Kimball and Sibley’s Technology Planning Maturity Model for Educators	136
Appendix B2: Lumley and Bailey’s Evaluation Model for School District Technology Plans	142
Appendix B3: Salina’s Technology Plan Review Instrument	146
Appendix B4: Comparison among different Technology Planning Models, and Guides	151
Appendix C1: Rubric for Evaluating the School District Technology Plan	157
Appendix C2: Survey Form	165
Appendix D1: Initial Cover Letter to the School District Superintendent	174

Appendix D2: Consent Form Used to Secure Superintendent's	
Willingness to Participate	176
Appendix D3: Second Cover Letter to the Superintendent	178
Appendix D4: Third Cover Letter to the Superintendent	180
Appendix D5: E-mail Message to the Superintendent	182
Appendix E1: First Cover Letter to the School District Contact Person	184
Appendix E2: Form to Collect District Technology Committee	
Members' Contact Information	186
Appendix E3: Second Cover Letter to the Contact Person	188
Appendix E4: First E-mail Message to the Contact Person	190
Appendix E5: Second E-mail Message to the Contact Person	192
Appendix F1: First Cover Letter to Participants	194
Appendix F2: Second Cover Letter to Participants	196
Appendix F3: Third and Last Cover Letter to Participants	198
Appendix G1: Parties Responsible for Developing Technology	
Plans in School Systems	200
Appendix G2: Parties Responsible for Selecting Technology	
Committee Members	202
Appendix G3: Formation of Sub-Committees in School Systems	205
VITA	207

LIST OF TABLES

Table 1:	Time periods covered by district technology plans.....	43
Table 2:	Duration of district technology plans by number of years.....	43
Table 3:	Data set by number of school districts.....	45
Table 4:	Breakdown of participating districts showing the number of plan elements included and the range of total rubric score.....	58
Table 5:	Number of technology plans by category.....	60
Table 6:	Frequency and percentages of occurrence of elements in Tennessee school district technology plans.....	61
Table 7:	Technology plans by geographic location.....	64
Table 8:	Breakdown of party responsible for developing the technology plans in urban, suburban, and rural school districts.....	65
Table 9:	Representation of technology planning committee members in urban, suburban, and rural school districts	65
Table 10:	Activities undertaken by technology planning committees/individuals from urban, suburban, and rural school districts	67
Table 11:	Parties responsible for developing technology plans in school systems	201
Table 12:	Summary of responses from Table 11 (See Appendix G1)	69
Table 13:	Parties responsible for selecting technology committee members	203
Table 14:	Summary of responses from Table 13 (See Appendix G2).....	70
Table 15:	Formation of sub-committees in school systems	206
Table 16:	Membership composition on technology planning committees.....	73
Table 17:	Criteria for selecting committee members.....	73
Table 18:	Activities performed by technology planning committees	75

Table 19:	Actions performed during needs assessment.....	76
Table 20:	Methods used for assessing needs.....	77
Table 21:	Goals and objectives identified in technology planning	78
Table 22:	Time periods of current technology plan.....	79
Table 23:	Revision of the technology plan since it was first written.....	80
Table 24:	Factors mentioned by respondents as reasons for periodic revisions of these technology plans.....	80
Table 25:	Party responsible for implementing district technology plans in urban, suburban, and rural school districts.....	82
Table 26:	Frequency counts of issues undertaken by urban, suburban, and rural school districts in implementing their technology plans	82
Table 27:	Frequency counts of party responsible for implementing district technology plans.....	83
Table 28:	Actions undertaken in implementing the technology plan.....	85
Table 29:	Ratings by district technology coordinators, principals, and teachers	88
Table 30:	Four clusters and number of cases derived from Table 29	90
Table 31:	Number of respondents for open-ended Question 22	93
Table 32:	Breakdown of responses given by district technology coordinators, principals, and teachers concerning factors related to the implementation of the technology plan.....	93
Table 33:	Breakdown of responses given by district technology coordinators, principals, and teachers concerning factors related to unplanned activities.....	95

CHAPTER I

INTRODUCTION

With the rapid development of modern telecommunications and computer technology, the integration of instructional technology into teaching and learning has become pervasive in schools in the United States. A number of studies have shown that the availability of computers and Internet access for teaching and learning in schools is increasing each year (Becker, Ravitz, & Wong, 1998). Hayes & Bybee (1995) report that the student-to-computer ratio was 22:1 in 1988-89 and 12:1 in 1995. According to Williams (2000), the student-to-computer ratio in American public schools improved to about 6:1 in 1999. The number of public schools that had Internet access increased from 35% in 1994 to 99% in 2002 (Kleiner & Lewis, 2003).

Indeed, the development of advanced computer technology and the Internet has led to major changes in how technology is used in public school classrooms in the United States. The Internet has extended instructional and learning opportunities beyond the boundaries of the single classroom. Technology has facilitated a paradigm shift from teacher-centered to student-centered learning environments, in which students are actively engaged in learning rather than serving as passive receivers. Schools are adopting technology because technology has been shown to be an effective tool for teaching and learning (Mann, Shakeshaft, Becker, & Kottkamp, 1999; Wenglinsky, 1998). Computers have also proven to be a highly efficient means for storing, managing, and updating student information and materials. In addition to these reasons, computer technology has been integrated into classrooms because educators recognized that this

technology has become an integral part of our society, which students must master to fulfill their professional and personal needs.

As the demand for technology integration in schools has grown, the federal government has sponsored many initiatives to help students learn through technologies. These federal initiatives include *Goals 2000: Educate America Act* (Public Law 103-227), *Improving America's Schools – Technology for Education Act of 1994* (Public Law 103-382), and *Telecommunications Act of 1996*. Each of these acts had as one of its objectives the preparation of technologically competent American students. The *Goals 2000 Act* offers guidelines for developing a state technology plan. The *Technology for Education Act* was aimed at promoting increased teacher training in the integration of technology into the curriculum. This act requires state and local governments to use part of the federal funds they receive to deliver teacher training in the use of technology. The *Telecommunication Act* was designed to insure that each school, and thus each student in the US, would have access to Internet. Under this act, the federal government introduced the E-rate program, which has assisted public schools and libraries in implementing telecommunication technologies and services in discount rates.

In his State of the Union address in January 1996, President Clinton established a vision of educational technology with the following four goals: (1) all teachers will have the training and support they need to help students learn to use computers and the information superhighway; (2) all teachers and students will have modern multimedia computers in their classrooms; (3) every classroom will be connected to the information superhighway; and (4) every school curriculum will have effective software and on-line learning resources (United States Department of Education, 1996). In February 1996,

President Clinton and Vice President Gore announced the *Technology Literacy Challenge* Program, with the objective of helping each American student to be technologically literate by the beginning of the 21st century. They proposed that this was possible through meeting the four goals stated above.

Even with these government initiatives, schools are not making sufficient progress in implementing technology. Researchers have identified many barriers to the use of instructional technology in schools (Rogers, P., 1999; Leggett, W. & Persichitte, K., 1998). These barriers include lack of access to hardware and software, inadequate staff development, lack of technical support, and lack of time for teachers to prepare to use technology. A number of studies have been carried out investigating how technology can be successfully integrated in schools (Cole, 1999; McCraw, 1993; Bailey, 1997; Texas Center for Educational Technology, 1996). Of the many recommendations suggested by these studies, the development of adequate technology plans documenting all necessary processes and issues is a primary step for effective integration of technology in schools. Such planning guides would help school districts address potential barriers to the success of their strategic plans and administrative practices. A long-range technology plan is critical to achieving the effective integration of technology into teaching and learning. A well-written technology plan provides a clear vision of how technology can be effectively implemented in a school and hence ensures that the school can improve student achievement and technological skills.

School districts and other educational institutions began to develop technology plans in the early 1980s when personal computers were first introduced in schools (Fries & Monahan, 1998). These plans mainly focused on how to use technology as a subject.

Since new technologies continuously emerge, technology plans have had to evolve to address these changes. As a result, many planning guides for technology have been published to assist school districts in the effective integration of technology into the schools (Dyrli & Kinnaman, 1994; Barnett, 2001; Lumley & Bailey, 1993; Kimball & Sibley, 1997). These guidelines provide school districts with both step-by-step procedures and lists of components to be used in developing their technology plans.

Federal and state governments have also outlined national guidelines for preparing technology plans. In June 1996, Secretary of Education Richard W. Riley presented the report “Getting America’s Students Ready for the 21st Century: Meeting the Technology Literacy Challenge” as the first national technology plan. The President proposed a budget of two billion dollars over a five-year period to fund the Technology Literacy Challenge Program. This program was intended to help states and local agencies create and implement plans for integrating technology into teaching and learning.

Since the Technology Literacy Challenge Program was enacted, state governments and public school districts have been formally required to create technology plans in order to be eligible to receive federal funds. In 1996, Tennessee Board of Education published its Education Technology Long-Range Plan (Tennessee Department of Education, 2003b). Tennessee Department of Education has set guidelines for school districts to use in preparing their technology plans. According to Tennessee guidelines, school district technology plans must incorporate necessary elements, and each school district is required to submit its technology plan in order to receive funding from state government and other agencies. The State of Tennessee implemented this policy to help ensure that technology would be effectively integrated into the schools. The planning

guidelines include Tennessee Local Education Plan for educational technology: *Checklist of required elements –2002/2003* (See Appendix A1) and Technology Plan Criteria (TPC) for Tennessee’s Enhancing Education through Technology (Title IID: *Ed Tech*) and E-Rate Discounts (See Appendix A2). The purpose of the present study is to examine the current state of Tennessee school systems’ technology planning and implementation efforts.

Statement of the Problem

The integration of instructional technology into school curricula is a challenging and complex task that requires the coordination and commitment of various stakeholders. Researchers have stated that a strategic technology plan is an essential step in this process (Cole, 1999; McCraw, 1993; Bailey, 1997; Texas Center for Educational Technology, 1996). Although school districts are required to prepare technology plans to receive government and other funding, these plans may or may not be adequate for the task. Many school districts may not know how to develop a technology plan that ensures the successful implementation of technology in the classroom. Moreover, few studies have been conducted to determine the degree of implementation of school district technology plans. Despite many efforts to assist school districts in developing viable plans, a number of school systems still lag behind in preparing well-articulated technology plans.

Purpose of the Study

The purpose of this study was to examine the development process and implementation of technology plans for public school districts in Tennessee. This study investigated how school districts developed their technology plans and their procedures

for reviewing these plans. The study examined commonalities among Tennessee school systems' technology plans with regard to the inclusion of critical components. In addition, it addressed the level of implementation of current technology plans in school districts. Finally, this study examined the nature and scope of the unplanned outcomes and initiatives and the degree to which these may have affected the implementation of districts' technology plans.

Importance of the Study

The results of this study can help educators and interested authorities to better understand the impact of technology plans on the infusion of instructional technology in schools. This study also provides information about unplanned technology implementation now taking place in school districts. This information should serve as baseline data for those interested in developing future technology plans, revising current plans or examining the current status of technology integration in Tennessee schools.

Assumptions

The following are the underlying assumptions of this study.

1. Information provided by the participants about the school district technology plans is current and credible.
2. Each participant responded to the survey questionnaire on the basis of his/her best knowledge, and his/her responses are trustworthy and valid.
3. The survey instrument is adequate to capture the information needed.

Limitations

This study is based both on a content analysis of the technology plans and on an analysis of survey data. Technology plans gathered from school districts may not have been recently updated with current changes. Analyses are based on the available documents and opinions of the participants. The survey was administered to three sets of subjects: (1) district technology directors/coordinators, (2) principals, and (3) teachers or site coordinators who were involved in creating their districts' technology plan.

Design of the Study

This study incorporated both quantitative and qualitative procedures. The following seven research questions were used as the framework for the investigation.

Research Questions

1. To what degree do Tennessee school districts' technology plans incorporate the critical components specified by state and federal educational agencies? What commonalities exist among these technology plans? What are the main components included in these plans?
2. What, if any, differences exist among rural, suburban, and urban school districts in Tennessee with regard to the development of their technology plans?
3. How were the school district technology plans in Tennessee developed? Who wrote them?
4. How many school districts have proposed to revise their technology plans in the future, and how have they planned to do it?
5. What, if any, differences exist among rural, suburban, and urban school districts in Tennessee with regard to the implementation of their technology plans?
6. How have Tennessee school districts planned to implement their technology plans? How do district technology coordinators, principals, and teachers perceive the effectiveness of the implementation of their districts' technology plans?

7. Are school districts in Tennessee presently engaged in any technology integration activities that were not part of their originally written technology plans? If so, what are these unplanned activities and how are they influencing the districts' technology implementation efforts?

Two research strategies have been employed to address these questions. First, a content analysis of district technology plans was performed to determine their structure and scope. Second, a select group of school district employees was surveyed to explore their perceptions and knowledge of the process used to create the plan and the current status of the implementation of these plans. The survey consisted of questions designed specifically to address above research questions. All participants were selected based upon their expertise and ability to answer these questions. Survey data were analyzed by computing simple descriptive statistics, such as frequency, percent, and mean.

Definitions of Terms

E-Rate: Discounts offered by the federal Telecommunications Act of 1996 to schools and libraries to purchase telecommunications services, internal connection accessories, and Internet access.

E-TOTE: EdTech Tennessee Online Technology Evaluation System: Technology survey that collects data both at the school and district level. The data are used in the state's annual reports to the US Department of Education and comprise part of the needs assessment component of the state education technology plan. (Tennessee Department of Education, 2003a)

Instructional technology: The theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning (Richey

and Seels, 1994). Simple definition: Advanced computer technology used for instructional purposes. For example, computers, multimedia computers, digital cameras, scanners, educational software, CD-ROMs, the Internet, Smartboards, and other audiovisual equipment.

Technology Plans: A plan that articulates, organizes, and integrates the content and processes of education in a particular discipline integrating appropriate technologies. It facilitates multiple levels of policy and curriculum decision making, especially in school districts, schools, and educational organizations that allow for supportive resource allocations. (Knuth, R., Hopey, C., & Rocap, K., 1996).

School District/School System: A local education agency directed by an elected local board of education that exists primarily to operate public schools or to contract for public school services. The terms “school district” and “school system” are used interchangeably in this document. (Utah Department of Education, 2002)

District Technology Director/Coordinator/Supervisor: The individual in a school district who is responsible for coordinating, planning, and implementing instructional technology in the district’s schools. Different school districts use different titles such as district technology director, district technology coordinator, or district technology supervisor. These terms describe individuals who perform similar job responsibilities. Thus, for simplicity, the term “district technology coordinator” is most frequently used in this document.

School level technology coordinator/building coordinator/media specialist: The school staff member who is responsible for planning, coordinating, and implementing technology in the school. Different schools use different titles such as school level

technology coordinator, building coordinator, or media specialist. These terms describe individuals who perform similar job responsibilities. Thus, for simplicity the term “school level technology coordinator” is used.

Rubric: A set of descriptions used for scoring and categorizing components of a technology plan.

Technology integration/infusion: The use of instructional technology across the curriculum in meaningful and relevant ways.

Technology implementation: The adoption and use of technology in schools.

Rural: (1) A large town – an incorporated place or a Census-designed place (CDP) with a population of at least 25,000 and located outside a consolidation metropolitan statistical area (CMSA) or metropolitan statistical area (MSA), (2) A small town – an incorporated place or CDP with a population between 2,500 and 24,999 and located outside a CMSA or MSA; or (3) any incorporated place, CDP, or non-place territory designated as rural by the U.S. Bureau of the Census. (Wisconsin Center for Education Research, 2002)

Suburban: (1) An urban fringe of a large city– any incorporated place, Census-designated place (CDP), or non-place territory within a consolidated metropolitan statistical area (CMSA) or metropolitan statistical area (MSA) of a large city and defined as urban by the U.S. Bureau of Census; or (2) An urban fringe of a midsize city – any incorporated place, CDP, or non-place within a CMSA or MSA of a midsize central city and defined as urban by the U.S. Bureau of the Census. (Wisconsin Center for Education Research, 2002)

Urban: (1) A large city– a central city of a metropolitan statistical area (MSA) or consolidated MSA (CMSA) with a population of at least 250,000; or (2) midsize city – central city of an MSA or CMSA with a population of less than 250,000.

(Wisconsin Center for Education Research, 2002)

Organization of the Document

This dissertation study is organized and presented in five chapters. The first chapter includes a brief description of growth and importance of technology usage in public schools in the United States, a background of technology plans, a problem statement, a statement of purpose, a statement on the importance of the study, assumptions, and limitations. The second chapter includes a review of relevant literature. The third chapter includes research design and methodology. The fourth chapter contains data analyses and results. The fifth chapter provides conclusions, discussion, and recommendations.

CHAPTER II

REVIEW OF THE RELATED LITERATURE

This chapter focuses on the literature related to the integration of technology in schools and on technology planning at various levels of institutions. A number of studies have pointed out the necessity technology plans for the successful implementation of instructional technologies in schools (Bailey, 1997; McCraw, 1993; Cole, 1999; Texas Center for Educational Technology, 1996). Consequently, several models have been proposed describing how a school district technology plan should be written (Barnett, 2001; California Department of Education, 2001).

This review has been organized into the following sections: implementation of technology in schools, historical development of technology plans, government initiatives in technology planning, technology planning initiatives in Tennessee, technology planning guides, related issues in technology planning and implementation, evaluation models for technology plans, and comparison between Tennessee guidelines (2002-2003 Checklist) and three other evaluation models: (1) Technology Maturity Model by Kimball and Sibley (1997-98); (2) Technology Plan Review Instrument by Salina (2001); and (3) Planning for Technology: A Guidebook for School Administrators by Lumley and Bailey (1993).

Implementation of Technology in Schools

Most schools in the United States have, to some extent, adopted and implemented instructional technology into teaching and learning. The recent advancements in computer technology are having an impact on classroom instruction, and every year

schools are spending millions of dollars to buy new equipment, develop infrastructure, hire technology staff, and provide training to teachers and staff. The federal government has initiated several programs, such as the Technology Literacy Challenge Fund, the Universal Service Fund, and No Child Left Behind, to enhance students' achievement through the use of technologies in schools. These programs are also intended to better prepare American students to acquire the technological skills necessary to compete in the current and future job market.

A review of literature revealed several critical factors that come into play during the successful implementation of technology in schools. These factors include resources, access, teachers' attitudes and training, leadership and support, monitoring and evaluation, curriculum reform and instructional change, technology planning, and other issues. (Cole, 1999; Fabry & Higgs, 1997; Leggett & Persichitte, 1998)

Resources

The implementation of technology in schools is not possible without abundant resources. Teachers and students will not be creative and motivated unless they have current technology and software. Funding is necessary to purchase, maintain, and upgrade hardware and software. An adequate budget also is necessary to pay for other service fees, such as phone bills and on-line account charges. Without sufficient funding, school districts will not be able to provide appropriate technology-related training. However, according to Cole (1999), resources not only include money and equipment, but also include time, infrastructure, and communications among teachers and administrators.

Access

Teachers need access to computer labs, computers, and other instructional technologies to teach students with technology (Cole, 1999; Fabry & Higgs, 1997). Siegel (1995) suggests that teachers have borrowing privileges so that equipment is available to them to use at night, on weekends, and in their classrooms. Fabry and Higgs (1997) argue that access is more than merely having technology available in schools; it also involves the issues of location, number, and types of technology that teachers and students can effectively use them. Poor access to hardware, software, networks, and other technologies presents a barrier to using instructional technology (Wesley and Kay, 1998).

Teachers' Attitudes and Training

The teachers' role is significant in the successful use of technology in curriculum because they are the ones who actually incorporate the technology in appropriate curriculum contexts. Stevens (1986) claims that in regard to the teachers' role, two major factors are involved in the implementation of instructional technology: (1) teachers' attitudes and (2) teachers' expertise in using technology in the classroom. Teachers are more likely to use technology if they have a positive attitude, confidence, and an eagerness to learn and implement new instructional approaches.

Many teachers do not have experience using technology to deliver instruction to students. Some teachers are resistant to using technology in their classroom instruction (Cole, 1999). Some do not see that technology can benefit both teachers and students in learning (Maddux, 1998; Rogers, 1999). Others may experience anxiety when using computers (Rogers, 1999). They view technology as just for computer literate teachers. Fisher and Dove (1999) argue that some teachers resist using technology because of the

school's security policies that hold teachers responsible for stolen equipment, vandalism, viruses, and equipment breakage. These teachers tend to teach students in the way they were taught or that they have been teaching.

Harvey and Purnell (1995) suggest that teachers' varied career stages and learning styles also determine their motivation level in using technology into the classroom. Efforts to implement technology will be more effective if teachers are provided rewards and incentives (Ely, 1995). Rewards could be any benefit, including simply a recognition letter from the principal.

Without teachers' technological knowledge and skills, the integration of technology into the curriculum is not possible. Teachers need training opportunities to be able to use technology in their classrooms. Professional development programs have been effective in improving teachers' ability to carry out new approaches in instruction (Siegel, 1995; Collins, 1992).

Teachers who have been trained in using instructional technology are creative and productive in teaching students using technology. Training not only helps teachers develop technological skills; it also helps them create a positive attitude towards using technology in classroom instruction. Training also helps teachers develop skills on how to teach students with instructional technologies. Fishman and Duffy (1992) suggest that recognizing teachers' perceived needs is crucial to a design process focused on restructuring classrooms. Teachers need help to design and develop instructional units that integrate technology.

Training is more effective if it is focused on a real classroom situation. Teachers should be trained with whatever equipment is available in their classrooms. They can

easily get frustrated if they must use hardware and software of different brands and varying versions of operating systems. Siegel (1995) argues both for training that is relevant to the curriculum and for follow-up training. Frequent training opportunities can help teachers refresh their knowledge as well as learn about new and upgraded technologies. As with teachers, administrators also require some level of technology training in order to be able to understand the importance of technology in the curriculum and effectively support their teachers.

Leadership and Support

The long-term vision and commitment of an educational leader affects every aspect of the technology integration process. Leadership occurs at many levels. For instance, leadership includes federal and state governments, superintendents, principals, technology coordinators, media specialists, and lead or mentor teachers. McCraw (1993) suggests that without long-term goals and strong leadership, there is little chance of technology being used effectively in schools. Administrators must continually update the school board about the needs and uses of technology in their schools.

Leaders are the ones who advocate for technological usage in schools and are ready to support teachers in different ways. Rogers (1999) found that administration could encourage teachers to try new technologies by providing funding for technical support and equipment. Many administrators do not seem to be motivated to use technology as they do not personally find technology to be important. With this attitude they do not see the need for providing resources and training for faculty members (Maddux, 1998).

Catchings (2000) suggests strong administrative support for the acquisition of resources and for the encouragement of teacher experimentation. Institutions need to

ensure that teachers will not feel any intimidation from school's security policies regarding stolen equipment, vandalism, viruses, and equipment breakage. Teachers need an institutional policy on ethical issues in using the Internet. Technical support personnel can help teachers in the day-to-day maintenance of technology, such as troubleshooting, installing, and repairing of technology. Pedagogical support can help teachers to design and develop technology-enhanced instructional approaches and materials in their curriculum (Cole, 1999). In many schools, technology coordinators provide technical support and support in infusing technology into the curriculum. In addition, administrators may support teachers by providing ample time for them to design and develop instructional materials using technology.

Time is one of the key factors that must be considered for successful integration of technology into curriculum. Teachers need time to develop or modify lesson plans, units, or curricula that incorporate technology, and, perhaps most critically, master technology skills. Teachers require lots of time and patience to play with computers to develop practical knowledge and become familiar with technology. Many studies indicate that lack of time is the greatest barrier to the successful integration of computers.

Wesley and Kay (1998) report that teachers require time to perform the following activities: plan for technology implementation; collaborate with peers; prepare integrated lessons and support materials; explore ideas and read about/observe others; practice strategies for embedding technology within curriculum; evaluate efficiency of implementation efforts, and effectiveness of strategies; develop personal skills with evolving technologies; maintain personal skills with updated technologies; and expand personal and professional technology skills.

Without proper technical support, the adoption, utilization, and integration of technology in the classroom is not possible (Wesley and Kay, 1998; Cole, 1999). Rogers (1999) further raises issues concerning the quality of technical support, staff development activities and hardware and software. Poorly trained technicians, outdated hardware and software, and inadequate staff development activities are all barriers to successful use of technology.

Monitoring and Evaluation

Continuous monitoring and assessment of the progress made in different stages of technology integration in classrooms provides feedback and allows for the early detection of items needing improvement (Cole, 1999). Evaluation helps to determine the impact of technology usage in instruction, and must be developed in the planning stage. Procedures must be specified to clarify such issues as who will conduct the evaluation, when and how. Evaluation can be conducted by an evaluator or by a committee comprised of administrators, technology coordinators, and expert teachers. A formative evaluation can be carried out to monitor and assess all stages involved in the process of integrating technology into the curriculum.

Curriculum Reform and Instructional Change

The use of technology in classroom instruction can bring about an extensive change in teaching and learning. According to Mills (1999), such reforms can be only successful if one first understands teachers' existing instructional practices. Barnett (2001) suggests that the use of technology constitutes an instructional change, and teachers must be ready to accept changes that occur in curriculum and instructional approaches. They must have confidence, commitment, and ample time and support to implement the changes as well.

Instructional change also requires new assessment approaches, which involves the assessment of the process and progress of skills rather than simply of information acquisition.

Senge, Kleiner, Roberts, Ross, Roth, & Smith (1999) outline ten challenges as barriers to instructional change through the application of technology. These challenges include

- Lack of time to implement the change.
- Inadequate support for those implementing the change.
- Lack of relevance of the change to the curriculum.
- Lack of consistent and clear goals and message regarding the change.
- Fear and anxiety of those facing change.
- Assessment of progress that is disconnected from traditional forms of assessment.
- Isolation and arrogance between believers and nonbelievers in the new innovation.
- Organizational structure and policies that hinder change.
- Inability to transfer knowledge across departmental boundaries.
- Failure of organizational strategies and intended focus to include change as a natural process of the organization.

Technology planning

McCraw (1993) suggests that a long-term technology plan, training for teachers and administrators and strong leadership are essential for the successful integration of technology into curriculum. A long-term plan for integrating technology into the

curriculum is necessary with regular evaluation for accountability. From multiple case studies, Catchings (2000) found that a comprehensive school-based technology plan is one of the critical factors that contribute to the successful implementation of technology in curricula. These plans should set curricular goals with time lines for achieving them. The results of one case study demonstrate that positive teacher attitudes toward the use of technology can be obtained by inviting teachers to participate in the establishment of goals and timelines

In order to adopt and integrate technology into the school curriculum, a clear vision of instructional priorities, goals for technology usage and expected learning outcomes of students is necessary. An extensive, detailed plan can help to accomplish the desired goals and objectives. The work of determining a vision and making plans to accomplish it is a major undertaking with several steps in the process of implementing technology in the curriculum. The planning process must be conducted collaboratively by a committee representing all stakeholders (teachers, administrators, students, parents, and community members). Ely (1995) argues that people feel responsible if they are allowed to participate in the process of planning and designing new ways to accomplish innovative procedure. A committee is responsible for carrying out various planning activities, such as needs assessment, selecting technology, collecting and managing funds and resources, preparing teachers, teacher training, integrating technology and instructional change, continuous monitoring and evaluation. In addition to planning these activities for today, the planners also should keep an eye on tomorrow by allowing for the emergence of new practices and technologies as technology rapidly changes (Barnett, 2001).

Other Issues

In addition to the factors described above, Maddux (1998) raises the following issues related to policy and attitude:

- Adoption of state-level plans
- Fear of inappropriate web sites
- Placement of all school computers in centralized labs
- Unrealistic overvaluing of standardized tests
- The implicit notion that teaching is telling and learning is listening
- The current poor quality of web pages

Summary

With the complexity of implementing technology programs in schools, such programs must be guided by adequate and careful planning. Technology plans should describe the current status of technology use in schools and describe the future desired state. Plan should also articulate policies for review and acceptable use, and be prepared by the combined effort of all stakeholders. Stakeholders need to be well informed about the importance of technology in teaching and learning so that they can be fully involved and committed to implementing the plan. A continuous coordination and cooperation between stakeholders is essential to the success of technology program. Sources of funding must be clearly defined and budgets must be available so that schools can purchase new equipment, hire new personnel, and provide incentives to teachers, as mandated by the plan. Finally, a continuous assessment of the progress achieved in each stage and component of a plan is necessary to measure the success of a program.

Historical Development of Technology Plans

The concept of formal technology planning in educational institutions in the United States emerged in the early 1980's (Fries & Monahan, 1998; Hoffman, 2002) when microcomputers were first available and schools were increasingly adopting and implementing them in the curriculum. According to Bingham (1984), the topic of technology planning for acquisition and use of microcomputers was a major issue at every level, including schools, state education agencies, and even at computer conferences and publications in the beginning of the 1980s. Bingham (1984) states that the North Carolina public schools were involved in planning to adopt microcomputers with the assistance of the North Carolina Department of Public Education after the Spring of 1980. In 1983, the North Carolina Department of Public Education proposed a three-phased planning model providing the state, school systems, and the State Education Agency with the leadership for microcomputer use (Bingham, 1984). These phases were: (1) defining state guidelines and recommendations; (2) providing assistance to school systems in developing and implementing their local plans; and (3) developing state education agency focus and activities.

Harry N. Vakos (1986), Superintendent of the Rochester Public Schools, Minnesota states that the Rochester school system adopted a formal technology plan beginning in 1980-81. In January 1986, Merrimack Education Center (MEC) published a technology planning model, *A Template for Preparing a Technology Applications Plan*, to assist school districts in writing a technology applications plan.

The use of technology in teaching and learning has been a major change agent in education reform. Because of the growing demand for emerging technology in education,

the United States government also has formulated plan and policies intending to serve as a framework for implementing technology in schools (U.S. Department of Education, 1996).

Government Initiatives in Technology Planning

Fishman and Zhang (2003) state, “although technology planning has existed for many years, it first became a requirement in state and local school improvement plans as a result of the *Goals 2000: Educate America Act* passed in 1994.” The Goals 2000 Act provided “a national vision and strategy to infuse technology and technology planning into all educational programs and training functions carried out within school systems at the State and local level” (Cradler & Bridgforth, 1994). Following the mandates of the Goals 2000 Act, in June 1996 Secretary of Education Richard W. Riley presented a report, “Getting America’s Students Ready for the 21st Century: Meeting the Technology Literacy Challenge” as the first national technology plan (U.S. Department of Education, 1996). The report stated that its intention was to show educators at state and local levels “how schools, communities, and states can apply today’s sophisticated information technology to raise student achievement, with the aim of attaining new standards of educational excellence set by states and local communities.”

Following the national vision of technology integration into teaching and learning, the federal government established several programs, such as the Technology Literacy Challenge Fund and the Universal Service Fund, to support educational institutions in the mid 1990’s. President Clinton proposed a budget of two billion dollars over a five-year period to fund the Technology Literacy Challenge Program. School districts in the nation were influenced by the policy mandates for technology planning as they were required to

develop technology plans to apply for the federal funds (Hoffman, 2001). In order to be approved by the Universal Service Fund, technology plans had to meet criteria in five core areas: “establishment of clear goals and a realistic strategy, professional development, assessment of needed technologies, budget, and evaluation” (Hoffman, 2001).

In the Fall of 1999, the U.S. Department of Education revised the original national educational technology plan published in 1996. The resulting technology plan, “e-learning,” had five new goals. As stated in the plan, they were

1. All students and teachers will have access to information technology in their classrooms, schools, communities and homes.
 2. All teachers will use technology effectively to help students achieve high academic standards.
 3. All students will have technology and information literacy skills.
 4. Research and evaluation will improve the next generation of technology applications for teaching and learning.
 5. Digital content and networked applications will transform teaching and learning.
- (U.S. Department of Education, 2001a).

In January 2002, President Bush reauthorized the Elementary and Secondary Education Act passed in 1994 by signing the “No Child Left Behind Act of 2001” (Public Law 107-110). Title II, Part D of the law, Enhancing Education Through Technology, is devoted to the improvement of “student academic achievement through the use of technology in elementary schools and secondary schools” (U.S. Department of Education, 2001b). Subpart 1 of this act describes how states and local education

agencies apply for technology grants and Subpart 2 describes the national technology activities. To be approved for grants under this act, states must have their technology plans indicating state goals for the use of technology; in addition, districts must have local long-range strategic educational technology plans.

In response to the federal funding requirements, the need for a hierarchy of technology plans from national to local levels (national technology plan, state technology plan, school district technology plan, and individual school technology plan) has emerged. In this chain of planning, each level is responsible for approving plans at the next lower level.

Technology Planning Initiatives in Tennessee

In 1991, The Tennessee State Board of Education developed the “Master Plan for Tennessee Schools: Preparing for the 21st Century.” The focus of the “Master Plan” was on three Key Result Areas: (1) “Establishing a 21st Century Classroom,” (2) “Creating Rational, Workable, Accountable Governance System” and (3) “Providing Adequate Sustained School Funding.” One of the goals of the Key Area “Establishing a 21st Century Classroom” was to focus on technology which according to the Board would “be used to improve instruction and learning in all schools, to provide professional development, to manage schools and school systems, and to link all schools in a statewide information network.”

In 1996, Tennessee Board of Education published its Education Technology Long-Range Plan (Tennessee Department of Education, 2003b). In 1999, Brush reported that approximately 92 percent of public school districts in Tennessee had technology plans. The current state technology plan has following four main goals:

1. All Tennessee students will have Internet access to the world's libraries, databases, and content.
2. All Tennessee students and teachers will use technology resources to develop workforce relevant skills, perform research and solve programs.
3. All Tennessee teachers will be prepared to use instructional technology, incorporating it effectively into the curriculum.
4. All of Tennessee's communities will be reconnected to their schools through technology. (Tennessee Department of Education, 2003b).

The Tennessee Department of Education prepared a checklist of 17 elements (2002-2003) required in Tennessee Local Education Agency technology plans that were submitted for the federal grant "Enhancing Education Through Technology" (See Appendix A1). The checklist is divided into two sections, process and content. The process part includes four components: needs assessment, stakeholder involvement, timeline, and responsible parties. The content part includes 13 components: vision, goals and strategies, collaboration among educators, collaboration with community partners, curricula and teaching that integrate technology, increased accessibility, equity, professional development, budget, interoperability, leadership, review of policies and procedures, and evaluation. In addition, school districts were mandated to include technology plans incorporating these elements. After the first year of use, this checklist was consolidated with other technology plan checklists, Technology Plan Criteria (TPC) for Tennessee's Enhancing Education through Technology (Title IID: *Ed Tech*) and E-Rate Discounts (See Appendix A2).

The Tennessee Department of Education developed an instrument, Tennessee STaR Chart (2002), for helping schools and school districts assess their existing technologies and teacher competence with technology (See Appendix A3). As seen in Appendix A3, the chart presents four levels of progress for each of four main areas: (1) teaching and learning; (2) educator preparation and development; (3) administration and support services; and (4) infrastructure for technology.

Technology Planning Guides

From the early 1980s to date, a number of strategic planning guides and models have been proposed to assist schools and school districts with careful and strategic planning for the acquisition and use of technologies in teaching and learning (Merrimack Education Center, 1986; Kimball & Sibley, 1997; Barnett, 2001). Hoffman (2001) notes that most of the early technology planning models were developed by school administrators or educators associated with schools and based largely on their experience with their own districts or on a single case study. Most technology planning guides contain prescriptive guidelines with several steps for use in planning for technology at district or school levels.

Vakos (1986) suggests the following ten steps for the successful implementation of computer programs: (1) need assessment; (2) statement of philosophy; (3) board policies; (4) administrative procedures; (5) learner goals; (6) instructional priorities; (7) equipment needs; (8) preparation of bid specs; (9) integration; and (10) evaluation design. Merrick Education Center (1986) proposed a model in which the following areas were included in a school district's technology plan: (1) the school district's current status and objectives; (2) curriculum development; (3) computer hardware, software, and technical support; (4)

staff development; (5) program organization and implementation; (6) program budget; and (7) other considerations, such as equity and networking. Barnett (2001) proposed a technology planning guide with the following ten essential elements for helping districts and schools to effectively use technology: (1) creation of vision; (2) involvement of all stakeholders; (3) gathering of data; (4) revision of the research; (5) integration of technology into the curriculum; (6) commitment to professional development; (7) establishment of a sound infrastructure; (8) allocation of appropriate funding and budget; (9) planning for an ongoing monitoring and assessment; and (10) preparation for tomorrow.

Based on their own experiences as technology leaders and a review of technology plans, Dyrli and Kinnaman (1994) suggest strategies for creating an effective school district technology plan categorized into three sections: (1) setting up a districtwide education technology steering committee, (2) the major components in district-level planning, and (3) putting planning pieces together.

According to their suggestions, the basic guides in the process are:

1. Start with your educational vision.
2. Assess your district's present use of technology.
3. Develop a guiding framework.
4. Implement your plans.
5. Decide how to evaluate your progress.

In October 1995, six Regional Technology in Education Consortia formed a Technology Plan Task Force involving representatives from each of the RTECs. This Task Force, under the leadership of the North Central Regional Technology in Education

Consortium, was charged with studying existing technology planning documents and recommending a set of guiding questions that would help administrators and technology planners in varied educational settings. In 1996, after a year of study, the task force presented a technology-planning guide with seven guiding questions including significant issues related to technology planning:

1. What is your vision of learning?
2. How will you use technology to support your vision of learning?
3. How will you develop a supportive infrastructure?
4. Do you understand the context of your technology planning process?
5. How will you garner public support for your plan?
6. How will you implement your plan?
7. How will you evaluate the implementation of your technology plan?

Larry Anderson and John Perry, Jr. (1994), Director and Associate Director of National Center for Technology Planning, recommend several steps as the recipe for successful technology planning in schools. These steps include (1) establishing committee representation, (2) writing progress report, (3) subdividing responsibilities, (4) establishing time frames, (5) setting target dates, (6) building consensus, (7) formulating plan, (8) implementing the plan, and (9) evaluating the plan.

In a study of technology-planning in California schools, Kimball (1996) identified nine essential components that are common in each planning guide for effective technology plans. These components were (1) broad-based support in the planning in the planning process, (2) comprehensive needs assessment, (3) vision based on the school district's overall vision, (4) goals based on the vision, (5) action plans for achieving the

goals, with timelines, responsibilities, and budget, (6) plan for evaluation of progress, (7) multi-year planning, (8) elaboration on the curriculum integration of technology, and (9) planning for staff development.

Although these guides were developed at different times by different authors, they share common planning tasks, such as forming technology planning committees, assessing needs and current status of schools or school districts, and formulating program philosophy, goals, and objectives. There also are commonalities among planning components, though minor differences arise out of the various authors' unique views and needs. These planning guides have tended to promote dynamic planning as new technologies and issues emerge.

Related Issues in Technology Planning and Implementation

Planning for technology and its implementation is a complex process that involves various factors. The following are a few issues revealed from the review of literature.

Formation of a Technology Planning Committee

Most of the planning guides suggest that the formation of an empowered planning committee is the primary step in the process of preparing an actual technology plan. Barnett (2001) suggested the importance of support from all stakeholders who should have an opportunity to supply their input in defining and refining the goals of technology plans. Dyrli and Kinnaman (1994) suggested a district-wide education technology steering committee committed to a clear vision of where the district will go, how it will get there, and how it will measure its progress. They also stressed that the committee should include (1) a leader who is "educator first and technologist second," (2) an

informed education consultant, (3) representation from all affected groups, (4) executive blessing, and (5) an empowered committee.

Implementation of Technology Plans

The issue of implementing a technology plan is critical for the successful integration of technology into the curriculum. Even a well-written technology plan will be worthless if it is not implemented properly. Fries and Monahan (1998) indicate the need to link district technology plans with individual schools. They also suggest that the establishment of link between district-level technology committee and building-level planning teams is critical in addressing building-level needs.

Revision of Technology Plans

Most of the technology-planning models suggest frequent revisions of technology plans. Fries and Monahan (1998) suggest that a five-year plan is no longer valid as technology changes too rapidly. They also argue that technology plans need to be revised often so that the plan will never sit idle for too long.

Evaluation Models for Technology Plans

Many educators have published guidelines for helping schools or school districts evaluate the quality of their technology plans. Three evaluation methods are described below: (1) Technology Maturity Model by Kimball and Sibley (1997-98); (2) Planning for Technology: A Guidebook for School Administrators by Lumley and Bailey (1993) and (3) Technology Plan Review Instrument by Salina (2001). These models, while similar in some respects, are each distinguished by unique features.

Technology Planning Maturity Model for Educators by Kimball and Sibley

This model identifies 23 elements as required components of a well-written district technology plan (See Appendix B1). A description of four levels from poor quality to high quality is given for each component. Using this rubric, a technology plan can be assessed in two ways (1) to identify if the plan has included a required element, and (2) to determine the quality of the plan with respect to that particular element.

Planning for Technology by Lumley and Bailey

In 1993, Lumley and Bailey proposed a six-step technology planning model to help school administrators initiate and carry out a systematic technology planning. The six steps include the organization of a team; the preparation of the planning team for study; the assessment of the current state of technology in the district; the development of guiding documents for technology; the design of a long-range technology plan; and the implementation, institutionalization, revision, and evaluation of the technology plan. Each step contains a set of key questions or a set of statements (See Appendix B2)

Technology Plan Review Instrument by Salina

After reviewing five different technology planning evaluation models, Salina recommended a new model for evaluating district technology plans (See Appendix B3). The proposed model contains 21 questions defining components of a good district technology plan. In this model, three levels of technology planning are suggested: (1) initial, (2) transitional, and (3) mature for each question and subsequently three rating ranges: initial (21-42), transitional (43-52), and mature (53-63).

Summary of the above Three Models

As shown in Table in Appendix B4, all of the above three models to some extent include the following components: (1) needs assessment, (2) stakeholder involvement, (3) timelines, (4) mission and vision, (5) budget/funding/resources, (6) goals and objectives, (7) professional/staff development, (8) evaluation, and (9) facilities. The model developed by Kimball and Silbey (1997-98) appears to be more detailed in describing the component of needs assessment. This model proposes needs assessment in three different views: (1) breadth, (2) depth, and (3) assessment of needed equipment. The model developed by Lumley and Bailey (1993) also proposes a detailed needs assessment approach to identify needs related to technology literacy and current use. However, the model proposed by Salina (2001) focuses on maintaining an inventory of existing hardware and software and developing a process for selecting and purchasing hardware.

Different models and guidelines use different terms for stakeholder involvement. For example, Kimball and Silbey (1997-98) refer to “broad-based support,” Lumley and Bailey (1993) to “planning team,” Salina to “planning committee.” All of these models describe this component in detail.

All of the above three models describe the component of timeline for the implementation of technology plans. However, the TPRI model by Salina (2001) is very specific, indicating a timeline for the installation of new computer technology and a timeline for the delivery of professional development training.

All of the above models describe the component of goals and objectives of technology planning. However, the TPRI model by Salina (2001) describes objectives as exit outcomes and competencies for students.

All of the above models and guidelines describe the component of budget and funding allocation. However, the TPRI model describes budget and funding as the allocation of sufficient resources to support the implementation of the plan.

Two components of “responsible party” and integration of technology into the curriculum were included in both guidelines by Kimball and Silbey (1997-98) and Lumley and Bailey (1993). The components of “review of policies and procedures” and “maintenance and support” were included in both guidelines by Kimball and Silbey (1997-98) and Salina (2001).

The following components were included in only one of the above models:

- program integration
- multilayer planning
- school pilot project
- model classroom configuration
- institutionalization of strategies

Comparison between Tennessee Guidelines (2002-2003 Checklist) and the Three Other Evaluation Models

The following eight components contained in the Tennessee guidelines (2002-2003 checklist) were also found in all of the above three other models: (1) needs assessment, (2) stakeholder involvement, (3) timelines, (4) mission and vision, (5) budget/funding/resources, (6) goals and objectives, (7) professional or staff development, and (8) evaluation (See Appendix B4). The component of responsible party contained in the Tennessee guidelines (2002-2003) was also included in two other models. Two components, integration of technology into the curriculum and review of policies and

procedures, were included in two other models. Two components, collaboration among educators and interoperability, were included in one other model. Four components, collaboration with community partners, increased accessibility, equity, and leadership, were not found in any of the other models. Similarly, the following components found in other models were not included in the Tennessee guidelines (2002-2003 checklist):

- facilities
- action plans
- educational research
- maintenance and support
- program integration
- multilayer planning
- school pilot project
- model classroom configuration
- institutionalization strategies

Technology planning guidelines (2002-2003) prepared by Tennessee have most of the important components as identified in the review of literature. The component of action plans, which is not listed in Tennessee guidelines (2002-2003 checklist), seems to be a combination of several components, such as goals and objectives, responsible party, timeline and budget. In the Tennessee guidelines, the components of facility and infrastructure are not included, but can be considered as a part of other objectives.

CHAPTER III

METHODOLOGY

This study utilized both quantitative and qualitative procedures to examine the current state of technology planning in Tennessee public school systems. The study was based on two data sources. The first source involved copies of current technology plans that participating school districts were asked to provide. The second source of data was a survey about technology planning and implementation administered to school district technology directors/coordinators, principals, and teachers. The research design and methodology of this study are described in the following sections.

Target Population and Sample

The target population for the study was all Tennessee public school systems. There are 136 public school systems in Tennessee, and all of these school districts were invited to participate in the study. A survey was administered to employees of the schools who represented the following groups: (1) district technology coordinators, (2) principals, and (3) teachers who were involved in developing district's technology plan. If more than one technology director, principal, or teacher in a district was involved in the development of the plan, one participant from each category was randomly selected. There were a total of 408 (3 x 136) potential respondents in the study.

Instrument Development

Two instruments were developed for use in the study. One was a rubric for analyzing technology plans. The second was a survey for collecting perceptions of selected technology planning committee members.

Development of a Rubric for Content Analysis of the Technology Plan

To perform content analysis of technology plans, a rubric was created based on the state guidelines, Tennessee Local Education Agency (TLEA) plan for educational technology: *Checklist of required elements—2002-2003* (See Appendix A1 for TLEA Checklist and Appendix C1 for Rubric). This rubric was intended to gauge the degree to which the technology plan conformed to the components included in the checklist. The rubric consisted of a rating scale with three levels: 0, 1, and 2 to designate weak, intermediate, and strong elements of the technology plan, and an explicit criterion was established for each scale based upon the guidelines. Level “0” corresponded to “not included” or “irrelevant” information. Level “1” corresponded to minimal inclusion of information, and it was considered as “minimally” acceptable. Level “2” corresponded to a plan in which the specific component was extensively addressed.

Before performing the actual examination of technology plans, validity of the scoring instrument was established. The clarity and content relevance of the rubric was tested in two steps. First, three evaluators were asked to rate two representative district technology plans using the rubric. These three evaluators were selected based on their strong instructional technology backgrounds. Two evaluators were faculty members at University of Tennessee: one in Instructional Technology and another in Theory and Practice in Teacher Education. The third evaluator was a doctoral student majoring in Instructional Technology, and she also had a teaching experience in Tennessee. The sample technology plans were selected in such a way that one was a “good” example and one was a “bad” example. The score obtained from each rater was analyzed by computing correlation coefficients between all pairs of raters. After analyzing the data,

the researcher met separately with all evaluators and looked over the plan element by element thoroughly and discussed why the evaluator scored a particular element in a specific way. After this step, guidelines for helping raters understand what and how they were supposed to do was developed. The evaluation rubric was again tested using data from three other raters who also had strong instructional technology backgrounds. One evaluator was a faculty member who has a high level of technology background. The other two evaluators were doctoral students majoring in Instructional Technology. In addition, both had teaching backgrounds: one was as a media specialist, and another was as a technology trainer to school teachers. The instrument was then reviewed regarding those plan elements to which raters had most disagreement and the descriptions of the rubric-rating criteria for these elements were re-written.

Survey Instrument

A review of literature indicated that the following components were seen as essential elements in a well-written technology plan. They are: (1) broad-based support, (2) needs assessment, (3) development of vision and mission, (4) development of goals and objectives, (5) integration of technology into the curriculum, (6) staff development, (7) hardware/software, (8) infrastructure, (9) timelines, (10) evaluation, and (11) review of plan (Kimbal, 1996; Dyrli & Kinnaman, 1994; Barnett, 2001). Most of these components were included in the Tennessee state guidelines for developing a school district technology plan. Based upon the literature review, a survey questionnaire containing 23 items, including 3 open-ended questions, was created by the researcher (See Appendix C2). The questions were organized into five sections. The first section of the questionnaire investigated how the technology plan was created. The second section

investigated the degree to which the plan had been implemented, based on the knowledge and perceptions of the respondents. The third section was designed to determine whether or not school districts have ongoing technology planning activities. In other words, section three determined whether or not school districts were planning to revise their technology plans. The fourth section solicited demographic information from the respondents. The fifth section probed for subjects' experience in the process of developing and implementing their school district technology plans. The fifth section also attempted to identify any unexpected outcomes that might have occurred during the implementation of the technology plan.

Validity of the survey questionnaire was established by having experts read it for relevance and clarity. One of these experts was a district technology supervisor, and two were doctoral students in Instructional Technology at University of Tennessee. In analyzing the questionnaire, these experts read all questions thoroughly and gave feedback for each question as to the comprehensibility and clarity of that question. Finally, a committee of experts at the University of Tennessee reviewed the questionnaire and declared it to have face validity.

Data Collection

Data collection took place between July 2003 and December 2003. Multiple communications with participants took place. In the second week of July 2003, telephone calls were made to all school districts in Tennessee to verify their contact addresses. In addition, names of the school district superintendents or directors of schools were verified along with the name of the principle secretary to the school district superintendent or director of schools. Following this step, a package including a cover

letter, a consent form, and self-addressed stamped envelope was mailed to all school district superintendents and directors of schools in Tennessee. This letter requested permission to conduct the research project during the last week of July and first week of August of 2003. The cover letter also described the purpose and scope of the study (See Appendix D1). In the consent form, superintendents were asked to provide the name and address of a contact person who was knowledgeable about technology planning and implementation in their school districts (See Appendix D2). The contact person was the primary source for acquiring a hard copy of the school district's current technology plan and a list of the committee members who were involved in creating the technology plan along with their addresses.

During the first week of August 2003, phone calls were made to the secretaries of superintendents inquiring if they had received the letters sent to them. In the second week of September, a second letter including a self-addressed stamped envelope and a consent form was sent as a reminder to those superintendents and directors of schools who had not sent the consent form back (See Appendix D3). A phone inquiry was subsequently made directly to the superintendents during the first and third weeks of September. In the third and fourth weeks of October, a third letter was sent again reminding the superintendents of the request made in the previous letters, and a second telephone call was subsequently made to those school districts who did not reply to the letter (See Appendix D4). Following this, from the last week of September through the second week of October, e-mail messages were also sent to those district superintendents whose e-mail addresses were available (See Appendix D5).

From the second week of August, the researcher began to receive responses from superintendents with the names of district contact persons. Upon receipt of names and addresses of contact persons, a package containing a cover letter, a form for writing a list of technology committee members, and a self-addressed stamped-envelope was mailed to contact persons requesting both a hard copy of the district's current technology plans and a list of technology planning committee members (See Appendix E1 for Cover letter; Appendix E2 for the Form for writing a list of technology committee members). A package containing the same items was sent again within the period of four to six weeks as a reminder to those who had not replied. In addition, two e-mail notes were also sent as reminders (See Appendix E3). As a final reminder, potential respondents were contacted by phone.

After getting a list of the district's technology committee members and their addresses, prospective respondents were identified, and each participant was mailed a package containing a cover letter with a consent memo, a survey questionnaire, and a self-addressed stamped envelope (See Appendix F1 for participant cover letter with a consent memo). Participants were given five weeks to complete and return the mail survey. One week after the requested return date, participants who had not yet returned the survey were reminded by being sent a second letter, with the same contents enclosed (a survey questionnaire, cover letter, and a self-addressed stamped envelope) and another three week time period was provided to complete and return the survey (See Appendix F2). One week after the requested return date, those who had not returned the survey were sent a third letter (See Appendix F3). A last reminder letter was sent to the participants in the first week of December, 2003 (Appendix F4).

At the end of this procedure, 70 of 136 (51%) school districts responded to the request to participate in the study. Of these 70, 9 (13%) school districts declined to participate in the study, and 61 school districts agreed to participate and provided the names of the contact persons to assist with data collection. Of these 61, 11 contact persons never responded. Of the remaining 50 school districts, 34 contact persons provided the list of their recent technology committee members, and 40 school systems sent copies of their technology plans. Technology coordinators were included in all 34 committee lists; principals were included in 13 school districts, and teachers were included in 21 school districts. In total, 58 survey forms were returned: one from a director of schools, one from a district level administrator, 36 from district technology coordinators, 10 from principals, and 11 from teachers. The district level administrator also was in the category of district technology coordinators as s/he might be the most knowledgeable and responsible for developing and implementing the technology plan. Ten district technology directors sent complete survey form even though they did not send a list of technology committee members.

Of the 40 technology plans received, about 43 % of the plans were developed for years 2003 through 2006; 25% of the technology plans were developed for years 2002-2005 (Table 1). No technology plans were developed earlier than 2001.

Seventy five percent of the technology plans received were developed for three years, and 12.5% of them were developed for five years (Table 2).

Table 1: Time periods covered by district technology plans

Plan year	Number of Plans	Percentage
2000-2005 (5 year)	1	2.5
2001-2004 (3 year)	2	5
2001-2006 (5 year)	1	2.5
2002-2004 (2 year)	2	5
2002-2005 (3 year)	10	25
2002-2006 (4 year)	2	5
2002-2007 (5 year)	2	5
2003-2005 (2 year)	1	2.5
2003-2006 (3 year)	17	42.5
2003-2008 (5 year)	1	2.5
2004-2007 (3 year)	1	2.5

Table 2: Duration of district technology plans by number of years

Number of Years	Number of Plans	Percentage
2	3	7.5
3	30	75
4	2	5
5	5	12.5

As shown in Table 3, of the total 136, forty-seven school districts participated in the study to some degree. A complete data set with district technology plan and complete survey forms from district technology directors, principals, and teachers was received from two school districts only. District technology plans and complete survey forms by district technology coordinators and principals or teachers were received from 11 school districts, district technology plan and complete survey forms from district technology directors were received from 16 school districts. District technology plans only were received from nine school districts, and from five school districts, only survey forms from district technology directors were received. Thus, thirty one school districts (23% of the total 136 school districts in the State of Tennessee) were included in the final group of participants since they submitted both a district technology plan and at least one of the three requested survey forms (district technology director, principal, and teacher). A total of 47 completed survey forms were returned from 29 district technology coordinators, 9 principals, and 9 teachers (Figure 1). These 47 forms represented 31 different school districts.

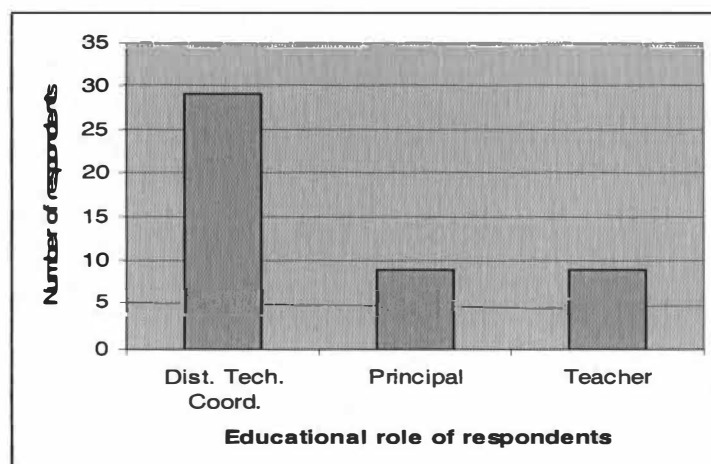


Figure 1: Respondent types from 31 school systems studied

Table 3: Data set by number of school districts

Participation characteristics of the school districts	Number of school districts
District technology plan and complete survey forms from district technology coordinator, principal, and teacher	2
District technology plan and complete survey forms from district technology coordinator, principal	5
District technology plan and complete survey forms from district technology coordinator, and teacher	6
District technology plan and complete survey form from district technology coordinator only	16
District technology plan and complete survey forms from principal and teacher	1
District technology plan and complete survey form from principal only	1
District technology plan only	9
No district technology plan, complete survey forms from district technology coordinator, principal, and teacher	1
No district technology plan, complete survey form from district technology coordinator only	5
No district technology plan, complete survey forms from teachers only	1
Total participation in any one of the above form	47

Data Analysis

The data collected during this study were analyzed in accordance with the research questions that guided the study. First, the contents of the school district technology plans were examined and each element of the plan was assigned a numeral score using the scoring rubric. Frequency and percentage of element and total scores were computed using the Statistical Package for Social Sciences (SPSS, 2004) software program. Second, survey data were analyzed by computing frequency and percentage for each data set. In addition, patterns of responses were examined. Findings were presented in tables and figures that described the pattern of responses. Third, textual data obtained from the open-ended questions of the survey questionnaire were analyzed by developing “Categories” based on themes and patterns of responses. Categories were decided upon through the combined efforts of two evaluators: (1) the researcher and (2) a doctoral student in Instructional Technology with a background in library media. First, each evaluator separately read and extracted themes and patterns from the text and developed categories. The two evaluators then compared their findings to determine common categories for all instances of disagreements. Data analysis procedures pertinent to each research question are reported below.

Research Question 1

To what degree do Tennessee school districts’ technology plans incorporate the critical components specified by state and federal educational agencies? What are the main components included in these plans? What commonalities exist among these technology plans?

This question focused on the degree to which Tennessee school systems have incorporated the required components as specified by the state and federal educational agencies. It was stated as a general question, with two more specific questions to clarify the purpose of the main question.

Document Analysis. In the document analysis, contents of the technology plan were examined using a rubric developed based on the TLEA guidelines. A numerical score of 0, 1, or 2 was assigned for each element indicated in the rubric based on the researcher's judgment of the presence or absence and description of the element. The score received for each element of a plan was used to determine the presence or absence of elements and to compute the total score of the plan. A score of 0 means that an element is absence and scores of 1 or 2 received by an element mean that an element is present to a lesser or higher degree. The degree of incorporation of required elements in district technology plans in the sample was determined by computing how many district technology plans included a certain of number of elements. The range of scores received by a certain number technology plans that had covered a certain number of elements was also used to determine the quality of the plans.

Commonalities in the technology plans were determined by examining the organizational patterns of the technology plans. The organizational patterns were examined based on two sets of state guidelines: (1) the Tennessee Local Education Agency (TLEA) plan for educational technology: *Checklist of required elements – 2002-2003* (See Appendix A1) and (2) the Technology Plan Criteria (TPC) for Tennessee's Enhancing Education through Technology (Title IID: *Ed Tech*) and E-Rate Discounts (See Appendix A2). Technology plans in the sample were divided into three categories:

(1) those organized according to TLEA, (2) those organized according to TPC, and (3) Others. The plans that were written without following either of these two sets of state guidelines were categorized as “Others.”

The frequencies of the scores 0 and 1 or 2 for each element were used to determine the frequency of the elements included in the school district technology plans. The score 0 means that an element is absent and scores of 1 or 2 mean that elements are present. The main elements of the plans were identified by computing the frequency and percentage of elements included in the plans.

Survey Analysis. Survey data were not used to address Research Question 1.

Research Question 2

What, if any, differences exist among rural, suburban, and urban school districts in Tennessee with regard to the development of their technology plans?

This question focused on whether any differences exist between rural, suburban, and urban school districts in Tennessee regarding the development procedures of their technology plans.

Document Analysis. Technology plans were examined to determine the frequency and percentage of school districts using each of the three organizational patterns (TLEA, TPC, and Other) in three types of regions: urban, suburban, and rural.

Survey Analysis. Questions 2, 7, and 9 of the survey questionnaire were also used to address research question 2. Data collected from 31 respondents (29 technology coordinators from 29 districts and 2 principals from districts which provided no survey forms from their district technology coordinators) were analyzed. Responses from the

principals were included in the analysis because their responsibilities provide them with a broader view of district initiatives.

First, responses from Survey Question 2 were used to determine who was involved in developing technology plans in urban, suburban, and rural school districts. Responses were examined to determine the frequency and percentage of categories of responsible parties in urban, suburban, and rural school districts. Second, the roles of the committee members were analyzed to determine the geographic location of the school districts in the sample. Frequency and percentage of different kinds of member roles were determined for urban, suburban, and rural regions. Third, types of issues addressed by school districts in the three types of regions were analyzed by computing their frequency and percentage. Lastly, types of actions considered by the different school district types were analyzed by computing the frequency and percentage of relevant responses.

Research Question 3

How were the school district technology plans in Tennessee developed? Who wrote them?

This research question focuses on how school districts in Tennessee developed their technology plans. The following issues were examined: (1) who was responsible for conceptualizing and creating the technology plan; (2) how were the committee and subcommittees formed, and what was the role of committee members; (3) what criteria were used to select committee members; (4) what actions were performed by the committee; (5) how was needs assessment conducted; and (6) how were goals and objectives identified.

Document Analysis. Data from the document analyses were not used to answer this research question.

Survey Analysis. Research Question 3 was addressed by questions 2-11 of the survey questionnaire.

Parties Responsible for Developing the Technology Plan

Survey Question 2 was used to address this issue. Based on the responses of district technology coordinators, principals, and teachers, the frequency and percentages of parties responsible for developing the district technology plan were computed. School systems where district technology coordinators, principals, and teachers disagreed regarding who was responsible for developing the plan were also examined.

Formation of Committee, Sub-committees, and Role of Committee Members

Survey questions 3, 5, 6, and 7 were used to address these issues. Based on the responses of district technology coordinators, principals, and teachers, the frequency and percentage of parties responsible for selecting the committee members were computed. In addition, the frequency and percentage of districts with sub-committees were computed. School systems where the district technology coordinator, principals, and teachers disagreed regarding who was responsible for selecting the committee members, or how sub-committees were formed were examined. The procedures for forming sub-committees and establishing their duties also were examined. Based on the responses from 29 district technology coordinators and two principals, the frequency and percentage of involvement of different types of committee members were computed.

Criteria for Selecting Committee Members

Survey Question 8 was used to address this issue. Based on responses from 29 the district technology coordinators and two principals, the frequency and percentage of districts using certain criteria for selecting committee members were computed.

Activities Performed by a Technology Planning Committee

Survey Question 9 was used to address this issue. Based on responses from the 29 district technology coordinator and two principals, the frequency and percentage of the technology planning committee's performed particular actions were computed.

Issues Addressed in Needs Assessment

Survey Question 10 was used to address this issue. Based on responses from the 29 district technology coordinator and two principals, the frequency and percentage of particular types of the issues addressed in needs assessment were computed.

Methods Used for Assessing Needs

Survey Question 11 was used to address this issue. Based on responses from the 29 district technology coordinator and two principals, the frequency and percentage of particular types of the methods used for assessing needs were computed.

Identification of Goals and Objectives

Survey Question 12 was used to address this issue. Based on responses from the 29 district technology coordinators and two principals, the frequency and percentage of particular goals and objectives included in district technology plans were computed.

Research Question 4

How many school districts have proposed to revise their technology plans in the future, and how have they planned to do it?

This question addressed issues related to the revision of district technology plans.

Document Analysis. Data from the document analysis were not used to answer this research question.

Survey Analysis. Questions 15-18 of the survey questionnaire addressed issues related to the revision of technology plans. In the analyses, responses from the 29 district technology coordinators and two principals were used.

First, Survey Question 15 was used to determine how long each respondent's school district had had its current technology plan. The frequency and percentage of districts whose plans had been in existence for specified lengths of time were computed. Second, Survey Question 16 was used to address the issue of whether or not the plan was revised since it was first written. The frequency and percentage of the responses addressing this issue were computed. Third, Survey Question 17 was used to address the issue of whether or not the districts planned to revise their technology plans in the future. The frequency and percentage of the responses addressing this issue was computed. Fourth, Survey Question 18 was used to determine the factors to be considered by the districts in revising the technology plan. The frequency and percentage of the responses addressing the factors were computed.

Research Question 5

What, if any, differences exist among rural, suburban, and urban school districts in Tennessee with regard to the implementation of their technology plans?

This question focused on determining any differences that might exist between rural, suburban, and urban school districts in Tennessee regarding the implementation procedures of their technology plans.

Document Analysis. Data from the document analysis were not used to address this research question.

Survey Analysis. Question 4 and 13 addressed possible differences among urban, suburban, and rural school districts in implementing their technology plans. Survey question 4 was used to determine the party responsible for implementing the plan. In this analysis, responses from the 29 district technology coordinator and two principals were used. The frequency and percentage of responses regarding the party indicated as responsible for the implementation of the plan were computed. Question 13 provided a list of action plans involved in implementing technology plans from which respondents could choose those relevant to their districts. The frequency and percentage of the actions chosen were computed for each school district type: rural, suburban, and urban.

Research Question 6

How have Tennessee school districts planned to implement their technology plans?

How do district technology coordinators, principals, and teachers perceive the effectiveness of the implementation of their districts' technology plans?

This question contains two parts. The first part focuses on actions considered in the course of implementing the district technology plan, whereas the second part focuses on perceptions of district technology directors, principals, and teachers regarding the effectiveness of the implementation of their districts' technology plans.

Document Analysis. Data from the document analysis were not used to answer this research question.

Survey Analysis. Questions 4, 13, 14, and 22 of the survey questionnaire were used to answer Research Question 6. Survey Question 4 was used to determine who was

responsible for implementing the plans. Based on the responses of district technology coordinators, principals, and teachers, the frequency and percentage of the parties responsible for developing the plan were computed. School systems where district technology coordinator, principals, and teachers disagreed regarding the party responsible for developing the plan also were examined.

Question 13 specified a set of actions that can be involved in implementing technology plans. The frequency of specific actions taken by the school districts in implementing their technology plans and their percentage were computed.

Question 14 consisted of 13 statements that could be used to characterize the implementation of technology plans. In order to focus the respondents' attention on the statements and get more reliable information, two of the statements (7 and 11) were negatively worded. Each of these statements was associated with a five-point Likert scale. The levels of the scale were as follows: 5 = Strongly Agree, 4 = Agree, 3 = No Opinion, 2 = Disagree, and 1 = Strongly Disagree. The ratings by respondents on each statement were used to determine their perceptions of how effectively the technology plan is being implemented.

Respondent ratings and averages (if multiple respondents participating from one school system) were presented. School systems from which there were two or more respondents had their ratings averaged for each statement to attain an overall statement score. These school systems are noted by asterisks (*). School systems with averages of ratings awarded by two respondents were referenced by one asterisk. School systems with averages of rating awarded by three respondents were marked with two asterisks.

To obtain a holistic perceptive of perceptions of implementation, both in the local school districts and across the 31 reporting school districts, respondent ratings were averaged. To ensure that scores for negatively and positively worded statements were of equal value in the averaging process, the scale scores for the two negatively phrased statements were transposed. The original ratings awarded by respondents were put within parentheses and the transposed numbers outside the parentheses.

The 31 average scores across the statements were divided into four clusters with score-ranges from lowest to highest. Based on these clusters, the level of effectiveness of technology plan implementation was assessed. In addition, statements that contributed lowest and highest level of effectiveness were identified.

Research Question 7

Are school districts in Tennessee presently engaged in any technology integration activities that were not part of their originally written technology plans? If so, what are these unplanned activities and how are they influencing the districts' technology implementation efforts?

This question contains three parts. The first and main part focuses on whether school districts are presently engaging in any activities that were not part of their originally written technology plans. The additional parts of the question were intended to clarify the answer given to part one.

Document Analysis. Data from the document analysis were not used to answer this research question.

Survey Analysis. Open-ended Question 23 of the survey questionnaire addressed this research question. Participants answered this question based on their experience and

practice. From the analysis of open-ended responses, common themes and issues were identified.

Summary

This chapter has covered the research design and methodology used to examine the development and implementation of district technology plans in Tennessee. Data were collected from two sources: content analysis of technology plans and a survey of selected participants. A rubric was developed to examine the contents of a sample of Tennessee technology plans. Survey data were analyzed computing descriptive statistics, such as frequency, percentage, and mean using SPSS (2004). Results of these data analyses are presented in Chapter IV.

CHAPTER IV

FINDINGS

This chapter presents the findings from the analyses performed on the data collected during this study. These data were collected from two different sources: a content analysis of 31 district technology plans and a compilation of responses from 47 survey questionnaires completed by district administrators or technology coordinators, principals, and teachers or school level technology coordinators. The technology plans from participating districts were analyzed by using a scoring rubric designed by the investigator. Each was assigned a score that reflected the degree to which the technology plan contained all the required elements specified by the Tennessee Local Education Agency (TLEA) plan for educational technology: *Checklist of required elements—2002-2003* (See Appendix A1). Survey data were analyzed by computing various statistical measures using SPSS (2004). The textual data obtained from open-ended questions were analyzed by extracting themes and patterns of responses.

Forty school districts submitted their district technology plans. There were only 31 school districts that submitted both a technology plan and at least one survey form. Therefore, only 31 of these plans were suitable for analysis to address the following research questions.

Research Question 1

To what degree do Tennessee school districts' technology plans incorporate the critical components specified by state and federal educational agencies? What commonalities exist among these technology plans? What are the main elements included in the plans?

Document Analysis. Table 4 displays the number of technology plans that included elements specified by the TLEA guidelines and the range of actual scores received by the plans. An examination of technology plans using the rubric showed that 12 district technology plans (39%) included all 17 elements. Seventeen technology plans (55%) included more than 82% of the total 17 elements.

Table 4: Breakdown of participating districts showing the number of plan elements included and the range of total rubric score

Number of plans (%) (N = 31)	Number of elements (%) (N = 17)	Range of actual scores
12 (38.7%)	17 (100%)	21 - 30
2 (6.5%)	16 (94.1%)	23
3 (9.7%)	14 (82.4%)	14 - 18
1 (3.2%)	13 (76.5%)	13
5 (16.1%)	12 (70.6%)	14 - 19
2 (6.5%)	11 (64.7%)	17 - 18
3 (9.7%)	10 (58.8%)	10 - 16
1 (3.2%)	9 (52.9%)	10
2 (6.5%)	6 (35.3%)	6

The overall content of technology plans as evaluated on the basis of total rubric score was somewhat disappointing. Since each element was rated by a rubric having three levels 0 (weak), 1 (intermediate), and 2 (strong), the total possible score for a technology plan was 34. The scores could theoretically have ranged from 0 to 34 (17 x 2). The plans that contained 94% or more of elements secured the highest total scores, as might have been expected. However, there were only 14 plans in this category. More than half (54.8%) of the plans reviewed contained 14 or fewer of the required elements.

The commonality among the technology plans was determined from the organizational patterns observed in the plans. These organizational patterns were diverse. Some plans appeared to have been written by following the guidelines given in the Tennessee Local Education Agency (TLEA) plan for educational technology, specifically the *Checklist of required elements – 2002-2003* (See Appendix A1), while others appeared to have been written by following the guidelines in the Technology Plan Criteria (TPC) for Tennessee's Enhancing Education Through Technology (Title IID: *Ed Tech*) and E-Rate Discounts (See Appendix A2). Others included elements from both sets of guidelines or appeared to have been written without reference to any set of guidelines. Based on the elements included, technology plans in the sample were sorted into three categories: (1) TLEA, (2) TPC, and (3) Other. However, some plans that were categorized as TLEA-based plans included additional elements not found in the TLEA guidelines, and some plans included in the TPC category also were found to have a few additional elements not included in the TPC guidelines.

Table 5: Number of technology plans by category

Technology plans (model)	Number of technology plans	Percentage
TLEA checklist	15	48.4
TPC	6	19.4
Others	10	32.3
Total	31	100

As shown in Table 5, the highest number of technology plans in the entire sample group appeared to have been written according to the guidelines of TLEA (48%). Nineteen percent of the plans appeared to have been guided by the TPC, and 32% appeared to have been written using other guidance or specifically ignoring elements from any set of guidelines.

The category “Others” contains some technology plans that have elements mixed from TLEA and TPC guidelines as well as some plans that bear little resemblance to the organizational structures mandated by the state of Tennessee. Most of these plans were relatively short and did not include many of the TLEA or TPC required elements. Of the 13 technology plans that fell into the category “Others”, 12 focused on goals and strategies or action plan sections that touched upon most of the elements prescribed by the state guidelines.

Table 6 shows the frequency and percentages of scores 0, 1, and 2 for each planning element across all plans. These scores provide insight into the commonalities across the plans. A score of “2” indicates detailed attention to the plan element.

Table 6: Frequency and percentages of occurrence of elements in Tennessee school district technology plans

Elements	Quality/Number of Technology Plans Percent			
	0 (missing or irrelevant)	1 (intermediate attention)	2 (detailed attention)	1 and 2 (some attention)
Needs Assessment	4 (12.9%)	21 (67.7%)	6 (19.4%)	27 (87.1%)
Stakeholders Involvement	5 (16.1%)	8 (25.8%)	18 (58.1%)	26 (83.9%)
Timeline	1 (3.2%)	15 (48.4%)	15 (48.4%)	30 (96.8%)
Responsible Parties	9 (29%)	8 (25.8%)	14 (45.2%)	22 (71%)
Vision	7 (22.6%)	13 (41.9%)	11 (35.5%)	24 (77.4%)
Goals and Objectives	1 (3.2%)	16 (51.6%)	14 (45.2%)	30 (96.8%)
Collaboration among educators	14 (45.2%)	15 (48.4%)	2 (6.5%)	17 (54.8%)
Collaboration with community partners	4 (12.9%)	17 (54.8%)	10 (32.3%)	27 (87.1%)
Integration of technology into the curriculum	1 (3.2%)	23 (74.2%)	7 (22.6%)	30 (96.8%)
Increasing accessibility	5 (16.1%)	19 (61.3%)	7 (22.6%)	26 (83.9%)
Equity	9 (29%)	18 (58.1%)	4 (12.9%)	22 (71%)
Professional development	1 (3.2%)	23 (74.2%)	7 (22.6%)	30 (96.8%)
Budget	5 (16.1%)	19 (61.3%)	7 (22.6%)	26 (83.9%)
Interoperability	13 (41.9%)	11 (35.5%)	7 (22.6%)	18 (58.1%)
Leadership	13 (41.9%)	15 (48.4%)	3 (9.7%)	18 (58.1%)
Review of policies and procedures	7 (22.6%)	15 (48.4%)	9 (29%)	24 (77.4%)
Evaluation	5 (16.1%)	14 (45.2%)	12 (38.7%)	26 (83.9%)

A score of “1” indicates minimal attention to the plan element, and a score of “0” indicates absence of element. Two elements, timeline (48.4%) and stakeholder involvement (58.1%), were most frequently found to be present and detailed in the technology plans and were thus rated with a score of 2. The components of “responsible parties” and “goals and objectives” were two other elements receiving a score of “2” in at least 45 percent of the plans were. More than 50 percent of all technology plans studied gave minimal attention (score of “1”) to the following elements: needs assessment (67.7%), goals and objectives (51.6%), collaboration with community partners (54.8%), integration of technology into the curriculum (74.2%), increasing accessibility (61.3%), equity (58.1%), professional development (74.2.%), and budget (61.3%).

Elements most often missing from or irrelevant to plans were collaboration among educators, interoperability, and leadership. The last column of Table 6 summarizes the data in columns 3 and 4, thus giving a picture of elements receiving at least minimal attention across the plans. The following elements appeared to be most commonly included in this sample of Tennessee school district technology plans: timeline (96.8%), goals and objectives (96.8%), integration of technology into the curriculum (96.8%), and professional development (96.8%). On the other hand, 40 percent or more of the technology plans did not include the following elements: collaboration among educators (45.2%), interoperability (41.9%), and leadership (41.9%).

Survey Analysis. Data from survey analysis were not used to address this research question.

Research Question 2

What, if any, differences exist among rural, suburban, and urban school districts in Tennessee with regard to the development of their technology plans?

Document Analysis. In the study, the distribution of participating school districts in regard to geographic location was as follows: one from an urban area, 7 from suburban areas, and 23 from rural areas (Figure 2).

The technology plan from the single participating urban school district was written in accordance with TLEA guidelines (Table 7). The technology plans from the participating suburban school districts represented all these planning categories (TLEA, TPC and Other), as did the 23 rural participants (Table 7).

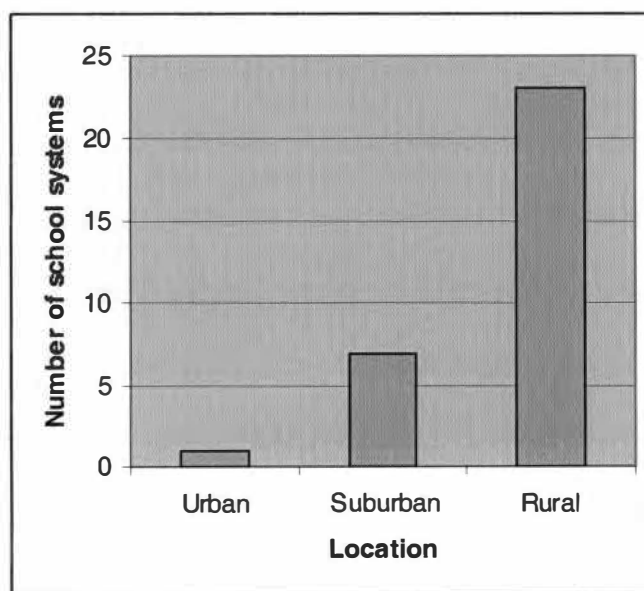


Figure 2: Breakdown of number of school systems in the sample by location

Table 7: Technology plans by geographic location

Geography location	Urban	Suburban	Rural
TLEA	1 (100%)	4 (57.1%)	10 (43.5%)
TPC	0	2 (28.6%)	4 (17.4%)
Other	0	1 (14.3%)	9 (39.1%)
Total	1 (100%)	7 (100%)	23 (100%)

Survey Analysis. Data pertinent to this research question were collected from 31 respondents: 29 technology coordinators from 29 districts, and two principals from those two districts from where no survey forms were received from the technology coordinators.

As shown in Table 8, the respondent from the single participating urban school district indicated that the district technology plan was developed by a committee. In the suburban school districts, two respondents (29%) indicated that their technology plans were developed by an individual, in these cases the technology coordinators, and five respondents (71%) indicated that their plans were developed by a committee. In the rural school districts' reporting, six respondents (26%) indicated that their technology plans were developed by an individual; 17 respondents (74%) noted that their plans were developed by a committee.

Table 9 displays the representation of technology committee members in urban, suburban, and rural school districts in Tennessee as specified by the respondents.

Table 8: Breakdown of party responsible for developing the technology plans in urban, suburban, and rural school districts

Responsible party	Number of responses		
	Urban	Suburban	Rural
An individual (Technology coordinator)	0	2 (29%)	6 (26%)
A committee	1 (100%)	5 (71%)	17 (74%)
Total	1 (100%)	7 (100%)	23 (100%)

Table 9: Representation of technology planning committee members in urban, suburban, and rural school districts

Responsible party	Number of responses		
	Urban	Suburban	Rural
Teachers	1	5 (71%)	13 (57%)
Principals	1	5 (71%)	13 (57%)
School level technology coordinators	1	4 (57%)	11 (48%)
Media specialists	1	4 (57%)	5 (22%)
Curriculum supervisors	1	5 (71%)	9 (39%)
District technology coordinators	1	5 (71%)	17 (74%)
Superintendents	1	2 (29%)	8 (35%)
Parents	1	3 (43%)	5 (22%)
Community members	1	3 (43%)	6 (26%)
Local college/university experts	1	1 (14%)	0 (0%)
(Business consultants	1	2 (29%)	2 (9%)
Others	0	0 (0%)	3 (13%)
Total	1	7 (100%)	23 (100%)

The respondent from the single participating urban district indicated that the district had invited all of the different types of stakeholders mentioned in the questionnaire to participate in their technology planning committee. The suburban school districts had mostly included the following categories of committee members: teachers (71%), principals (71%), curriculum supervisors (71%), and district technology coordinators (71%). In rural districts, it appeared that the persons most often included were district technology coordinators (74%), principals (57%), teachers (57%) and school-level technology coordinators (48%).

Table 10 shows activities undertaken in developing technology plans by urban, suburban and rural school systems. The single participating urban district indicated that it had undertaken all of the activities mentioned in the questionnaire. All of the suburban school districts indicated that they undertook the following activities in developing their technology plans: writing a vision of technology usage, identifying goals and objectives, conducting needs assessment and following the state guidelines. Most of the rural districts undertook the following activities: identifying goals and objectives (91%), conducting needs assessment (96%), and revision of existing technology plans (91%).

Table 10: Activities undertaken by technology planning committees/individuals from urban, suburban, and rural school districts

Responsible party	Number of responses		
	Urban (N = 1)	Suburban (N = 7)	Rural (N = 23)
A vision of how technology can support school district's vision was developed.	1	7 (100%)	19 (83%)
Goals and objectives were identified to accomplish technology vision.	1	7 (100%)	21 (91%)
Needs assessment was conducted.	1	7 (100%)	22 (96%)
Existing technology plan was reviewed.	1	6 (86%)	21 (91%)
Technology plans of other school districts were reviewed.	1	5 (71%)	12 (52%)
State guideline was followed.	1	7 (100%)	19 (83%)
Criteria for the evaluation of technology plan were developed.	1	6 (86%)	10 (43%)
Others	1	0	1 (4%)

Research Question 3

How were the school district technology plans in Tennessee developed? Who wrote them?

Document Analysis. Data from the document analysis were not used to answer this research question.

Survey Analysis. Questions 2 - 3 and 5 - 11 of the survey questionnaire addressed how district technology plans in the school systems in Tennessee were developed.

Parties Responsible for Developing the Technology Plan

Table 11 shows party responsible for developing the district technology plan as indicated by different respondent types (See Appendix G1). In six cases where at least two survey forms were received from district personnel, the district technology coordinator, principal and/or teacher gave different responses. For example, in two cases, the district technology coordinator indicated that the district technology plans was developed by a committee, whereas the principal mentioned that it was developed by district technology coordinators. In one case, the district technology coordinator indicated that the plan was developed by a committee, whereas the teacher respondent indicated that it was developed by an individual. In addition, in three other cases, one principal and two teachers indicated that they did not know who created the plan, although district technology coordinators said that the plans were developed by a committee.

As shown in Table 12, seventy-two percent of the district technology coordinators reported that their district technology plans were conceptualized and created by committees, whereas 24% reported that their district technology plans were conceptualized and created by an individual.

Table 12: Summary of responses from Table 11 (See Appendix G1)

Responsible party	Number of responses		
	District technology Coordinators/directors.	Principals	Teachers
An individual	7 (24.1%)	4 (44.4%)	2 (22.2%)
A committee	22 (75.8%)	4 (44.4%)	5 (55.6%)
Don't know	0	1 (11.1%)	2 (22.2%)
Total	29 (100%)	9 (100%)	9 (100%)

Four principals reported that their district technology plans were conceptualized and created by committees (44.4%), four principals reported that their district technology plans were conceptualized and created by an individual (44.4%), and one principal reported that s/he did not know (11.1%). About 56 percent of teachers reported that their district technology plans were conceptualized and created by committees, whereas 22 percent reported that their district technology plans were conceptualized and created by an individual, usually the district technology director/coordinator.

Formation of Committee, Sub-committees, and Role of Committee Members

As shown in Table 13, of the total 31 school systems studied, at least one survey response was received from 24 school districts regarding the parties responsible for selecting the committee members (See Appendix G2). The data set showed that there was agreement among district technology coordinators, principals, and teachers in all except three cases.

As shown in Table 14, thirty-nine percent of the district technology coordinators reported that committee members were selected by district technology coordinators.

Table 14: Summary of responses from Table 13 (See Appendix G2)

Responsible party	Number of responses		
	District technology coordinators	Principals	Teachers
Superintendents	5 (21.7%)	2 (40%)	0
Asst. Superintendents	2 (8.7%)	0	0
District technology coordinators	9 (39.1%)	1 (20%)	2 (28.6%)
Others	7 (30.4%)	2 (40%)	5 (71.4%)
Total	23 (100%)	5 (100%)	7 (100%)

Another 30% of the district technology coordinators reported that committee members were selected by district superintendents and assistant superintendents. And, the remaining 30% of the district technology coordinators reported that committee members were selected by others. The responsible parties specified as “Others” were: superintendents and technology coordinators, technology coordinator and principals, supervisor of instruction, superintendent and principals, assistant superintendent and principals, and others.

Table 15 displays the data provided by 24 school districts with regard to the formation of technology planning sub-committees (See Appendix G3). Seven of the 24 reporting districts (29.2%) indicated that sub-committees had been formed, and multiple respondents from districts agreed, except in one case. In one case, a district technology coordinator reported that the district did not use sub-committees, but the principal and teacher said they did.

Of the total 47 survey forms studied, 10 respondents (5 – district technology coordinators, 2 – principals, and 3 – teachers) answered survey Question 6, which was intended to probe how the sub-committees were formed and what their charges were. Only two survey forms were received from the same school system, and their views were similar. The five district technology coordinators reported as follows:

- School level sub-committees were developed.
- The committee divided itself into sub-committees each with responsibility for a part of the plan.
- Sub-committees were developed voluntarily depending on members' areas of expertise and interests, each with responsible for particular areas as well as combining them from different categories such as business and administration.

The two principals reported as follows:

- Sub-committees were developed by the principal only or by the principal and technology coordinator with the charge of developing a school technology plan.

The three teachers reported as follows:

- Committee members were first given an outline of topics to be addressed by the plan. They were then given the opportunity to pick an interest area in which they wanted to work.
- Sub-committees were school level technology committees. Committee membership was voluntary.

- After establishing the goals, volunteers chaired sub-committees comprised of teachers, parents, administrators, and staff. Their responsibilities were surveying various groups and forming objectives.

Data collected from 31 respondents (29 technology coordinators from 29 districts and 2 principals from those 2 districts from whose technology coordinators did not submit complete survey forms) were used to determine stakeholder involvement.

Table 16 displays the membership composition of technology planning committees in 23 school districts (8 districts did not supply this information). The following stakeholders were most often included on the district technology committees: district technology directors/coordinators (74%), principals (61%), teachers (61%) and school level technology coordinators (52%). Stakeholders least often involved in plan development were local college or university experts, business consultants and parents. Few respondents indicated that their school districts involved “other” stakeholders in their technology planning committees. Committee members falling in the category “other” were described as school board members, technicians and federal program directors.

Criteria for Selecting Committee Members

Table 17 presents the selection criteria for members of technology planning committees in 28 school districts (3 districts did not supply this information). The committee members were primarily selected on the basis of the following criteria: technological expertise (74%), representation from each school (68%) and teaching expertise (55%).

Table 16: Membership composition on technology planning committees

Role of committee members	Number of responses	Percentage
Teachers	19	61.3
Principals	19	61.3
School level tech. coordinators	16	51.6
Media specialists	10	32.3
Curriculum supervisors	15	48.4
District technology director/ coordinator/supervisor	23	74.2
Superintendent	11	35.5
Parents	9	29.0
Community members	10	32.3
Local college/university experts	2	6.5
Business consultants	5	16.1
Others	3	9.7
Total respondents	31	100

Table 17: Criteria for selecting committee members

Criteria	Number of responses	Percent
Technology expertise	23	74.2
Teaching expertise	17	54.8
Representative from each school	21	67.7
Representative for specific occupation	7	22.6
Ethnic representation	4	12.9
Others	7	22.6
Total respondents	31	100

In addition, respondents specified other criteria, such as educational experience, curriculum integration, special education, title programs, administration, interest, federal program, media and e-rate and grant expertise.

Activities Performed by a Technology Planning Committee

Table 18 displays frequency counts for activities performed by school districts during the development of the technology plan. The following actions were most often performed by the committee in developing technology plans: conducting needs assessment (97%), identifying goals and objectives (94%), writing technology vision (87%), reviewing the existing technology plan (90%), and following state guidelines (87%). In addition to the actions presented in the survey form, one participant reported that their school district reviewed school improvement plan needs.

Issues Addressed in Needs Assessment

Table 19 displays the frequency counts of the specific issues that were addressed in needs assessment. The most frequently reported issues were as follows: reviewing the availability of technology to teachers and students (97%), determining teacher skills in using technology in classroom instruction (94%), assessing the availability of hardware and software (91%), assessing networking and telecommunications infrastructure (87%) and working on budget and resources (81%). In addition, two participants from two different districts indicated that their districts conducted the e-rate survey.

Table 18: Activities performed by technology planning committees

Involved activities	Number of responses	Percent
A vision of how technology can support school district's vision was developed.	27	87.1
Goals and objectives were identified to accomplish technology vision.	29	93.5
Needs assessment was conducted.	30	96.8
Existing technology plan was reviewed.	28	90.3
Technology plans of other school districts were reviewed.	18	58.1
State guideline was followed.	27	87.1
Criteria for the evaluation of technology plan were developed.	17	54.8
Others	2	6.5
Total respondents	31	100

Table 19: Actions performed during needs assessment

Issues examined	Number of technology plans	Percent
The many different uses of technology that support teaching and learning.	24	77.4
Technology available to teachers.	30	96.8
Technology available to students.	30	96.8
Teacher skills in using technology in classroom instruction.	29	93.5
Availability of hardware and software in each school site.	28	90.3
Availability of networking and telecommunications infrastructure.	27	87.1
Physical infrastructure (e.g., electrical wiring, building, furniture)	20	64.5
Technical support	21	67.7
Equity of resources to teachers, staff, and students	22	71.0
Policy and procedure (e.g., copyright, acceptable use technology)	20	64.5
Budget and funding resources.	25	80.6
Others	2	6.5
Total	31	100

Methods Used for Assessing Needs

Table 20 displays frequency counts of specific methods used for needs assessment. The most frequently reported methods were surveys (87%), review of existing technology plan (81%) and observations (74%). In addition, one district technology coordinator indicated that the school district performed the e-tote survey.

Identification of Goals and Objectives

Table 21 displays frequency counts for the specific goals and objectives identified during the development of district technology plans. The most frequently reported goal and objectives were staff development (94%), improvement of teaching and learning (94%) and acquisition of hardware and software (90%). In addition, one school district participant reported that issues of replacement, upgrade and refreshment procedure were addressed in goal-setting.

Table 20: Methods used for assessing needs

Techniques for assessing needs	Number of responses	Percent
Surveys	27	87.1
Focus group discussions	10	32.3
Observations	23	74.2
Meetings	5	16.1
Review of the existing technology plan	25	80.6
None of the above	0	0.0
Others	2	6.4
Total	31	100

Table 21: Goals and objectives identified in technology planning

Characteristics of goals	Number of responses	Percent
Improvement of teaching and learning as prescribed by curriculum goals and objectives.	29	93.5
Need for staff development	29	93.5
Acquisition of hardware and software	28	90.3
Acquisition of technology support services	18	58.1
Development of networking	14	45.2
Need for budget and funding	23	74.2
Need to allocate resources equally across schools	12	38.7
Others	1	3.2
Total responses	31	100

Research Question 4:

How many school districts have proposed to revise their technology plans in the future, and how have they planned to do it?

Document Analysis. Data from document analysis were not used to answer this question.

Survey Analysis. Questions 15-18 of the survey questionnaire addressed the issue of the revision of technology plans. Issues examined in this section were the extent of the current plan, revisions of the technology plan, provisions to revise the plan, and factors considered in revising the plan. Data for this research question were collected from 31 respondents: 29 technology coordinators from 29 districts and 2 principals from those 2 districts whose technology coordinators did not submit complete survey forms.

Table 22: Time periods of current technology plans

Length of time	Number of responses	Percentage
2 month – 5 month	11	35.5
6 month – 1 year	9	29.0
1 year 2 month – 2 year	7	22.6
2 year 3 month – 3 year 2month	3	9.7
7 year	1	3.2
Total	31	100

Most technology plans were reported to have been recently updated or developed. As shown in Table 22, about thirty six percent of the respondents reported that their current technology plans had been developed or updated within the last 2 to 5 months, 29% reported their technology plans had been updated or developed within 6 months to 1 year, and about 23% reported their technology plans had been developed or updated within one year to two years as of the date of this study (Fall, 2003).

The majority of respondents (77 %) reported that their district technology plans had been revised; only 23% respondents reported their district technology plans had not been revised since these plans were first written (Table 23). All district technology coordinators and the two selected principals indicated that their districts intended to revise their technology plans at some point in the future.

Table 24 displays the frequency counts of the specific factors that were selected by respondents as reasons for revising their district technology plans. The most frequently reported factors were new technologies (96%), budget and funding (94%), changing needs of students (93%) and repair and maintenance (81%).

Table 23: Revision of the technology plan since it was first written

Revision of the plan	Number of responses	Percentage
Yes	24	77.4
No	7	22.6
Total	31	100

Table 24: Factors mentioned by respondents as reasons for periodic revisions of these technology plans.

Factors	Number of responses	Percent
Education reform	21	67.7
Changing student needs	28	90.3
New technologies	30	96.8
Equity of access	20	64.5
Quality and impact of resources	20	64.5
Repair and maintenance	25	80.6
Budget and funding	29	93.5
Others	1	3.2
Total responses	31	100

Research Question 5

What, if any, differences exist among rural, suburban, and urban school districts in Tennessee with regard to the implementation of their technology plans?

Document Analysis. Data from document analysis were not used to answer this research question.

Survey Analysis. Data for this research question were collected from 31 respondents: 29 technology coordinators from 29 districts and 2 principals from the 2 districts where complete survey forms were not received from technology coordinators.

Twenty-five of the total 31 surveys contained answers to survey question 2, which attempted to identify parties responsible for implementing district technology plans (Table 25).

Table 26 presents frequency counts of issues considered by urban, suburban, and rural school districts in implementing their technology plans. Participants from rural school systems frequently reported the following issues considered in implementing their technology plans: formulation of strategies for professional development (96%), establishment of a timeline (91%), allocation of resources (91%) and equity (83%). They less frequently reported consideration of following issues in implementing technology plans: hiring new staff (22%), technical and administrative support (30%), collaboration with communities (22%) and motivational measures (26%). Participants from suburban school districts frequently reported the following factors considered in implementing the technology plan: assigning responsible party (100%), setting timeline (86%), allocating resources (86%), providing professional development (86%) and ensuring equity (86%).

Table 25: Party responsible for implementing district technology plans in urban, suburban, and rural school districts

Responsible party	Number of responses		
	Urban	Suburban	Rural
An individual (district tech. coordinator)	0	2	9
A committee	0	4	7
Other (technology department; director, board, supervisors, and teachers)	1	0	2
Total	1	6	18

Table 26: Frequency counts of issues undertaken by urban, suburban, and rural school districts in implementing their technology plans

Considered actions	Number of responses		
	Urban	Suburban	Rural
Timeline	1	6 (86%)	21 (91%)
Responsible party	1	7 (100%)	14 (61%)
Hiring new technology staff	1	5 (71%)	5 (22%)
Strategies for getting funds	1	4 (57%)	10 (43%)
Allocation of resources	1	6 (86%)	21 (91%)
Professional development	1	6 (86%)	22 (96%)
Technical and administrative support	1	5 (71%)	7 (30%)
Collaboration with communities	1	4 (57%)	5 (22%)
Motivational measures	1	2 (29%)	6 (26%)
Equity	1	6 (86%)	19 (83%)
Quality services	1	4 (57%)	13 (57%)
Total	1	7 (100%)	23 (100%)

Research Question 6

How have Tennessee school districts planned to implement their technology plans?

How do district technology coordinators, principals, and teachers perceive the effectiveness of the implementation of their districts' technology plans?

Document Analysis. Data from document analysis were not used to answer this research question.

Survey Analysis. Data pertinent to this research question were collected from 31 respondents: 29 technology coordinators from 29 districts, and two principals from those two districts from where no survey forms were received from the technology coordinators.

Table 27 displays data provided by respondents from 25 school districts with regard to the party responsible for implementing the technology plan. Of the 25 reporting districts, 11 (44%) indicated that individuals--usually district technology coordinators--were responsible for implementing the district technology plan; twelve (48%) indicated that a committee was responsible; and two (8%) indicated that technology department was responsible.

Table 27: Frequency counts of responsible party for implementing district technology plans

Responsible party	Number of responses	Percent
An individual (district tech. coordinator)	11	44
A committee	12	48
Other	2	8
Total	25	100

Question 13 of the survey questionnaire addressed the actions taken by the school systems during the implementation of their technology planning process. The given actions were as follows:

1. Setting of timeline for meeting the goals in different phases
2. Assignment of responsible persons for achieving the goals on timeline
3. Hiring of new technology related personnel
4. Formulation of strategies for getting funds
5. Allocation of resources and budget
6. Formulation of strategies for professional development
7. Establishment of technical and administrative support systems
8. Collaboration with public and other institutional communities
9. Formulate motivational measures for teachers and administrators
10. Equity of access to technology for all teachers and students as well as across all schools
11. Searches for vendors for best deal and quality services

Table 28 displays the frequency counts as reported by 29 district technology coordinators and two principals from 31 school systems for the specific activities performed in implementing the technology plan. The data set shows that the following actions were most frequently performed: establishing a timeline for meeting the goals (90%), allocating resources and budget (90%), formulating strategies for professional development (94%) and ensuring equity (84%).

Table 28: Actions undertaken in implementing the technology plan

Activities	Number of responses	Percent
Timeline	28	90.3
Responsible party	22	71.0
Hiring new technology staff	11	35.5
Strategies for getting funds	15	48.4
Allocation of resources	28	90.3
Professional development	29	93.5
Technical and administrative support	13	41.9
Collaboration with communities	10	32.3
Motivational measures	9	29.0
Equity	26	83.9
Quality services	18	58.1
Total	31	100

Survey Question 14 was used to answer the second part of Research Question 7.

The survey question contained 13 statements that identified characteristics of technology-plan implementation. Survey respondents were asked to rate on a five-point Likert scale each of the statements. The levels of the scale were as follows: 5 = Strongly Agree, 4 = Agree, 3 = No Opinion, 2 = Disagree, and 1 = Strongly Disagree. Each of these statements was intended to capture an aspect of the effectiveness of technology-plan implementation as perceived by district technology directors, principals and teachers.

The statements are as follows:

1. The committee members, staff and teachers are committed to the technology planning activities.
2. Technology planning goals are being achieved as per the timeline.
3. The responsible persons are committed to making their efforts.
4. Administering personnel are very supportive and encouraging.
5. Technology plan are being implemented based on needs of each school in the district.
6. As a result of the technology plan, more teachers are becoming skillful and are using technology in their classrooms.
7. The implementation of plan has been hampered by the lack of sufficient budget.
8. Student learning environments are enhanced by sufficient and advanced use of technology.
9. Technology plans are tied to staff development scheme.
10. School teacher were involved in making decisions about technology applications.
11. Your district has failed to garner public support in the implementation of technology plan.
12. In general the plan has made a progress to meet its goals.
13. The technology plan has made a positive impact on the integration of technology in schools.

In order to ensure that the respondents were focused on the statements and get more reliable information, two of the statements (7 and 11) were negatively worded. To obtain a holistic perceptive of perceptions of implementation, both in the local school districts

and across the 31 reporting school districts, respondent ratings were averaged. Table 29 displays the respondent ratings and averages (if there were multiple respondents participated from one school system). The mean scores shown in the far right-hand column of the table are the means of ratings for all 13 statements within individual school districts. The mean scores shown in the last row of the table (bottom of page) are the means of ratings given an individual statement by respondents from the 31 participating school districts. Thus, there is a mean score representing overall implementation in a school district (last column) and a mean score representing an aspect of implementation across the 31 districts (bottom row).

To ensure that scores for negatively and positively worded statements were of equal value in the averaging process, the scale scores for the two negatively-phrased statements were transposed. The numbers within parentheses in statements 7 and 11 are the original ratings awarded by respondents, and numbers outside the parentheses are transposed numbers. Since a score of 3 is a mid-point score there was no need to transpose this number. Where a school system had only one survey respondent, the ratings in Table 29 represent the perceptions of that individual. Where there were two or more respondents, their ratings for each statement were averaged to attain a statement score. These school systems are referenced by asterisks (*). School systems with no asterisk have ratings by a single rater (usually the technology coordinator). Ratings in the table from school systems with one asterisk are averages of ratings awarded by two respondents. School systems marked with two asterisks provided ratings by more than two raters, which were then averaged. In 14 school districts there were multiple respondents (district technology coordinator, principal, and teacher) participated by completing the survey form.

Table 29: Ratings by district technology coordinators, principals, and teachers

School System	St1	St2	St3	St4	St5	St6	St7	St8	St9	St10	St11	St12	St13	Mean
SS1	2	2	4	3	3	3	1(5)	3	4	3	2(4)	3	3	2.8
SS2	2	2	5	5	4	4	3	2	2	1	2(4)	4	3	3
SS3*	3.5	3	3	2.5	3	3.5	2(4)	4	4	2.5	3	3	4	3.2
SS4	4	4	4	4	4	2	1(5)	2	4	4	3	4	3	3.3
SS5	4	4	4	5	4	3	1(5)	4	4	4	3	3	3	3.5
SS6	4	2	5	3	2	4	1(5)	5	4	4	3	4	4	3.5
SS7*	3.5	3.5	4.5	4.5	3.5	4	3	4	2.5	3.5	3	4	3.5	3.6
SS8	4	4	4	4	4	3	4(2)	3	4	3	3	4	3	3.6
SS9	4	4	4	4	4	3	2(4)	3	4	4	3	4	4	3.6
SS10*	4.5	3	5	5	3.5	4.5	1(5)	4.5	4	3	1.5 (4.5)	4	4	3.7
SS11	3	2	4	5	4	4	2(4)	4	4	4	4(2)	4	4	3.7
SS12*	4	2.5	4.5	4.5	4	3.5	2(4)	4.5	3.5	4	3.5 (1.5)	4	4	3.7
SS13	4	4	4	5	4	3	5(1)	4	1	4	4(2)	4	3	3.8
SS14*	4.5	4.5	4.5	4.5	4.5	3	3	4.5	4.5	4	3.5 (2.5)	3.5	2.5	3.8
SS15	5	4	4	4	3	4	1(5)	4	4	4	3	4	5	3.8
SS16*	4	4.5	4.5	4.5	4	4	4(2)	4	3	4	3.5 (2.5)	4	4	3.9
SS17*	5	3.5	4.5	4.5	4	4	2.5 (3.5)	4.5	3.5	3	4.5 (1.5)	3.5	3.5	3.9
SS18	5	4	5	4	4	5	1(5)	5	5	5	1(5)	4	4	4
SS19	4	5	4	4	4	4	4(2)	4	2	4	5(1)	4	4	4

Table 29: Continued

School System	St1	St2	St3	St4	St5	St6	St7	St8	St9	St10	St11	St12	St13	Mean
SS20	4	4	4	4	4	5	3	4	5	5	3	4	4	4.1
SS21	4	4	4	5	4	3	4 (2)	5	4	4	4 (2)	4	4	4.1
SS22*	4.3	3.3	4.7	4.7	3	4.7	2.7 (3.3)	5	4.7	3.3	4 (2)	4	4.7	4.1
SS23*	4.5	4	5	5	5	5	1.5 (4.5)	4	4	3	4 (2)	4	4.5	4.1
SS24	4	5	4	5	4	5	2 (4)	4	5	5	3	4	4	4.2
SS25	5	4	5	5	4	4	1 (5)	5	5	5	2 (4)	4	5	4.2
SS26*	4.5	3.5	4.5	5	4.5	4.5	4 (2)	4.5	3	4.5	4 (2)	4	4.5	4.2
SS27**	5	5	5	5	4.5	5	1 (5)	4.5	4	3	5 (1)	4.5	5	4.3
SS28*	4	4	4.5	5	4.5	4	4.5 (1.5)	4.5	4.5	4.5	5 (1)	3	4.5	4.3
SS29*	5	5	5	5	5	5	2 (4)	4.5	5	5	3.5 (2.5)	4.5	4.5	4.5
SS30**	5	5	5	5	4	5	2 (4)	5	5	5	4 (2)	5	5	4.6
SS31*	4.7	4.7	4.7	4.7	4.7	4.7	3.7 (2.3)	4.7	4.7	4.7	4.7 (1.3)	4.7	4.7	4.6
Mean	4.1	3.8	4.4	4.5	3.9	4	2.4	4.1	3.9	3.9	3.3	3.9	4	

SS# - School systems

* - averages of ratings by two raters (usually district technology coordinators and principals or teachers)

** - averages of ratings by three raters, district technology coordinator, principals and teachers

Table 30: Four clusters and number of cases derived from Table 29

Cluster and range	Number of cases	Percent
3 and below 3	2	6.5
3.1 to 3.5	4	12.9
3.6 to 4.0	13	41.9
4.1 and above	12	38.7

The average scores on the far right-hand column of Table 29 can be divided into four clusters (Table 30). According to the above clusters, there are two school systems whose average score fell into the first category (6.5%). Since the average score (2.8) of one system (SS2) is lower than the mid-point score (3), the respondent from this system indicated that his/her school system is not making average progress in implementing the technology plan. Characteristics that seem to be holding back the implementation of plan in this system are represented in responses to items 1, 2, 7, and 11. The respondent indicated that committee members and other staff were not committed to the technology planning activities, and technology goals and objectives were not achieved as per the timeline. The respondent also indicated that budget constraints are a problem in implementing the plan as is acquiring public support.

Four school systems (SS19, SS24, SS14, and SS3) fell into the second category (13%). Since their mean scores are slightly greater than 3, the respondents' perceptions are that their districts are making progress in implementing their technology plans (a little better than average progress). These four school systems also indicated that lack of budget was the main problem in implementing the plan.

Thirteen school systems (42%) fell into the third category. Since the mean scores of these school systems were between 3.6 and 4.0, the implementation of their district technology plans seems to be making good progress. Respondents from the majority of these school systems also indicated that lack of budget was a barrier to implementing the technology plan. Acquiring public support seemed to be a problem in a few cases.

Twelve school systems (39%) fell into the fourth category. Since the mean scores of these systems are greater than 4, the implementation of their district technology plans seems to be making strong progress. In this category respondents from almost every school system also indicated that lack of budget was a barrier to implementing the technology plan. Some of the factors that seem to be contributing to the success of implementation in these school systems were commitment of committee members and other staff to the planning activities, commitment of the responsible party, administrative support and enhancement of student learning by sufficient and advanced use of technology.

Based on their mean ratings, some school systems are making better progress in implementing their technology plan than others. Respondents from the majority of school systems indicated that the implementation of the technology plan was hampered by a lack of budget. Similarly, respondents from many school systems saw problems in acquiring public support for implementing the technology plan. Since statements 3 (commitment of responsible party in making their efforts) and 4 (administrative support and encouragement) received the highest average scores (4.4 and 4.5 respectively) among implementation characteristics, respondents in most of the 31 school systems strongly

agree that the persons responsible for technology integration are committed to making an effort, and that administrative personnel are very supportive and encouraging.

In addition to the above quantitative data, open-ended responses obtained in question 22 of the survey questionnaire were used to determine insights from respondents and were used to corroborate results observed by Question 14. The following table (Table 31) shows the number of respondents who answered Question 22, an open-ended question that was intended to examine whose perceptions regarding the level of implementation of their district technology plans.

A qualitative analysis of the open-ended responses regarding the implementation characteristics of district technology plans revealed the following categories (Table 32).

District technology coordinators and principals most often raised the issue of funding in implementing technology plans. They indicated that the implementation of technology planning depends on sufficient budget. Some of them noted that the implementation of the technology plan was hampered and behind their original plans because of the lack of funding and budget cuts. One district technology coordinator wrote:

Implementation is slow due to lack of funding, lack of manpower in technology department and too much paperwork for the acquisition of funding.

One principal argued that technology planning is a means of seeking funding sources.

The school district's technology plan has established a minimum base line for implementing technology in all our school. The plan also encourages and allowed for each school to seek technology funds to implement the latest technology. The district plan includes seeking funds from local funding sources for each school. These funds are distributed equally between school based on each school average daily attendance.

Table 31: Number of respondents for open-ended Question 22

Types of participant	Included	Missing	Total
District technology coordinators	25 (86%)	4 (14%)	29
Principals	7 (78%)	2 (22%)	9
Teachers	7 (78%)	2 (22%)	9

Table 32: Breakdown of responses given by district technology coordinators, principals, and teachers concerning factors related to the implementation of the technology plan

Category	District technology coordinators	Principals	Teachers	Total
Funding	10	2	0	12
Leadership	1	1	0	2
Curriculum and integration of technology	2	2	1	5
Training/professional development	4	0	0	4
Hardware/software	0	2	2	4
Development	2	0	2	4
Implementation	3	0	1	4
Revision of technology plan	3	0	1	4
Miscellaneous	3	0	0	3

One participant reported that funding was insufficient due to the growth the school district is experiencing. Another respondent stated that their school administration and boards see little value of technology in the classroom, and even talk of reducing technology staff.

Two participants suggested that the timely implementation of technology plans depends on leadership in each school. Four participants indicated that their district technology plans were proceeding according to the set timeline. One participant reported:

The district's technology plan implementation process seems to be going well at this time. Teachers are being trained at both building level and system wide. Inservices have been scheduled for teachers to share with each other how they are using technology in the classroom. Teachers are also being equipped with new technology in the classroom.

One participant mentioned that s/he was new in his/her position and was not fully familiar with the current technology plan.

Research Question 7

Are school districts in Tennessee presently engaged in any technology integration activities that were not part of their originally written technology plans? If so, what are these unplanned activities and how, are they influencing the districts' technology implementation efforts?

Document Analysis. Data from document analysis were not used to answer this research question.

Survey Analysis. Question 23 of the survey questionnaire addressed this research question. Of the 31 school districts studied, at least one complete survey was received from 25 school districts with total 29 complete survey forms.

Table 33: Breakdown of responses given by district technology coordinators, principals, and teachers concerning factors related to unplanned activities

Types of participant	Included	Missing	Total
District technology coordinators	19 (66%)	10 (34%)	29
Principals	5 (56%)	4 (44%)	9
Teachers	5 (56%)	4 (44%)	9

There were only three school districts from which two or all three respondent types answered Survey Question 23. In one school district, all three respondent types answered. In one school district, the district technology coordinator and principal answered. In one school district, the technology coordinator and a teacher answered. Table 33 shows the number and frequency of responses by these three types of respondents.

From each school district, at least one complete survey form was taken into consideration for the analysis of open-ended responses. If more than one survey was returned from a particular district with an answer to Question 23, the form returned by the technology coordinator was included because technology coordinators are more likely to be knowledgeable about the technology program in the district. If a survey form was not received from the coordinator, the survey form received from a principal was included. If both coordinator and principal did not return the survey form then the survey form from a teacher was included in the analysis.

The length of the responses varied from one to 81 words. The following categories were derived from an examination of open-ended responses related to unplanned

activities that the school district engaged in: (1) no, none, or not aware, (2) grants, and (3) professional development and integration of technology.

A significant number of respondents representing their school districts, 9 of the total 25 cases (36%), reported that their school districts were not engaged in any unplanned activities. Most of them directly said “no” or “none,” and a few participants reported that they had no idea about it. The most frequently noted responses were related to grants and federal funds. Six respondents, five district technology coordinators from five districts and one teacher from another district mentioned that grants such as Ed Tech, NCLB (No Child Left Behind), GEAR, and Title I were the only unplanned technology activities they were engaged in. These participants reported that their districts were involved in more technology integration activities because of the grants they had received.

One participant noted:

Yes, we received an Ed-Tech grant for technology integration. Training will be completing activities this year.

Professional development and integration of technology was another frequently indicated category. Many participants mentioned that they have increased professional development and integration of technology activities. School districts that received grants focused on professional development activities. They also mentioned that they increased these activities by providing online services and buying more new equipment and software programs.

One teacher participant noted:

Most definitely. An extensive staff development plan is in place to assist teachers in technology/curriculum integration from K-12.

CHAPTER V

CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS

This chapter presents conclusions drawn from the findings presented in Chapter IV as well as discussion and recommendations for policies and future research.

Conclusions

In this section, conclusions related to each research question are presented.

Research Question 1

To what degree do Tennessee school districts' technology plans incorporate the critical components specified by state and federal educational agencies? What commonalities exist among these technology plans? What are the main components included in these plans?

Conclusion 1. Based on the rubric scores, the overall quality of the technology plans in the sample was poor. Fewer than half of the technology plans in the sample included 16 of the 17 elements required by TLEA guidelines. This fact indicates that the majority of the districts were either not guided by the TLEA checklist or that they chose to ignore some of the required elements when writing their plans. More than 50 percent of the total plans studied received scores below 18 (out of a possible score of 34), indicating minimal or no attention to many of the elements specified in the TLEA guidelines.

This result is consistent with findings of the studies “Technology planning in California schools: planning for success or destined for failure” by Kimball (1966) and “Technology planning and implementation: a study of effective change efforts in Michigan public school districts” by Hoffman (2001). Both investigators reported

evidence of inadequate planning for technology in their respective schools and school systems.

Conclusion 2. The technology plans of participating school districts were found to be diverse regarding their organizational patterns and content coverage. The elements included and extent of description of these elements varied widely among the sample of technology plans studied.

The organizational patterns of these technology plans, based on the elements they covered, can be divided into three categories: (1) the Tennessee Local Education Agency (TLEA) checklist, (2) Technology Plan Criteria (TPC), and (3) Other. Almost half of the technology plans in the sample appear to have been written following the TLEA guidelines. Although each school district was required to follow the state guidelines, many school districts wrote technology plans in their own way. These plans did not include many of the TLEA or TPC required elements. Instead, they included elements other than those required by the state guidelines.

Conclusion 3. Four elements were found to be most common components of district technology plans: timeline, goals and objectives, integration of technology into the curriculum and professional development. This finding is consistent with the recommendations found in the literature.

Many school districts had missed or poorly described the following elements: collaboration among educators, interoperability, leadership and equity.

Research Question 2

What, if any, differences exist among rural, suburban, and urban school districts in Tennessee with regard to the development of their technology plans?

Conclusion. There were slight variations among technology plans in urban, suburban and rural school districts regarding content coverage, organizational patterns and planning committee membership. It is difficult to draw conclusions about urban school districts because only one urban school district participated in the study. Based on the data collected, however, the single urban school district and most participating suburban school districts were found to be more successful in developing their technology plans than the rural school districts. The urban school district and most of the suburban school districts appeared to comply with the state guidelines in writing their technology plans. A significant number of the technology plans from rural school systems did not appear to have followed state guidelines.

There were no differences between suburban and rural school systems regarding the charges given to committees or individuals in developing district technology plans. There were differences, however, between suburban and rural school districts in terms of the involvement of various member types in the committee. Suburban school districts tended to include more teachers, principals, curriculum supervisors and district technology coordinators on their technology planning committees, whereas rural school districts were found to depend on the district technology coordinators as key members of smaller technology planning committees.

As with the make up of the committee, there were differences between these suburban and rural school systems in terms of the issues they addressed. Rural school districts were found to be less concerned than suburban school districts about the vision of technology planning, state guidelines and establishment of evaluation criteria.

Research Question 3

How were the school district technology plans in Tennessee developed? Who wrote them?

Conclusion 1. Technology committees, individuals (usually district technology coordinators), and, sometimes, sub-committees, were responsible for developing district technology plans. Respondents from most school districts indicated that technology committees were involved in developing their technology plans. In a few cases, however, there appeared to be disagreement among district technology coordinators, principals and teachers regarding the party responsible for developing the technology plan.

District technology coordinators indicated the plans were developed by a committee, whereas some principals and teachers from the same school districts indicated the plans were developed by an individual. One principal and two teachers indicated that they did not know who developed the plan.

Conclusion 2. Most of the technology committee members were selected by district technology coordinators and superintendents or their designees. In some cases, committee members were selected by both superintendents and assistant superintendents or district technology coordinators and principals.

Conclusion 3. Only a few respondents from a few school systems mentioned that their districts formed technology sub-committees. There were no requirements in the TLEA guidelines for districts to form sub-committees and most of the members were selected for sub-committees on a volunteer basis or with regard to their expertise and interest. In some cases principals alone, or principals and technology coordinators, were

responsible for selecting committee members. Sub-committees were responsible for developing plans for particular tasks and bringing them to the full committees.

Conclusion 4. The following criteria emerged as critical factors in selecting the committee members from schools: technology expertise, representation from each school and teaching expertise. In addition to the selection criteria mentioned in the questionnaire, respondents also indicated a few other criteria, such as educational experience, curriculum integration, special education, title programs, administration, interest, federal program, media and e-rate and grant expertise.

Conclusion 5. Activities undertaken most often in developing technology plans included performing needs assessment, identifying goals and objectives, developing technology vision, revising the existing technology plan and reviewing the state guidelines.

Conclusion 6. The most frequently reported steps taken in assessing needs were reviewing the availability of technology to teachers and students, determining teacher skills in using technology in classroom instruction, and assessing the availability of hardware, software, and infrastructure.

The most frequently reported methods employed in assessing needs were surveys, review of the existing technology plan, and observations. The E-tote (Ed Tech Tennessee Online Technology Evaluation System) survey also was mentioned as a method to assess needs.

Conclusion 7. The following were identified by survey respondents as the most important goals of district technology plans: staff development (including procedures for

refreshment of technology and skills), improvement of teaching and learning and acquisition or replacement and upgrade of hardware and software.

Research Question 4

How many school districts have proposed to revise their technology plans in the future, and how have they planned to do it?

Conclusions. School districts recognized the need for a periodic revision of technology plans. The majority of the respondents reported that their district technology plans had been revised since they were first written and have been recently updated. Participants from all school districts in the sample indicated that their districts intended to revise their technology plan at some point in the future.

Research Question 5

What, if any, differences exist among rural, suburban, and urban school districts in Tennessee with regard to the implementation of their technology plans?

Conclusion 1. There was slight variation in implementing the technology plans among urban, suburban, and rural school districts. The single participating urban school district reported that the technology department was responsible for implementing the technology plan. In most suburban school districts, committees were responsible for implementing the plans. In most rural school districts, an individual, typically the district technology coordinator, was responsible for implementing the plan.

Conclusion 2. Most rural and suburban school districts seem to be concerned with the following actions in implementing their district technology plans: setting a timeline, allocating resources, formulating strategies for professional development and ensuring

equity. However, suburban school districts are additionally concerned with identifying parties responsible for a specific task.

Research Question 6

How have Tennessee school districts planned to implement their technology plans?

How do district technology coordinators, principals, and teachers perceive the effectiveness of the implementation of their districts' technology plans?

Conclusion 1. In most cases individuals, usually district technology coordinators, rather than technology committees, were responsible for implementing the district technology plan.

Conclusion 2. Based on the perceptions of survey respondents, technology plans in almost all school districts were being implemented to some degree; however, there was perceived variation in progress.

Conclusion 3. The consensus view of the respondents is that the implementation of plans is hindered by lack of funding.

Research Question 7

Are school districts in Tennessee presently engaged in any technology integration activities that were not part of their originally written technology plans? If so, what are these unplanned activities and how are they influencing the districts' technology implementation efforts?

Conclusions. A majority of respondents reported that their school districts were not engaged in unplanned activities. Some respondents indicated that their districts received grants for professional development activities and for buying new equipment.

Discussion

Although every effort was made to include all of the 136 public school districts in Tennessee in the sample, the total usable sample consisted of 31 school districts (23 percent of the total population). Only one urban school district, seven suburban districts and 23 rural districts participated. Districts might have had several reasons for choosing not to participate in the study. Some school districts indicated that they were not able to participate in the study because of a budget cut, limited staff or time factors. Others may not have seen the study as important. Still others might have felt threatened, especially if they had not completed plans or had not made progress in the implementation of their technology plan. Regardless of the reasons for the high rate of non-participation, the small sample size and self-selected nature of the sample mean that these results should not be used to generalize these findings as predictions of the level of technology planning in school districts across the state of Tennessee.

Most of the technology plans analyzed during this study were not well-written and did not address the required elements as prescribed by the TLEA guidelines. These plans might have been written prior to the publication of the guidelines, or they might not have been revised for several years. School districts might not have seen the importance of these elements, or they had little information about how to implement these elements. In those plans which included the elements, the discussion was often sketchy with little detailed explanation. There might be many possible reasons for this, although the unclear definitions of the elements listed in the TLEA checklist may be the most plausible one. It would have been helpful for school districts to receive examples and additional information regarding the required elements.

Another possible reason for the poor quality of the plans might be the discrepancies which exist between TLEA and TPC guidelines. The TLEA guidelines specify 17 elements required for a technology plans, whereas TPC specifies only 9 elements. There was evidence that some school districts were familiar with both sets of guidelines and used both for developing their plans.

Technology plans written by many rural school districts did not appear to follow the state guidelines. These rural school districts may not have known about the state guidelines, may not have seen the significance of the guidelines or may not have had sufficient resources to invest in developing their technology plans according to state guidelines.

In many cases, a technology committee was not involved in technology planning and implementation. Moreover, many technology planning committees did not include diverse stakeholders, especially principals and teachers. In most of the school systems, district technology coordinators were the primary persons engaged in both planning and implementation. If committees are involved in developing technology plans, more people share ideas and feel responsibility for implementing technology plans.

There was disagreement in the responses of district technology coordinators, principals and teachers in some cases regarding certain issues, such as who developed the technology plan, who selected the committee members, and who was responsible to implement the plan. One reason might be the nature of their job responsibilities and their access to information. Another reason might be that certain processes and procedures exist only on paper, but not in reality.

Some participants indicated that their districts were engaged in unplanned activities. The most frequently reported unplanned activities were related to grants for professional development and new equipment. School districts received grants to provide training for their teachers on how technology can be integrated into their teaching and learning. In addition, school districts increased facilities for the integration of technology activities by buying new equipment and software. Sometimes unplanned activities might be beneficial because they provide school districts with more opportunities and resources. Sometimes, however, they are overwhelming and burdensome because of time constraints and lack of staff. They may hamper the regular planned activities, and the staff may not be able to focus on their planned activities.

Recommendations

The findings from this study lead to the following recommendations.

Recommendations for Policies

1. The state should provide detailed guidelines including a rubric or checklist, so that school districts can gain a better understanding of what is required in a detailed technology plan.
2. Many rural school districts were found not to be following the state guidelines. These school districts should be encouraged to develop technology plans by adopting state and federal guidelines.
3. If teachers and principals are more technologically advanced, they might be more actively involved in planning for implementing technology in their schools or school systems. Therefore, concerned authorities should encourage them to seek additional technological training and facilities.

4. A significant number of survey respondents reported that their district technology plans were created by an individual, most often the district technology coordinator. The plans would be more meaningful and effective if more stakeholders were involved in the development of technology plans. With collective input, stakeholders might feel more responsible for implementing the technology plans.

5. A small number of participants mentioned that their district technology committees formed sub-committees. Planning for successful implementation of technology into the curriculum is a complex task that involves many resources and various activities. The formation of sub-committees would most likely help districts create more effective technology plans and also provide opportunities for more people to become involved and contribute their expertise to specified tasks.

6. A number of respondents (23%) indicated that their technology plan had not been revised since it was originally developed. The state should encourage school districts to revise their district technology plans on a more frequent basis (perhaps every 2 – 3 years) because of changing technologies and student needs.

7. It is obvious that funding is the single most critical factor in successful program implementation. Therefore, the state government should assist school districts in finding resources so that their technology budget continuously increases rather than decreases. In addition, local personnel (technology coordinators, principals, superintendents) need to aggressively seek funds through grants and other means.

8. Technology plans are generally developed considering existing resources and institutional needs, and are developed for a certain timeframe. The concerned parties,

however, should be flexible and ready to make changes by adding new activities or changing the planned activities as conditions change.

Recommendations for Future Research

1. With the rapid development of emerging technology, the needs and scope of educational agencies are changing. In order to keep abreast of these changes, a study of this type should be replicated every three to four years.

2. Technology planning is a complex process in which the involvement of diverse stakeholders is critical. This study revealed limited participation in technology planning beyond technology coordinators, some principals, and a few teachers at present. Future research should include more and different stakeholders, such as parents, students, and community leaders. A study designed to determine the perceptions of different types of respondents selected from the same school system would give additional insight into issues such as public support, funding and inclusion.

3. Technology planning and implementation depends on the context of a school system. A similar study could be conducted to determine the relationship between technology planning and implementation in a variety of contexts.

4. A similar study should be conducted focusing on a specific topic or aspect of a technology plan, such as the relationship between the plan for integrating technology into the curriculum and actual integration over the next three or four years.

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APPENDICES

APPENDIX A1

Tennessee Local Education Agency (LEA) plan for educational technology: *Checklist of required elements – 2002-2003*

Tennessee Local Education Agency (LEA) plan for educational technology: *Checklist of required elements—2002-2003*

The technology plan elements described in this initial checklist apply to all district plans for educational technology reviewed by the Tennessee Department of Education and submitted in connection with mandates of the Elementary and Secondary Education Act NCLB. After the initial year of use, this checklist will be consolidated with other technology plan checklists including those used for re-rate applications.

School districts with education improvement/accreditation plans that include technology may submit their entire plan with numbered pointers to the plan elements described in this checklist or create a separate technology plan that consists of excerpts properly cited from their education improvement/accreditation plan.

The checklist is divided into two sections – process and content. “Process” includes elements that the district must incorporate in *creating* and *executing* the technology plan. “Content” includes elements that must be incorporated into the plan itself.

Yes	No	REQUIRED ELEMENTS OF THE DISTRICT PLAN
		<i>Process Elements</i>
		1. Needs assessment – Plan describes the district’s needs related to technology literacy and incorporating technology into district educational practice. The description must be based on a needs assessment conducted within the district. ¹
		2. Stakeholder involvement in planning- Plan describes the diverse stakeholders in the district who were involved in developing the plan and the process through which stakeholders were engaged.
		3. Timeline—Plan includes a timeline (of not more than three years) for implementation.
		4. Responsible parties – Plan indicates by name and title who is responsible for overseeing implementation of specific elements of the plan.
		<i>Content Elements</i>
		5. Vision – Plan includes a vision that relates educational technology to increasing student achievement.

¹ One component of the Needs Assessment must be the Tennessee STaR Chart, which will be available on the web at [URL]. The Tennessee STaR Chart information is needed at each building level.

Yes	No	REQUIRED ELEMENTS OF THE DISTRICT PLAN
		6. Goals and Objectives – Plan sets forth goals and measurable objectives for using technology to improve student academic achievement, aligned with State standards.
		7. Collaboration among educators – Plan encourages collaboration among all district educators—including classroom teachers, school library staff, administrators and educational technology staff—in reaching educational goals and objectives. The plan provides mechanisms to promote the active participation of library staff in curriculum planning that incorporates development of information literacy.
		8. Collaboration with community partners – Plan includes a description of how the district will work with community partners (such as parents, community groups, other educational entities, government agencies, and public or academic libraries) to help achieve the plan’s goals and objectives for educational technology. (The description will include, where applicable, a program in collaboration with adult literacy services providers.)
		9. Curricula and teaching that integrate technology—Plan describes how the district will identify and promote curricula and teaching strategies that effectively integrate technology, based on a review of relevant research, leading to improvements in student academic achievement.
		10. Increasing accessibility—Plan describes how the district will ensure that all students and teachers have increased access to technology resources.
		11. Equity – Plan provides for equitable access to technology and information resources for all students and educators—paying particular attention to closing the gap for students and educators who have had poorer access because of race, gender, disability, economic status, or special needs.
		12. Professional development – Plan includes a description of how the district will provide ongoing, sustained, high-quality professional development for teachers, principals, administrators, and school library media centers to improve student achievement in a standards-based environment. (The description must include strategies that will improve teacher competency in educational technology.)

Yes	No	REQUIRED ELEMENTS OF THE DISTRICT PLAN
		13. Budget – Plan provides an annualized budget for connectivity, hardware, software, professional development, print and electronic resources, support and other services, personnel, and plan-related activities that support development and use of educational technology.
		14. Interoperability—Plan includes specific provisions for interoperability among technology components (Hardware to hardware; software to software; hardware to software)
		15. Leadership – Plan includes elements that strengthen the role of district and school leadership in advocacy, administration, communication, and modeling of effective educational technology integration in achieving the plan’s goals and objectives.
		16. Review of policies and procedures – Plan identifies the district’s current or pending policies and procedures (e.g., <i>Acceptable use of the Internet, student Internet safety, and digital copyright</i>) that related to the use of educational technology.
		17. Evaluation – Plan includes a description of the methods and standards by which attainment of the plan’s goals and objectives will be measured.

APPENDIX A2

Technology Plan Criteria (TPC) for Tennessee's Enhancing Education Through
Technology (Title IID: *Ed Tech*) and E-rate Discounts

Technology Plan Criteria (TPC) for Tennessee's Enhancing Education Through Technology (Title IID: Ed Tech) and E-rate Discounts **For Verification that the School District Technology Plan** **Qualifies and Meets Compliance Requirements for Funding and Discounts**

(BOX 1, for completion by school district use only.)

School District: _____	Date of plan: _____
Contact Person: _____	Phone: _____
☐ School District hereby assures CIPA compliance as required by E-rate and Ed Tech (see Box 5 for CIPA requirements) (Box 4: Use only for resubmits)	
Director of Schools' Signature: _____	This plan is resubmitted for additional review after an earlier review indicated revision was required before approval could be given.
Director of Schools' Name: _____	
Date of Assurance: _____	Date of original review: _____

Directions:

(1) The SCHOOL DISTRICT completes Box 1 where signature by the Director of Schools signifies assurance of CIPA compliance. In Box 2, the school district uses the review criteria in COLUMN 1 to identify the information that must be included in the District Technology Plan in order to meet Ed Tech and E-rate Discount requirements. For each criterion listed in Box 2, the school district completes COLUMN 3 to indicate where in the District Technology Plan the reviewers will find evidence that the specified criterion has been met. The school district indicates location by specific page number and paragraph number. Upon completing the form, the district submits the District Technology Plan and the complete TPC as follows: MAIL the District Technology Plan and completed TPC to:

Brenda Staggs
Tennessee Department of Education
6th Floor Andrew Johnson Tower
710 James Robertson Parkway
Nashville, TN 37243

AND E-MAIL, by attachment an electronic copy of the completed TPC to Brenda.Staggs@state.tn.us

(2) STATE REVIEWERS will examine indicated location to determine if criteria for Ed Tech and E-rate have been met. State reviewers will place a checkmark in COLUMN 2 if

specified criterion HAS been met. NA preprinted in column 2 indicates the criterion does not apply to one of the governing requirements. State reviewers will use COLUMN 4 for comments especially in cases where criteria have not been met. State reviewers will complete Box 3 and return the TPC by e-mail to the district contact person.

(3) If the plan requires revision as indicated in Box 3, the SCHOOL DISTRICT will revise the plan, complete another TPC including Box 4 and resubmit within the time specified. Box 5 provides reference to CIPA requirements delineated by USAC (c-rate) and Ed Tech legislation.

(SAMPLE BOX 2)

Column 1	Column 2	Column 3	Column 4
The Plan Includes (Criteria)	Minimum Met (for state office use only) Ed. Tech E-rate	Reference in School District Technology Plan (Cite the specific page number and paragraph where evidence will be found in the Technology Plan)	Reviewer Comments
		(for completion by school district)	(for completion by state reviewers)

Minimum Criteria Required for Enhancing Education Through Technology Funding, E-rate Discounts

(BOX 2: for completion by school district and state reviewers)

Column 1 The Plan Includes (Criteria)	Column 2 Minimum Met		Column 3 Reference in School District Technology Plan (specify precise page number and paragraph) (for completion by school district)	Column 4 Reviewer Comments (for completion by state reviewers)
	Ed. Tech	E-rate		
1. Goals and Strategies				
a. Goals -- a description of specific goals, aligned with challenging State academic standards, for using advanced technology to improve student academic achievement.				
b. Strategies for improving academic achievement and teacher effectiveness -- a description of how Ed Tech funds and E-rate discounts will be used to improve the academic achievement, and technology literacy, of all students and to improve the capacity of all teachers to integrate technology effectively into curriculum and instruction.		NA		
c. A strategy for using information technology and telecommunications to improve education or library services.				
d. Steps to increase accessibility -- a description of the steps the school district will take to ensure that all students and teachers have increased access to technology. <i>(The description must include how Ed Tech funds will be used to help students in high-poverty and high-needs schools, or schools identified for improvement or corrective action under section 1116 of Title I.)</i>		NA		
e. Innovative delivery strategies -- a description of how the school district will encourage the development and use of innovative strategies for the delivery of specialized curricula through the use of technology.		NA		
2. Telecommunications Assessment				
Assessment of the telecommunication services, hardware, software, and other services that will be needed to improve education or library services.				
3. Promotion of curricula and teaching strategies that integrate technology				
A description of how the applicant will identify and promote curricula and teaching strategies that integrate technology effectively into curricula and instruction that:				
a. is based on a review of relevant research,		NA		
b. is aligned to Tennessee Instructional Technology Standards, and		NA		
c. will lead to improvements in student academic achievement		NA		
d. and includes a <u>timeline</u> for this integration		NA		

Contacts: *Enhancing Education Through Technology Funding*: Jerry Bates at 615.532.6287 (Jerry.Bates@state.tn.us) or Brenda Staggs 615.532.2490 (Brenda.Staggs@state.tn.us)
E-rate Discounts: Lisa Colthron at 615.532.2818 (Lisa.Colthron@state.tn.us)

Column 1 The Plan Includes (Criteria)	Column 2 Minimum Met		Column 3 Reference in School District Technology Plan (specify precise page number and paragraph) (for completion by school district)	Column 4 Reviewer Comments (for completion by state reviewers)
	Ed. Tech	E-rate		
4. Professional development A description of how the school district will provide ongoing, sustained professional development for all school professionals to further the effective use of educational technology.				
5. Technology type and costs Plan provides for a sufficient budget to acquire and support the non-discounted elements of the plan: the hardware, software, professional development, and other services that will be needed to implement the strategies. a. Description of the type and costs of technology to be acquired with Ed Tech funds and E-rate discounts, including interoperability provisions. b. Description of how the applicant will coordinate activities funded through the Ed Tech program with technology-related activities supported with funds from other sources. c. Description of the supporting resources, such as services, software, other electronically delivered learning materials, and print resources, that will be acquired to ensure successful and uses of technology.		NA		
6. Evaluation & Accountability a. Description of an evaluation process that enables the district/schools to monitor progress toward the specified goals and make mid-course corrections in response to new developments and opportunities as they arise. b. A description of the process the school district will use to monitor progress and to evaluate the effectiveness of the funded activities in: integrating technology into classrooms, increasing the effectiveness of teachers, and enabling students to reach challenging State academic standards.	NA	NA		
7. Parental involvement A description of how technology will be used to promote parental involvement and increase communication with parents, including a description of how parents will be informed of the technology used so parents can reinforce at home the instruction received at school.	NA	NA		

Column 1 The Plan Includes (Criteria)	Column 2 Minimum Met		Column 3 Reference in School District Technology Plan (specify precise page number and paragraph)	Column 4 Reviewer Comments
	Ed. Tech	E-rate	(for completion by school district)	(for completion by state reviewers)
8. Collaboration with adult literacy service providers A description of how the program will be developed, where applicable, in collaboration with adult literacy service providers		NA		
9. Children's Internet Protection Act (CIPA) Compliance LEA assures that CIPA compliance has been met. See the requirements that follow.				

(BOX 3: for completion by state reviewers only)

This is to certify that the submitted District Technology Plan was reviewed to determine whether it met the minimum criteria required for *Enhancing Technology Through Education* funding and *E-rate* discounts. Reviewer comments are summarized in Box 2 Column 4. If a specific component has not been checked in Column 2, reviewers could not certify that the plan met that particular minimum criterion. Plan must therefore be revised and resubmitted.

Date Reviewed: _____

Initials of Reviewer(s): _____

Plan expires: _____

Your plan meets minimum criteria to qualify for:

- ☐ Enhancing Education Through Technology Funding (Title II D: Ed Tech)
☐ E-Rate Discounts
☐ Your plan requires REVISION as indicated in Box 2.

Resubmit by: _____

ADDITIONAL REMARKS from Reviewer(s):

Contacts: *Enhancing Education Through Technology Funding*: Jerry Bates at 615.532.6287 (Jerry.Bates@state.in.us) or Brenda Siaggs 615.532.2490 (Brenda.Siaggs@state.in.us)
E-rate Discounts: Lisa Coltron at 615.532.2818 (Lisa.Coltron@state.in.us)

CIPA Requirements: (CIPA is the Children's Internet Protection Act)

• USAC (e-rate) Requirements for CIPA Compliance¹

1. Technology Protection Measure

A Technology Protection Measure is a specific technology that blocks or filters Internet access. It must protect against access by adults and minors to visual depictions that are obscene, child pornography, or - with respect to use of computers with Internet access by minors - harmful to minors. It may be disabled for adults engaged in bona fide research or other lawful purposes. For schools, the policy must also include monitoring the online activities of minors.

2. Internet Safety Policy

The Internet Safety Policy must address the following issues:

- access by minors to inappropriate matter on the Internet and World Wide Web;
- the safety and security of minors when using electronic mail, chat rooms, and other forms of direct electronic communications;
- unauthorized access, including so-called "hacking," and other unlawful activities by minors online;
- unauthorized disclosure, use, and dissemination of personal information regarding minors; and
- measures designed to restrict minors' access to materials harmful to minors.

3. Public Notice and Hearing

The authority with responsibility for administration of the school or library must provide reasonable public notice and hold at least one public hearing to address a proposed Technology Protection Measure and Internet Safety Policy.

• H.R. 1 (No Child Left Behind (§2441: Internet Safety) Reference on Disabling Technology Protection Measure²

"DISABLING DURING CERTAIN USE-An administrator, supervisor, or person authorized by the responsible authority under subsection (a) may disable the technology protection measure concerned to enable access for bona fide research or other lawful purposes."

The "responsible authority under subsection (a)" is the "school board, local education agency, or other authority with responsibility for administration" of the school.

• NCLB Guidance Document for Title II Part D³

K-1. How do the requirements of the Children's Internet Protection Act (CIPA) affect LEAs that receive Ed Tech funds?

Subpart 4 of the Ed Tech legislation incorporates into the ESEA the requirements of the Children's Internet Protection Act (CIPA). These provisions require LEAs to certify, under certain circumstances, that schools have adopted and are enforcing Internet safety policies. As a condition of participating in the Ed Tech program, LEAs must submit a CIPA certification form to their SEA. The CIPA requirements in the ESEA apply with respect to elementary or secondary schools that do *not* receive e-rate discounts and for which Ed Tech funds are used to purchase computers used to access the Internet, or to pay the direct costs associated with accessing the Internet. The CIPA requirements in the ESEA do not apply to schools that receive e-rate discounts. (These schools are governed by other CIPA provisions and must submit their CIPA certifications to the Federal Communications Commission.)

K-2. What kind of CIPA certification must an LEA file with its SEA?

An LEA seeking Ed Tech funds must certify to its SEA that *one* of the following conditions exists -

- Every "applicable school" has complied with the CIPA requirements in subpart 4 of Part D of Title II of the ESEA. (An "applicable school" is an elementary or secondary school that does *not* receive e-rate discounts and for which Ed Tech funds are used to purchase computers used to access the Internet, or to pay the direct costs associated with accessing the Internet.)
- Not all "applicable schools" have yet complied with the requirements in subpart 4 of Part D of Title II of the ESEA. However, the LEA has received a one-year waiver from the U.S. Secretary of Education under section 2441(b)(2)(C) of the ESEA for those applicable schools not yet in compliance.
- The CIPA requirements in the ESEA do not apply because no funds made available under the program are being used to purchase computers to access the Internet, or to pay for direct costs associated with accessing the Internet, for elementary and secondary schools that do not receive e-rate services under the Communications Act of 1934, as amended.

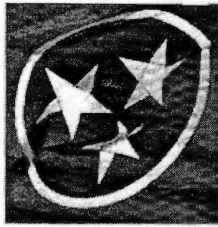
¹ <http://www.sl.universalservice.org/ref/crcncc/CIPA.asp>

² <http://www.ed.gov/legislation/ESEA02/pg37.html>

³ http://www.ed.gov/offices/OESE/esea/Ed_Techguidance.doc

APPENDIX A3

**Tennessee STaR Chart: A Tool for Planning and Assessing School Technology and
Readiness**



Tennessee STaR Chart: **A Tool for Planning and Assessing** **School Technology and Readiness¹**

The Tennessee STaR Chart, patterned after the *CEO Forum STaR Chart* (with the additional work done by Texas' Education Agency's Educational Technology Advisory Committee) has been developed around four key areas: Teaching and Learning, Educator Preparation and Development, Administration and Support Services, and Infrastructure for Technology. The Tennessee STaR Chart is designed to help campuses and districts determine their progress toward meeting long-range technology goals. The Tennessee STaR Chart will also assist in the measurement of the impact of state and local efforts to improve student learning through the use of technology.

The Tennessee STaR Chart will help campuses and districts answer some critical questions:

- 1) What are your campuses' and district's current educational technology profiles?
- 2) What evidence can be provided to demonstrate their progress in meeting long-range technology goals?
- 3) What areas should your campus and district focus on to improve its level of technology integration to ensure the best possible teaching and learning?

The Tennessee STaR Chart can be used:

- ★ To create and/or to update the district's Technology Plan
- ★ To set benchmarks and goals. Campuses and districts may use the chart to identify current education technology profiles, establish goals, and monitor progress.
- ★ To create individualized assessment tools. Education administrators and policymakers may use the Tennessee STaR chart as the basis for technology assessments and to evaluate varied perspectives of different staff and clientele.
- ★ To apply for grants. The Tennessee STaR chart will help schools identify their educational technology needs as they apply for grants.
- ★ To determine funding priorities. Education administrators and policymakers can use the Tennessee STaR Chart to determine where to allocate funds.
- ★ To use the Tennessee STaR Chart for a historical perspective. Campuses and districts can complete the survey and then use the profile annually to gauge their progress. The data can be reported to school boards, and community, campus or district planning committees to gauge progress and align with national and state standards.
- ★ To help conceptualize your campus' or district's vision of technology.

¹ Available online: <http://www.state.tn.us/education/acctstar-campus-portrait.doc>

Instructions for Completing a Campus Tennessee STaR Chart Profile

The printed STaR Chart materials may be used for discussion and collection of data. Use the instructions below to develop your campus STaR profile.

1. Four Key Areas are identified: Teaching and Learning, Educator Preparation and Development, Administration and Support Services, and Infrastructure for Technology.
2. Each Key Area is divided into Focus Areas. Within each Focus Area, indicators are provided for assessing the campus' Level of Progress. It is possible that the campus may have indicators in more than one Level of Progress. Select the one Level of Progress that best describes your campus.
3. The number of points for each level of progress is given on the grid. Total the numbers of points for each key area; then use the scoring table (below) to determine your school's "Level of Progress".
4. When the online Tennessee OnTarget system is available, you will enter your STaR Chart responses into the OnTarget system. Summary reports and graphs will then be available.

The Tennessee STaR Chart is a tool to help Tennessee school districts and campuses develop their own long-range technology plan. Campuses and districts can use this data to perform a needs assessment, judge progress, set benchmarks and goals, determine funding priorities, provide information for technology planning, and measure the impact of state and local efforts to improve student learning through the use of technology. Districts will be able to view this data by school, district, and district type (urban, rural, etc.) This data will not be used as an evaluation measure of individual campuses or districts.

Impact of the Tennessee STaR Chart

Future applications for state funded technology grants under the Enhancing Education Through Technology Act will request a completed campus or district Tennessee STaR Chart profile to be filed with the application as an indicator of current status and progress and as a formative and/or summative evaluation tool.

Use the completed surveys, the reports and charts to compare your campus' progress to like-sized campuses and to the statewide profile. Your data will be compiled with those of other campuses to provide an overall picture of the state of technology in Tennessee. Additional statewide aggregated data will be available in the Spring of 2003.

Adapted by the Tennessee Department of Education with permission from (1) the Texas STaR Chart (developed by the Educational Technology Advisory Committee of the Texas Education Agency) and (2) the STaR Chart originally created by the CEO Forum. Find the [original] STaR Chart online at ww2.iste.org/starchart. Copyright © 2002, ISTE (International Society for Technology in Education), 800-336-5191 (U.S. & Canada) or 541-302-3777 (Int'l), iste@iste.org, www.iste.org. All rights reserved. Permission does not constitute an endorsement by ISTE.

Tennessee STaR Chart Scoring Table

Key Area	Total Numeric Score	Look up the numeric score for each key area in the grid below to determine the "Level of Progress"				Your School's Level of Progress
		Early Tech	Developing	Advanced	Target	
I: Teaching and Learning		6-8	9-14	15-20	21-24	
II: Educator Preparation and Development		6-8	9-14	15-20	21-24	
III: Administration and Support Services		5-7	8-12	13-17	18-20	
IV: Infrastructure for Technology		5-7	8-12	13-17	18-20	

KEY AREAS:		I. Teaching and Learning				
Focus: Levels of Progress	(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
Early Tech (1 pt)	Teacher-centered lectures Students use technology to work on individual projects	Use technology as a supplement	Occasional computer use in library or computer lab setting	No technology use or integration occurring in the core curriculum subject areas	<i>Campuses that serve grades K-8:</i> Within each grade level cluster (K-2, 3-5, 6-8), some but not all Technology standards are met <i>High School Campuses:</i> At least 4 Technology Applications courses offered	Students occasionally use software applications and/or use tutorial software for drill and practice
Developing Tech (2 pts)	Teacher-directed learning Students use technology for cooperative projects in their own classroom	Use technology to streamline administrative functions (i.e., grade book, attendance, word processing, E-mail, etc.)	Regular weekly computer use to supplement classroom instruction, primarily in lab and library settings	Use of technology is minimal in core curriculum subject areas	<i>Campuses that serve grades K-8:</i> Within each grade level cluster (K-2, 3-5, 6-8), most Technology standards are met <i>High School Campuses:</i> At least 4 Technology Applications courses offered and at least 2 taught	Students regularly use technology on an individual basis to access electronic information and for communication and presentation projects
Advanced Tech (3 pts)	Teacher facilitated learning Students use technology to create communities of inquiry within their own community	Use technology for research, lesson planning, multimedia and graphical presentations and simulations, and to correspond with experts, peers, and parents	Regular weekly technology use for integrated curriculum activities utilizing various instructional settings (i.e., classroom computers, libraries, labs, and portable technologies)	Technology is integrated into core subject areas, and activities are separated by subject and grade	<i>Campuses that serve grades K-8:</i> Within each grade level cluster (K-2, 3-5, 6-8), all Technology standards are met Grade-level benchmarks (K-8) are established <i>High School Campuses:</i> At least 4 Technology Applications courses offered and at least 4 taught	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
Target Tech (4 pts)	Teacher as facilitator, mentor, and co-learner Student-centered learning, teacher as mentor/facilitator with national/international business, industry, university communities of learning	Integration of evolving technologies transforms the teaching process by allowing for greater levels of interest, inquiry, analysis, collaboration, creativity and content production	Students have on-demand access to all appropriate technologies to complete activities that have been seamlessly integrated into all core curriculum areas	Technology is integral to all subject areas	<i>Campuses that serve grades K-8:</i> Within each grade level cluster (K-2, 3-5, 6-8), all Technology standards are met Grade-level benchmarks (K-8) are met <i>High School Campuses:</i> All Technology Applications courses offered with a minimum of 4 taught, or included as new courses developed as local elective or included as independent study course	Students work collaboratively in communities of inquiry to propose, assess, and implement solutions to real world problems Students communicate effectively with a variety of audiences

TOTAL SCORE FOR KEY AREA I:

Teaching and Learning

KEY AREAS:	II. Educator Preparation and Development					
Focus	(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
Levels of Progress						
Early Tech (1 pt)	Technology literacy skills including multimedia and the Internet	10% meet ISTE technology proficiencies and implement in the classroom	Recognizes benefits of technology in instruction; minimal personal use	Whole group	Most at <u>entry</u> or <u>adoption</u> stage (Students learning to use technology; teachers use technology to support traditional instruction)	5% or less
Developing Tech (2 pts)	Use of technology in administrative tasks and classroom management; use of Internet curriculum resources	40% meet ISTE technology proficiencies and implement in the classroom	Expects teachers to use technology for administrative and classroom management tasks; uses technology in some aspects of daily work	Whole group, with follow-up to facilitate implementation	Most at <u>adaptation</u> stage (Technology used to enrich curriculum) Most beginning to use with students	6-24%
Advanced Tech (3 pts)	Integration of technology into teaching and learning; regularly uses internet curriculum resources to enrich instruction	60% meet ISTE technology proficiencies and implement in the classroom	Recognizes and identifies exemplary use of technology in instruction; models use of technology in daily work	Long term and ongoing professional development; involvement in a developmental/ improvement process	Most at <u>appropriation</u> stage (Technology is integrated, used for its unique capabilities)	25-29%
Target Tech (4 pts)	Regular creation and communication of new technology-supported, learner-centered projects; vertical alignment of all Technology Application curriculum standards; anytime anywhere use of Internet curriculum resources by entire school community	100% meet ISTE technology proficiencies and implement in the classroom	Ensures integration of appropriate technologies to maximize learning and teaching; involves and educates the school community around issues of technology integration	Creates communities of inquiry and knowledge building; anytime learning available through a variety of delivery systems; individually guided activities	Most at <u>invention</u> stage (Teachers discover and accept new uses for technology)	30% or more
TOTAL SCORE FOR KEY AREA II:				Educator Preparation and Development		

KEY AREAS:	III. Administration and Support Services				
Focus	(M) Vision and Planning	(N) Technical Support	(O) Instructional and Administrative Staffing	(P) Budget	(Q) Funding
Levels of Progress					
Early Tech (1 pt)	No campus technology plan; technology used mainly for administrative tasks such as word processing, budgeting, attendance, grade books	No technical support on-site; technical support call-in; response time greater than 24 hours	No full time dedicated district level Technology Coordinator Campus educator serving as local technical support	Campus budget for hardware and software purchases and professional development	Local fund raisers only
Developing Tech (2 pts)	Campus technology plan aligns with the TN Long Range Technology Plan; integrated into district plan; used for internal planning, budgeting, applying for external funding and discounts. Teachers/administrators have a vision for technology use for direct instruction and some student use	At least one technical staff to 750 computers Centrally deployed technical support call-in; response time less than 24 hours	Full-time district level Technology Coordinator/Assistant Superintendent for Technology Centrally located instructional technology staff; one for every 5,000 students Additional staff as needed, such as trainer, webmaster, network administrator	Campus budget for hardware and software purchases and professional development, <u>minimal</u> staffing support, and some ongoing costs	Fund raisers and minimum grants/minimal local funding
Advanced Tech (3 pts)	In addition to the above, the campus technology plan is approved by the board and supported by Director of Schools Campus plan collaboratively developed, guiding policy and practice; regularly updated Campus plan addresses technology application essential knowledge and skills and higher order teaching and learning Administrators use technology tools for <u>planning</u>	At least one technical staff to 500 computers Central technology support use remote management software tools Centrally deployed and minimal campus-based technical support on-site; response time is less than 8 hours	Full-time district level Technology Coordinator/Assistant Superintendent for Technology Centrally located instructional technology staff; one for every 1,000 students Additional staff as needed	Campus budget for hardware and software purchases and professional development, <u>adequate</u> staffing support, and ongoing costs	Grants, E-Rate discounts applied to technology budget, <u>locally supplemented</u> through tax dollars
Target Tech (4 pts)	In addition to the above, the campus technology plan is actively supported by the board Campus plan is collaboratively developed, guiding policy and practice; updated at least annually The campus plan is focused on student success; based on needs, research, proven teaching and learning principles. Administrators use technology tools for planning and decision making	At least one technical staff to 350 computers; centrally deployed and dedicated campus-based Central technology support use remote management software tools Technical support on-site; response time is less than 4 hours	Full-time district level Technology Coordinator/Assistant Superintendent for Technology <u>Dedicated</u> campus-based instructional technology support staff—one per campus plus one for every 1,000 students Additional staff as needed	Campus budget for hardware and software purchases, sufficient staffing support, costs for professional development, facilities and other ongoing costs <u>Appropriate</u> budget to support the district technology plan	Other competitive grants, E-Rate discounts, <u>locally supplemented</u> through tax dollars Other state and federal programs directed to support technology funding, bond funds, business partnerships, donations, foundations, and other local funds designated for technology
TOTAL SCORE FOR KEY AREA III:			Administration & Support Services		

KEY AREAS:	IV. Infrastructure for Technology				
Focus:	(R) Students per Computer	(S) Internet Access Connectivity/Speed	(T) Distance Learning	(U) LAN/WAN	(V) Other Technologies
Levels of Progress					
Early Tech (1 pt)	Ten or more students per Internet-connected multimedia computer Refresh cycle established by district/campus for every 6 or more years	Dial-up connectivity to the Internet available only on a few computers	No Web based/online learning available at the campus No satellite based learning available at the campus No two-way interactive video distance learning capabilities available at the campus	Limited print/file sharing network at the campus Some shared resources available on the campus LAN	Shared use of resources such as, but not limited to, TVs, VCRs, digital cameras, scanners, classrooms sets of programmable calculators
Developing Tech (2 pts)	Between 5 and 9 students per Internet-connected multimedia computer Refresh cycle established by district/campus is every 5 years	Direct connectivity to the Internet available at the campus in 50% of the rooms, including the library Adequate bandwidth to the campus to avoid most delays	Web-based/on-line learning available at the campus Satellite based learning available at the campus No two-way interactive video distance learning capabilities available at the campus, but available in the district	Most rooms connected to the LAN/WAN with student access Minimum 10/100 Cat 5 hubbed network High-end servers, such as Novell or NT servers, serving some applications	One educator per computer Shared use of resources such as TVs, VCRs, digital cameras, scanners, digital projectors, and analog video cameras; classrooms sets of programmable calculators
Advanced Tech (3 pts)	Four or less students per Internet-connected multimedia computer. Replacement cycle established by district/campus is every 4 years	Direct connectivity to the Internet in 75% of the rooms, including the library Adequate bandwidth to each classroom over the local area network (at least 10/100 MB LAN) to avoid most delays Easy access for students and teachers	Web-based/on-line learning available at the campus Satellite-based learning available at the campus Two-way interactive video distance learning capabilities available in at least one classroom	<u>All rooms</u> connected to the LAN/WAN with student access Minimum 10/100 Cat 5 switched network High-end servers, such as Novell or NT servers, serving multiple applications	One educator per computer Dedicated and assigned use of commonly used technologies such as computers with projection devices, TVs, VCRs, programmable calculators assigned to each student, and telephones in each classroom <u>Shared use of specialized technologies</u> such as digital cameras, scanners, document cameras and projectors, and digital video cameras
Target Tech (4 pts)	In addition to 4 or less students per Internet-connected multimedia computer, on-demand access for every student. Replacement cycle established by district/campus is 3 or less years	Direct connectivity to the Internet in all rooms on all campuses Adequate bandwidth to each classroom over the local area network (at least 100 MB or fiber network LAN) Easy access for students and teachers <u>including</u> some wireless connectivity	Web-based/on-line learning available at the campus Satellite-based learning available at the campus Two-way interactive video distance learning capabilities available at the campus in multiple classrooms	All rooms connected to the WAN sharing multiple district-wide resources Campus is connected to robust WAN with 100 MB/GB and/or fiber <u>switched network</u> that allows for resources such as, but not limited to, video streaming and desktop videoconferencing <u>Easy access</u> to network resources for students and teachers, <u>including</u> some wireless connectivity	One educator per computer Fully equipped class rooms with all the technology that is available to enhance student instruction readily available including all of the above as well as the use of new and <u>emerging</u> technologies

TOTAL SCORE FOR KEY AREA IV:

Infrastructure for Technology

Profiles for Technology-Literate Students (National Educational Technology Standards for Students [NETS-S]) *

Prior to completion of Grade 8, students will:

1. Apply strategies for identifying and solving routine hardware and software problems that occur during everyday use.
2. Demonstrate knowledge of current changes in information technologies and the effect those changes have on the workplace and society.
3. Exhibit legal and ethical behaviors when using information and technology, and discuss consequences of misuse.
4. Use content-specific tools, software, and simulations (e.g., environmental probes, graphing calculators, exploratory environments, Web tools) to support learning and research.
5. Apply productivity/multimedia tools and peripherals to support personal productivity, group collaboration, and learning throughout the curriculum.
6. Design, develop, publish, and present products (e.g., Web pages, videotapes) using technology resources that demonstrate and communicate curriculum concepts to audiences inside and outside the classroom.
7. Collaborate with peers, experts, and others using telecommunications and collaborative tools to investigate curriculum-related problems, issues, and information, and to develop solutions or products for audiences inside and outside the classroom.
8. Select and use appropriate tools and technology resources to accomplish a variety of tasks and solve problems.
9. Demonstrate an understanding of concepts underlying hardware, software, and connectivity and of practical applications to learning and problem solving.
10. Research and evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources concerning real-world problems.

Stages of Professional Development ** (CEO Forum STaR Chart)

Entry/Adoption Stage.

Educators move from the initial struggles to learn the basics of using technology to successful use of technology on a basic level (e.g., integration of drill and practice software into instruction).

Adaptation Stage.

Educators move from basic use of technology to discovery of its potential for increased productivity (e.g., use of word processors for student writing, and research on the Internet).

Appropriation Stage.

Having achieved complete mastery over the technology, educators use it effortlessly as a tool to accomplish a variety of instructional and management goals.

Invention Stage.

Educators are prepared to develop entirely new learning environments that utilize technology as a flexible tool. Learning becomes more collaborative, interactive and customized.

* For more information on Profiles for Technology-Literate Students, see http://cnets.iste.org/students/s_profiles.html
For Tennessee Student Technology Standards, see <http://www.state.tn.us/education/ci/cicomputered/cicompedk2.htm>.
[cicomped35.htm](#), [cicomped68.htm](#)

** For ISTE Technology Proficiencies for Teachers (NETS), see http://cnets.iste.org/students/t_profiles.html

APPENDIX B1

Kimball and Sibley's Technology Planning Maturity Model for Educators

Kimball and Sibley's Technology Planning Maturity Model for Educators

Criteria	1 (Poor Quality)	2	3	4 (High Quality)
Broad-Based Support Contributions (Administration, Teachers, Students, Community, Staff)	A list of contributors is not provided.	A list of contributors is provided but does not describe their constituencies. Equitable representation is not apparent because of a lack of detail.	A comprehensive list of contributors describes their constituencies. Representation is provided by at least three of the objective's five areas. The principal included.	A comprehensive list of contributors describes their constituencies. Representation is across all five areas of the objective. The principal is included.
Broad-based Support Process	No process for equitable representation is described.	The process to ensure equitable representation is briefly mentioned, not emphasized.		The process to ensure equitable representation is emphasized and mentioned in detail.
Breadth of Needs Assessment	A needs assessment is not provided.	A needs assessment is referenced but covers only one element of the school environment (equipment or staff development, but not both).	A needs assessment is referenced and more than one element is analyzed, but it does not completely assess staff, student, and community needs.	The needs assessment is comprehensive and consists of detailed information about staff development needs and competencies, attitudinal surveys, equipment inventories, and school and district context.
Depth of Needs Assessment	Broad generalizations are made about what the school needs but without reference to an assessment.	A needs assessment is referenced, but the instrument is informal, brief, and not specific. For example, a computer count is provided without details on where or how they are used.	A needs assessment is referenced with some level of detail, although the instrument and data are not provided and additional detail may be needed on collection and analysis.	The assessment in any given area is detailed and thorough. The instrument and generalizations about the data are provided. Raw data may be included in and appendix.

Criteria	1 (Poor Quality)	2	3	4 (High Quality)
Needs Assessment of Equipment	No equipment inventory is provided.	An inventory exists only for computers and without indicating vintage.	The inventory moves beyond computer to include phones and television, but it does not address infrastructure or equipment vintage.	A comprehensive equipment inventory includes computers, infrastructure, access, interactive television, telephones, and other equipment.
Mission and Vision	No clear mission or vision is articulated.	Vision is skill-based only and does not address larger school or district outcomes.	Vision focuses on technology outcomes and avoids presenting a learning outcome.	Vision is comprehensive and deals with large learning outcomes of students, not just technology outcomes. The statement identifies the learning process skills and values.
Goals and Objectives	General learning goals are unclear or absent.	Goals are equipment-based instead of based on learning outcomes. Objectives are unlinked to goals or absent. Objectives or goals are neither measurable nor obtainable.	Goals are broad and comprehensive but not completely clear. They are linked to objectives but are not readily obtainable or measurable. Goals are loosely tied to state or district documents.	Goals are broad and comprehensive, addressing teaching and learning needs, as well as being clear, attainable, and measurable. Objectives are delineated from goals and further define how they will be met.
Action Plans with Timelines, Responsibilities, and Budgets	An action plan exists, but timelines and responsibilities are nonexistent or limited. Assessment is not curriculum-based.	The action plan is tied specifically to the goals and objectives, although identified task, timeline, responsibility, funding, and assessment are incomplete and several elements are missing.	The action plan is tied specifically to the goals and objectives. Identified task, timeline, responsibility, funding, and assessment components are thorough, although one or more elements are missing.	The action plan is tied specifically to goals and objectives. Each task identifies a task, timeline, responsibility, funding, and assessment.
Program Integration	The document never mentions connections with other efforts.	The technology use plan (TUP) mentions other efforts but is not explicit in connecting with them.	The TUP is loosely coupled to other documents and needs, and program changes are integrated much of the time.	The TUP is tightly coupled to the other reform, curriculum, or accountability documents, with the approach fully integrated.

Criteria	1 (Poor Quality)	2	3	4 (High Quality)
Curriculum Integration	The plan focuses on technology outcomes and skill-based goals, and does not address how it can enhance curriculum.	The plan mentions curriculum integration but lacks detail.	The plan specifically identifies how the curriculum can be enhanced by the use of technology with detail. A technology-rich environment is described, but strategies for enhanced teaching are not explored thoroughly.	The plan specifically identifies not only how technology enhances the curriculum but also what a student using the technology may do in such an environment. The plan addresses strategies of teaching and learning that can be enhanced as a result of technology integration.
Evaluation	No formal evaluation is described.	An evaluation process is described but without detail, comprehensiveness, or reference to learning outcomes.	An evaluation process and instrument are described in detail, but without comprehensiveness. Links to goals and objectives are not apparent.	An evaluation process and instrument are described in detail and are comprehensive in nature. Evaluation is timely and tied to objectives.
Multiyear Planning	A timeline is not mentioned.	The plan covers only one academic year or project.	The plan covers more than one year but is short-term in nature and does not refer to ongoing planning and support.	The plan is multiyear and shows its links to multiyear funding, support, and planning activities.
Standards	The document does not mention equipment or software standards beyond brand names.	Equipment standards are mentioned but not well specified.	Equipment standards are specific but narrow in scope.	Equipment standards are specific and comprehensive and a process describes how they will be used.
Funding Alternatives	Funding resources are not mentioned.	Funding is mentioned, but it primarily focuses on budgeting or specific site funding without addressing other income needed to implement the plan.	Specific funding sources are described but limited to traditional sources and without specific budget figures.	Specific funding sources are described, including current and future funding sources; it also includes information on reallocation and use of resources and budget figures.

Criteria	1 (Poor Quality)	2	3	4 (High Quality)
School Pilot Projects (Research and Development)	No R&D projects are mentioned or planned as part of the project.	R&D efforts are mentioned but lack detail. No timelines, or assessments, or scalabilities are mentioned.	Specific R&D efforts are described, but scalability is not articulated. Timelines and measurements are mentioned but are not specific.	Specific R&D efforts are described, with implications for future work (scalability) articulated. R&D efforts have a timeline and measurable instruments in place.
Educational Research	No educational research is mentioned as part of the project.	Educational research is only broadly mentioned.	Specific educational research is mentioned but without connections to school efforts.	Specific educational research is mentioned and connections are made to school efforts.
Model Classroom Configurations	No classroom or school configurations are described.	Classroom configurations are mentioned but lack detail (e.g., "there will be three computers and a printer in each room").	Classroom configurations are described in detail but may be restrictive as the "only" right way; typically, only one type of configuration is described.	Classroom and school configurations are specifically described with links to teaching and learning outcomes. They are provided as possible solutions to particular problems but are not prescriptive in nature.
Facilities (electricity, security, etc.)	Facilities issues are not mentioned.	Facilities issues are mentioned but lack enough detail to build into an action plan.	Facilities issues are identified and articulated, but solutions and suggestions lack detail or clarity.	Specific facilities issues are identified, addressed, and include recommended solutions, budgets, and responsibilities.
Maintenance and Support	No maintenance and support are provided.	Support plans are mentioned but without enough detail or clarity to implement.	Support plans are mentioned with clarity and details but do not consider long-term issues.	Specific support plans are articulated. This includes the process for specific support issues and ongoing equipment replacement, staff development, and repair.
Software Agreements (site licensing and policies)	No software agreements or policies are mentioned.	Software agreements and policies are mentioned, but specifics are not articulated in the plan.	Specific software policy is articulated but not tied to site needs.	Specific software policy is articulated, and plans are given for accommodating software needs at the site.

Criteria	1 (Poor Quality)	2	3	4 (High Quality)
Copyrights and Acceptable-Use Policy	No copyright or acceptable-use policy is described.	Copyright and acceptable uses are mentioned, but the plan does not articulate specific policies.		Copyright and acceptable use policies are articulated in the document with samples of these policies available in the document.
Gifts and Disposal	No policy is provided for the disposal of receiving gifts of equipment and services.	Policy is provided, but is not clear or articulated.	Specific policy is articulated regarding disposal and gifts, but is not tied to standards.	Specific policy is articulated regarding the moving and disposal of equipment. Gift acceptance is tied directly to standards.
Staff Development	Staff development is not mentioned in the document.	Staff development is mentioned, but is not clearly articulated as to how it will be accomplished or evaluated.	Staff development is articulated, but is limited to single modalities and is not clearly assessed or provided for with resources.	Staff Development is specifically addressed either in the action plan or in a separate section. It includes multiple strategies, incentives, assessment, timelines, and resources.

APPENDIX B2

Lumley and Bailey's Evaluation Model for School District Technology Plans

Lumley and Bailey's Evaluation Model for School District Technology Plans (Salina, 2001)

The components of the model are as follows:

1. A technology planning team was organized.
 - a. A variety of resources was made available to the team.
 - b. The size of the team was established (shown as a ratio of staff).
 - c. A relationship existed between technology planning and the district mission statement, curriculum guides, and/or board goals.
 - d. A charge from the Superintendent or Board of Education was given to the technology committee.
 - e. A realistic timetable was established for completing the study. A decision was made about compensating to the technology chairperson and other members of the planning team.
2. The planning team was prepared for the study.
 - a. An overview of the roles and responsibilities of planning team members was given.

Specific roles and responsibilities were given to team members to prepare for as follows:
 - b. To develop mission and philosophy statement(s) for technology.
 - c. To identify long-range technology goals.
 - d. To determine technology needs and priorities.
 - e. To plan staff development programs and activities.
 - f. To project a technology budget.
 - g. To draft, implement and institutionalize a long-range technology plan.
 - h. To attend all planning team meetings.
 - i. To become familiar with and disseminate technology research.
 - j. To make recommendations for technology implementation.
 - k. To develop an action plan with timelines.
 - l. To prepare a list of recommendations for the board of education.

Planning team members were given demonstrations of the following technology tools:

- m. Computer
 - n. Telecommunications
 - o. Instructional and management software and media
 - p. CD-ROM and Laserdisk
3. Assess the current state of technology in the district.
 - a. What technologies were being used?
 - b. Where were software and hardware located?
 - c. How were software and hardware being used?

- d. What software and hardware were available?
 - e. What software was being used?
 - f. How was software previewed and evaluated?
 - g. Did current facilities meet current and future tech needs?
 - h. What was the existing condition of technology facilities in the areas of space, climate control, lighting, electrical power sources, furniture, demonstration stations, storage, security, telecommunications lines, and floors?
 - i. What was the level of technology awareness and experience among the staff?
 - j. Was technology staff development provided?
 - k. How were teachers using technology in their instructional program?
 - l. How were teachers using technology for management purposes?
 - m. What were the technology training barriers facing the staff? A technology needs assessment survey has been administered to district staff and community members.
4. Develop guiding documents for technology.
- a. A technology philosophy statement was written.
 - b. A technology mission statement was written.
 - c. Technology goal statements were written.
5. Develop a long-range technology plan.
- a. It was determined that additional hardware was/was not needed.
 - b. It was determined that additional software was/was not needed.
 - c. It was determined that curriculum patterns have to be realized.
 - d. It was determined that current and future facilities need to be modified for technology. This would include electrical power, network access, furniture, lighting, cabling, security, storage, climate control, and telephone capacity.
 - e. Funding was allocated in the budget or an outside source. The funding included capital budgeting, start-up costs for hardware, software, staffing, space, furniture, and facilities, operating costs for service, repair, maintenance, expendable materials, salaries, utilities, administration, security, expansion costs, and training costs.
 - f. Staff development activities were organized. This included voluntary training, incentives, hands-on activities, a link to lesson plans and classroom activities, peer interaction, and follow-up training.
 - g. A timeline for implementation was established.
 - h. The library media center was established as the focal point of electronic technology and the information hub of the school. The technology plan provides the library media center with computerized circulation services,

computer terminal searches, laserdisc technology, on-line databases, and electronic links into the classrooms.

6. Implement, institutionalize, revise, and evaluate the technology plan.
 - a. The technology plan included implementation strategies.
 - b. The technology plan included the time and staff needed to monitor and evaluate, revise, and update the long-range plan.
 - c. The technology plan included institutionalization strategies.

APPENDIX B3

Salina's Technology Plan Review Instrument

Salina's Technology Plan Review Instrument

Criteria	1 (Initial)	2 (Transitional)	3 (Mature)
Q1. The District Technology Plan (DTP) is created by a Technology Committee?	A technology committee is not addressed in the DTP.	The DTP made mention that a group of people created the technology plan but not by a formal committee.	The DTP was created by a technology committee.
Q2. The DTP identifies the Technology Committee Leader?	A technology committee leader is not addressed in the DTP.	The DTP includes a list of technology committee members and no committee leader is identified.	The DTP identifies a technology committee leader.
Q3. In the DTP, Technology Committee Members are broad-based representatives (administrators, teachers, students, support staff, other community members)	The DTP does not include any technology committee members.	The DTP includes a list of technology committee members and no areas of representation are identified.	The DTP identifies the technology committee members, their area of representation and there are three or more areas included.
Q4. The DTP includes a Mission and/or Vision Statement?	The DTP does not include a mission or vision statement.	The DTP includes a mission and/or vision statement that is skilled based and does not address learning.	The DTP includes a mission and/or vision statement which addresses student learning outcomes.
Q5. As of the DTP adoption date, a computer hardware inventory is included?	The DTP does not include a computer hardware inventory.	The DTP includes a list of computer hardware available in the district but no other specifics.	The DTP includes a computer hardware inventory by quantity, unit specifications, building, room.
Q6. As of the DTP adoption date, in includes an inventory of existing computers in the district that are: Stand-Alone or Networked	The DTP does not address existing computers.	The DTP includes an inventory of the existing computers but not if they are stand-alone or networked.	The DTP includes an inventory of the existing computers and if they are stand-alone or networked.
Q7. The DTP includes a list of the computer hardware to be purchased?	The DTP does not include a list of the computer hardware to be purchased.	The DTP includes the need to purchase computer hardware but no other specifics.	The DTP includes a list of computer hardware to be purchased by quantity, specifications, building, & room.

Criteria	1 (Initial)	2 (Transitional)	3 (Mature)
Q8. The DTP includes a timeline for the installation of new computer technology purchases?	The DTP does not address a timeline for the installation of new computer technology purchases.	The DTP does not include a timeline but states computer technology purchases will be installed by an on-going process and no other specifics.	The DTP includes a timeline for the installation of new computer technology purchases by year(s), computer specifications, quantity, building, room.
Q9. As of the DTP adoption date, a computer software inventory is included?	The DTP does not include a computer software inventory.	The DTP includes a list of software used districtwide only.	The DTP includes an inventory of software utilized in the district by operating system, building, room, and license type.
Q10. The DTP includes a process for selecting and purchasing software?	The DTP does not include a process for selecting and purchasing software.	The DTP includes the need to establish a process for selecting and purchasing software in the future.	The DTP includes a description of the process to select and purchase software.
Q11. In the DTP, and Internet connectivity option is included?	The DTP does not address Internet connectivity options.	The DTP includes the need for schools to have Internet connectivity but no other specifics.	The DTP includes Internet connectivity by building, room (via – T1, T3, cable, etc. connections).
Q12. The DTP identifies who will receive professional development training?	The DTP does not address who will receive professional development training.	The DTP does not include who will receive professional development training but recognizes the need to have it.	The DTP identifies the following are eligible to receive professional development training: administrators, teachers, support staff.
Q13. The DTP establishes a timeline for the delivery of professional development training?	The DTP does not address a timeline for the delivery of professional development training.	The DTP has no specific timeline for professional development training included but states it will be ongoing or as needed.	The DTP includes a timeline for the delivery of professional development training and identifies formal (set schedule) and informal (as needs arise) delivery models.

Criteria	1 (Initial)	2 (Transitional)	3 (Mature)
Q14. The DTP includes who will deliver the professional development training?	The DTP does not include who will deliver the professional development training.	The DTP includes no specifics except the need to have professional development training and create “turnkey in-district” people.	The DTP includes any of the following to be utilized to deliver professional development training: BOCES, SCOPE, Teacher Center/turnkey, Integration Specialist personnel.
Q15. The DTP includes an Acceptable User Policy (AUP) agreement.	The DTP does not include an AUP.	The DTP includes the need to establish an AUP agreement but no other specifics.	The DTP includes an AUP agreement and may identify who is required to sign this document (i.e., -students, staff, community members).
Q16. The DTP includes exit outcomes and competencies for students	The DTP does not include exit outcomes and competencies for students.	The DTP includes the need to create exit outcomes and competencies for students but no other specifics.	The DTP includes exit outcomes and competencies for all students by the completion of Elementary, Middle School, and High School.
Q17. The DTP defines the evaluation criteria used in rating the impact of the new computer technologies on student achievement.	The DTP does not include any evaluation criteria used in rating the impact of new computer technologies on student achievement.	The DTP includes a statement declaring the building level administrators responsible for setting evaluation criteria.	The DTP includes a set of indicators for student performance at the completion of Elementary, Middle School, and High School to be utilized in rating the impact of the new computer technologies on student achievement.
Q18. As of the DTP adoption date, facilities issues are addressed? (electrical capacity upgrades, networking, security, etc.)	The DTP does not address facilities issues.	The DTP includes facilities issues but no solutions are addressed.	The DTP includes the specific facilities issues by area(s) requiring improvement(s), building(s), room(s).

Criteria	1 (Initial)	2 (Transitional)	3 (Mature)
Q19. As of the DTP adoption date, it includes the technical support personnel responsible to maintain existing technologies and provide technical support.	The DTP does not address the present day technical support personnel	The DTP includes a list of the present day technical support personnel but no other information is provided.	The DTP includes the present day technical support personnel by: position title, quantity, building, responsibilities and if contracted services are utilized (i.e., - BOCES)
Q20. The DTP includes additional technical support personnel recommendations to support the district network and users upon adoption of the plan?	The DTP does not include any additional technical support personnel recommendations.	The DTP includes recommendations for additional technical support personnel but no other information is provided.	The DTP includes recommendations for technical support personnel by: position, title, quantity, building, responsibilities and if contracted services are requested (i.e., - BOCES).
Q21. The DTP includes a proposed budget for funding the technology improvement?	The DTP does not address a proposed budget for funding the technology improvements.	The DTP does include a proposed budget for funding the technology improvement but no specifics except the cost is addressed.	The DTP does include a proposed budget for funding the technology improvements including cost over: # of year(s), computer specifications, building(s), and room(s).

APPENDIXB4

Comparison among different Technology Planning Models, and Guides

Comparison among different Technology Planning Models, and Guides

S.N.	Technology planning elements	Kimball and Silbey	Lumley and Bailey	Salina	Tennessee (2002-03 checklist)
1	Needs assessment	X a. Breadth b. Depth c. Needs assessment of Equipment	X (hardware, software, existing physical facilities, staff needs)	X a. includes an inventory of existing computers and if they are stand-alone or networked. b. includes an inventory of software c. includes a list of the computer hardware and software to be purchased.)	X
2	Stakeholder involvement	X a. Broad-based support b. Broad-based support process	X (formation of technology planning team and their charges)	X a. Planning committee (broad-based representatives) b. Identify committee leader	X

S.N.	Technology planning elements	Kimball and Silbey	Lumley and Bailey	Salina	Tennessee (2002-03 checklist)
3	Timelines	X	X	X (installation of new computer technology purchases, delivery of professional development training)	X
4	Responsible party	X	X		X
5	Mission and vision	X	X	X	X
6	Goals and objectives	X	X	X (includes exit outcomes and student competencies)	X
7	Collaboration among educators		X (establishment of library media center)		X
8	Collaboration with community partners				X

S.N.	Technology planning elements	Kimball and Silbey	Lumley and Bailey	Salina	Tennessee (2002-03 checklist)
9	Curricula and teaching that integrate technology	X	X		X
10	Increasing accessibility				X
11	Equity				X
12	Professional or staff development	X	X	X (who will receive and who will deliver)	X
13	Budget/ funding/ resources	X	X	X	X
14	Interoperability	X (standards)			X
15	Leadership				X

S.N.	Technology planning elements	Kimball and Silbey	Lumley and Bailey	Salina	Tennessee (2002-03 checklist)
16	Review of policies and procedures	X a. Software agreement b. Copyright and acceptable-use-policy c. Gifts and disposal		X a. Includes a process for selecting and purchasing software. b. Acceptable-user-policy	X
17	Evaluation	X	X	X (evaluation criteria used in rating the impact of tech. on student achievement)	X
18	Facilities	X	X	X (Internet connectivity, electricity, networking, security)	
19	Action steps	X			
20	Educational research	X			
21	Maintenance and support	X		X (technical support personnel)	

S.N.	Technology planning elements	Kimball and Silbey	Lumley and Bailey	Salina	Tennessee (2002-03 checklist)
22	Program integration	X			
23	Multilayer planning	X			
24	School pilot project (R & D)	X			
25	Model classroom configuration	X			
26	Institutionalization strategies		X		

APPENDIX C1

Rubric for Evaluating the School District Technology Plan

Rubric for Evaluating the School District Technology Plan

Elements	Weak Technology Plan (0)	Intermediate Technology Plan (1)	Strong Technology Plan (2)
Needs Assessment Plan describes the district's needs related to technology literacy and incorporating technology into district educational practice. The description must be based on a needs assessment conducted within the district.	No needs assessment was performed.	District's needs were assessed in some areas, such as physical infrastructure, hardware, software, teacher competency in using technology into the curriculum, and technical support; but not all.	District's needs related to technology integration into educational practice was thoroughly assessed and identified by asking questions of various sources, such as teachers, students, parents, and administrators by the means of survey, interview, and arranging meetings. The areas of needs assessment include: physical infrastructure, hardware, software, teacher competency in using technology into the classroom, student knowledge and skills in using technology, and technical support.
Stakeholders Involvement Plan describes the diverse stakeholders in the district who were involved in developing the plan and the process through which stakeholders were engaged.	It is not specified who contributed in developing the district technology plan.	A list of committee members is provided, but does not mention their roles. The committee lacks representation from all stakeholders.	The plan has a committee comprised of representation from all stakeholder groups. The potential contributors to the technology planning committee included district technology directors, district technology supervisors, directors of schools, superintendents, assistant superintendents, principals, technology integration facilitators, network administrators, teachers, parents, students, community members, business consultants, site technology coordinators, and media specialists.

Elements	Weak Technology Plan (0)	Intermediate Technology Plan (1)	Strong Technology Plan (2)
Timeline Plan includes a timeline (of not more than three years) for implementation.	No timeline is provided for any of the action plans.	Identification of tasks and times is incomplete. Activities, tasks and timelines identified appear to be inappropriate. Timelines are not always consistent with state guidelines.	Activities, tasks and timelines for each are identified. Timelines are consistent with state guidelines. Timelines appear to be appropriate for activities and tasks to be completed.
Responsible Parties Plan indicates by name and title who is responsible for overseeing implementation of specific elements of the plan.	The plan does not mention who is responsible for accomplishing a certain task or activity.	One individual or the whole group is responsible for executing all action plans.	The plan clearly describes tasks and activities to be performed in the process of implementing the technology plan. Responsible person(s) is/are assigned for each task and activity to complete it.
Vision Plan includes a vision that relates educational technology to increasing student achievement.	The plan does not include a vision statement.	The technology plan has a vision statement, but the vision statement is not relevant to district goals and objectives.	The technology plan describes a clear vision, and it is tied to district goals or objectives.
Goals and Objectives -- Plan sets forth goals and measurable objectives for using technology to improve student academic achievement, aligned with State standards.			
a. Goals	The plan does not specify its technology goals.	The plan has included few goals.	The plan has included clear statements of goals.
b. Objectives	The plan does not specify its technology objectives.	The plan has included some objectives.	The plan has included clear statements of objectives.

Elements	Weak Technology Plan (0)	Intermediate Technology Plan (1)	Strong Technology Plan (2)
c. Link	The plan describes no linkage between technology goals and objectives.	There are linkages between some technology goals and objectives.	All objectives are tied to the technology goals.
d. Alignment	Technology goals and objectives are not aligned with state standards.	Some technology goals and objectives are aligned with state standards.	All technology goals and objectives are aligned with state standards.
Collaboration among Educators Plan encourages collaboration among all district educators—including classroom teachers, school library staff, administrators and educational technology staff—in reaching educational goals and objectives. The plan provides mechanisms to promote the active participation of library staff in curriculum planning that incorporates development of information literacy.	The plan does not describe how educators will be involved in collaborating in the use of instructional technology in district schools.	The plan briefly describes how educators will be collaborated in using technology in education in district schools.	Strategies for encouraging collaboration among educators in district schools are clearly identified and discussed.

Elements	Weak Technology Plan (0)	Intermediate Technology Plan (1)	Strong Technology Plan (2)
Collaboration with Community Partners Plan includes a description of how the district will work with community partners (such as parents, community groups, other educational entities, government agencies, and public or academic libraries) to help achieve the plan's goals and objectives for educational technology. (The description will include, where applicable, a program in collaboration with adult literacy services providers.)	The plan does not describe how the district will work with the community to help achieve the goals and objectives of the technology plan.	The plan describes briefly how the district will work with the community to help achieve the goals and objectives of the technology plan.	The technology plan describes thoroughly how the district will work with the community partners to help achieve the plan's goals and objectives.
Curricula and teaching that integrate technology Plan describes how the district will identify and promote curricula and teaching strategies that effectively integrate technology, based on a review of relevant research, leading to improvements in student academic achievement.	The plan does not describe teaching methods and strategies for using technology into the curriculum.	The plan describes briefly how teachers will use technology into the curriculum.	The plan includes detailed strategies for integrating technology into the curriculum.
Increasing Accessibility Plan describes how the district will ensure that all students and teachers have increased access to technology resources.	The plan does not describe how the district will ensure that all students and teachers will have increased access to technology resources.	The plan briefly describes with few strategies how the school district will ensure that all teachers and students will have increased access to technological resources.	The plan describes in detail strategies for how the district will insure that all teachers and students will have increased access to technological resources. The strategies include: increase of number of computers, increase of lab hour to be open, connection of the fast Internet, and availability of laptop computers to be borrowed by teachers.

Elements	Weak Technology Plan (0)	Intermediate Technology Plan (1)	Strong Technology Plan (2)
Equity Plan provides for equitable access to technology and information resources for all students and educators – paying particular attention to closing the gap for students and educators who have had poorer access because of race, gender, disability, economic status, or special needs.	The plan does not describe how the district will ensure equitable access to technology for all students and educators across the district.	The plan briefly describes with few strategies how the district will ensure equitable access to technological resources for all teachers and students across the district.	The plan describes thoroughly strategies for how the district will ensure equity of technological resources for all teachers and students across the district.
Professional Development Plan includes a description of how the district will provide ongoing, sustained, high-quality professional development for teachers, principals, administrator, and school library media centers to improve student achievement in a standards-based environment. (The description must include strategies that will improve teacher competency in educational technology.)	The plan mentions no provision for professional development.	A brief action plan with some strategies for the professional development is described. The plan provides teachers training, but fails to mention the follow-up sessions and training time.	The plan describes extensive action plan for professional development. The strategies include: (1) teachers are provided frequently and appropriately courses, training, and workshops to improve their technology skills as well as helping them how to integrate technology effectively into the curriculum; (2) the district has a provision of providing teachers with technical support for installing hardware/software and troubleshooting; (3) follow up sessions are provided for answering teachers' questions and assessing their understanding; (4) review classes are provided for updating and refreshing their knowledge with new and upgraded software; and (5) teachers are provided online training, tutorials, lesson and unit plans, and other resources through the district web site.

Elements	Weak Technology Plan (0)	Intermediate Technology Plan (1)	Strong Technology Plan (2)
Budget Plan provides an annualized budget for connectivity, hardware, software, professional development, print and electronic resources, support and other services, personnel, and plan-related activities that support development and use of educational technology.	The plan does not describe a district technology budget.	The plan presents a technology budget, but does not include a detailed budget for all necessary expenditures, such as buying new equipment, maintaining and upgrading current equipment, technical support, professional development, and the Internet services.	The plan has a detailed annualized technology budget with estimated expenditures for various aspects of implementation and maintenance, such as maintaining, upgrading, and buying new hardware, software, and infrastructure and staff development.
Interoperability Plan includes specific provisions for interoperability among technology components (Hardware to hardware; software to software; hardware to software)	The plan does not address the issue of software hardware compatibility and interoperability.	The plan mentions briefly interoperability among technology components.	The plan includes specific provisions for hardware software compatibility including network compatibility to be considered prior to purchasing new equipment that will assure interoperability of hardware to hardware, software to software, and hardware to software regarding their operating systems.
Leadership Plan includes elements that strengthen the role of district and school leadership in advocacy, administration, communication, and modeling of effective educational technology integration in achieving the plan's goals and objectives.	The plan does not mention necessity for technology leadership.	The plan describes briefly how leadership activities affect technological improvement in schools.	The plan identifies leadership activities that strengthen the role of district and school administrators in advocacy, administration, communication, and modeling of effective use of technology into the curriculum.

Elements	Weak Technology Plan (0)	Intermediate Technology Plan (1)	Strong Technology Plan (2)
Review of Policies and Procedures Plan identifies the district's current or pending policies and procedures (e.g., <i>Acceptable use of the Internet, student Internet safety, and digital copyright</i>) that related to the use of educational technology.	The plan does not mention policies and procedures, such as acceptable use of the Internet, digital copyright or fair use guidelines.	The plan briefly mentions policies and procedures, but does not describe these in detail.	The plan discusses fair use guidelines for educational materials, acceptable use of the Internet, and digital copyright in detail. The plan clearly outlines the issues related to security and acceptable use policy with do's and don'ts. The plan also describes how the district purposes to protect the ethical and legal issues by staff and students.
Evaluation Plan includes a description of the methods and standards by which attainment of the plan's goals and objectives will be measured.	An evaluation procedure for assessing the technology plan is not described.	An evaluation procedure is described, but lacks details and comprehensiveness. It does not refer to learning outcomes.	The plan includes a clear description of the methods and procedures that will be used for measuring the achievement of goals and objectives of the plan.

APPENDIX C2

Survey Form

Part One: Development of Technology Plans

The following set of questions asks you as to how your school district was engaged in developing your district technology plan.

1. Does your school district have a technology plan?
 - a. Yes
 - b. No (skip all questions, but please return this questionnaire to me.)
2. Who was responsible in the conceptualization and creation of your district technology plan?
 - a. An individual (Please specify)_____
 - (Please skip questions 4 through 7.)**
 - b. A committee
 - c. I don't know. **(Please skip to Q.13.)**
3. Who selected the committee members?
 - a. Superintendent/Director of Schools
 - b. Assistant Superintendent/Director of schools
 - c. School Board
 - d. Other (Please specify) _____
4. Who is responsible for the implementation of your district technology plan?
 - a. An individual
 - b. A committee
 - c. Other (please specify) _____
 - d. I don't know.
5. Did the committee form sub-committees to carry out specified responsibilities?
 - a. Yes
 - b. No
6. If "Yes", how were the sub-committees formed and what were their charges?

7. If a district committee was formed to create the technology plan, which of the following groups were represented on the committee? Check all that apply.

- ☐ Teachers
- ☐ Principals
- ☐ School Level Technology Coordinators
- ☐ Media Specialists
- ☐ Curriculum Supervisors
- ☐ District Technology Director
- ☐ District Technology Coordinators
- ☐ District Technology Supervisors
- ☐ Superintendent
- ☐ Parents
- ☐ Community Members
- ☐ Local College/University Experts
- ☐ Business Consultants
- ☐ Others please specify _____
- ☐ Don't know

8. Which of the following criteria were used to select the committee members? Check all that apply.

- ☐ Technology expertise
- ☐ Teaching expertise
- ☐ Representative from each school
- ☐ Representative for specific occupation (e.g., business leaders, parents)
- ☐ Ethnic representation
- ☐ None of the above
- ☐ Others (please specify) _____
- ☐ Don't know

9. Which of the following actions were involved in developing a technology plan?
Check all that apply.

- ☐ A vision of how technology can support school district's vision was developed.
- ☐ Goals and objectives were identified to accomplish technology vision.
- ☐ Needs assessment was conducted.
- ☐ Existing technology plan was reviewed.
- ☐ Technology plans of other school districts were reviewed.
- ☐ State guideline was followed.
- ☐ Criteria for the evaluation of technology plan were developed.
- ☐ Others (please specify) _____
- ☐ Don't know

10. If your district conducted a needs assessment, which of the following actions were involved in the process? Check all that apply. (If not, skip to Q. 12)

The committee examined:

- ☐ The many different uses of technology that support teaching and learning
- ☐ Technology available to teachers.
- ☐ Technology available to students.
- ☐ Teacher skills in using technology in classroom instruction.
- ☐ Availability of hardware and software in each school site.
- ☐ Availability of networking and telecommunications infrastructure.
- ☐ Physical infrastructure (e.g., electrical wiring, building, furniture)
- ☐ Technical support
- ☐ Equity of resources to teachers, staff, and students
- ☐ Policy and procedure (e.g., copyright, acceptable use technology)
- ☐ Budget and funding resources.
- ☐ Others (Please specify) _____
- ☐ Don't know

11. Which of the following methods were used to assess needs for technology and related resources to support instruction?

- | | |
|--|--|
| ☐ Surveys | ☐ Review of an existing technology plan |
| ☐ Focus group discussions | ☐ None of the above |
| ☐ Observations | ☐ Don't know |
| ☐ Meetings (open attendance) | |
| ☐ Others (please specify) _____ | |

12. Which of the following actions were included as goals of the technology plan?
Check all that apply.

- ☐ Improvement of teaching and learning as prescribed by curriculum goals and objectives.
- ☐ Need for staff development
- ☐ Acquisition of hardware and software
- ☐ Acquisition of technology support services
- ☐ Development of networking
- ☐ Need for budget and funding
- ☐ Need to allocate resources equally across schools
- ☐ Others (Please Specify) _____
- ☐ Don't know

Part Two: Implementation of Technology Plans

The following set of questions asks you about the implementation process and level of implementation of district technology plan based on your perception.

13. Which of the following attributes were included during the implementation of your technology plan? Check all that apply.

- ☐ Set of timeline for meeting the goals in different phases.
- ☐ Assignment of responsible persons for achieving the goals on timeline.
- ☐ Hiring of new technology related personnel
- ☐ Formulation of strategies for getting funds
- ☐ Allocation of resources and budget
- ☐ Formulation of strategies for professional development.
- ☐ Establishment of technical and administrative support systems.
- ☐ Collaboration with public and other institutional communities.
- ☐ Formulate motivational measures for teachers and administrators.
- ☐ Equity of access to technology for all teachers and students
as well as across all schools
- ☐ Searches for vendors for best deal and quality services.
- ☐ Other (please specify) _____
- ☐ Don't know

14. The following statements are intended to capture your perception of the degree to which your district technology plan has currently been implemented in schools. The abbreviations stand for as: SA = Strongly Agree, A = Agree, NO= No opinion, D = Disagree, SD= Strongly Disagree. **Please circle one.**

- a. The committee members, staff, and teachers are committed to the technology planning activities. SA A NO D SD
- b. Technology planning goals are being achieved as per the timeline. SA A NO D SD
- c. The responsible persons are committed to making their efforts. SA A NO D SD

- | | | | | | |
|--|----|---|----|---|----|
| d. Administrative personnel are very supportive and encouraging. | SA | A | NO | D | SD |
| e. Technology plans are being implemented based on needs of each school in the district. | SA | A | NO | D | SD |
| f. As a result of the technology plan, more teachers are becoming skillful and are using technology in their classrooms. | SA | A | NO | D | SD |
| g. The implementation of plan has been hampered by the lack of sufficient budget. | SA | A | NO | D | SD |
| h. Student learning environments are enhanced by sufficient and advanced use of technology. | SA | A | NO | D | SD |
| i. Technology plans are tied to a staff development scheme. | SA | A | NO | D | SD |
| j. School teachers were involved in making decisions about technology applications. | SA | A | NO | D | SD |
| k. Your district has failed to garner public support in the implementation of technology plan. | SA | A | NO | D | SD |
| l. In general the plan has made a progress to meet its goals. | SA | A | NO | D | SD |
| m. The technology plan has made a positive impact on the integration of technology in schools. | SA | A | NO | D | SD |

Part Three: Revision of Technology Plans

The following set of questions asks about your district's policy in revising the district technology plan.

15. How long has the district been using the current technology plan?

Years: _____ Months: _____

16. Since the plan was first written, to your knowledge has it ever been revised?

- a. Yes
- b. No
- c. Don't know

17. Does your district intend to revise the technology plan in future?

- a. Yes
- b. No

18. If the technology plan is to be revised, which of the following factors do you think will be taken into consideration in revising the technology plan? Check all that apply.

- ☐ Educational reform
- ☐ Student changing needs
- ☐ New technologies
- ☐ Equity of access
- ☐ Quality and impact of resources
- ☐ Repair and maintenance
- ☐ Budget and funding
- ☐ Others _____

Part Four: Demographics

The following set of questions asks you about your some demographic information.

19. I am currently working as a _____. (Check the one that applies to you.)

- | | |
|--|------------------------------------|
| ☐ District Technology Director | ☐ Principal |
| ☐ District Technology Supervisor | ☐ Teacher |
| ☐ District Technology Coordinator | |
| ☐ Media Specialist | |
| ☐ School Level Technology Coordinator | |
| ☐ Other (please specify): _____ | |

20. How long have you been employed in this position?

Years: _____ Months: _____

21. How would you characterize your school district? (check one.)

- ☐ Urban (central part of a large city with a population of at least 250,000 or midsize city with a population less than 250,000)
- ☐ Suburban (urban fringe of a large or a midsize city)
- ☐ Rural (outside area of a large town with a population of at least 25,000 or a small town with a population between 2,500 and 24,999)

Part Five: Open-ended Questions

In this section, you are asked to answer two open-ended questions about your district technology planning. Please answer these questions based upon your perception and experiences.

If you need more space, please feel free to use additional sheets, as necessary.

22. Please describe in as much detail as possible how you would characterize the implementation of your school district's technology plan.
23. Is your district presently engaged in any technology integration activities that were not part of their originally written technology plans? If so, please describe your experience in dealing with these new activities.

APPENDIX D1

Initial Cover Letter to the School District Superintendent

(Date)

Dr./Ms./Mr. _____
_____ School System
(Address)

Dear Dr./Ms./Mr _____:

As a doctoral student with a concentration in Instructional Technology at UT, I am planning to conduct research on the development and implementation of technology plans in the school districts in Tennessee. This study should be helpful to the participants who wish to compare their district's profile against statewide information. In addition, the aggregate responses to the questions examined by this study will be very beneficial to district's administrators in formulating and implementing their policies for the effective implementation and integration of instructional technology in their schools.

For the data collection, I plan to examine district technology plans using a rubric and do a survey of district-level technology directors or coordinators and principals and site coordinator or teachers who were involved in the development of the district's technology plan. Therefore, I would like to request that you grant me permission to contact personnel in your district who can provide data for my study. My purpose in this study is to establish common patterns and trends across the state of Tennessee, and no analysis will focus on the characteristics of any specific school district or how individual districts might compare with statewide trends. No school district names will be attached to the analysis, and specific individuals participating in the study will not be identified.

If you would be willing to participate in my study, please provide me with the name and contact information of a person(s) who is knowledgeable about your district technology planning. I am enclosing a stamped envelope for your convenience. I have also enclosed a copy of my draft survey questionnaire and a rubric to evaluate technology plans.

If you need more information about my study, please contact me. I can be reached by phone [REDACTED] or email [REDACTED]. I am glad to write more. I appreciate your cooperation.

Sincerely,

Raj K. Rai

Enclosures: 4 (SASE, Survey, Consent Form, and Rubric)

APPENDIX D2

Consent Form Used to Secure Superintendent's Willingness to Participate



Consent Form

The _____ school system
will participate in the study of "Development and Implementation of School District
Technology Plans in Tennessee."

Signature of Superintendent/Director of Schools

The person named below is most knowledgeable about our technology planning and
implementation and will serve as your contact for the project:

Name: _____

Address: _____

Telephone Number: _____

E-mail Address: _____

Would your school district like to receive a summary of the study when it is completed?

___ Yes ___ No

Please mail this completed form to Raj Rai at A 535 Claxton Complex, 1126 Volunteer
Blvd., Knoxville, TN 37996-3456. If you have any question about it, please email me at
[REDACTED] or phone me at [REDACTED]

APPENDIX D3

Second Cover Letter to the Superintendent

(Date)

Dr./Ms./Mr. _____
_____ School System
(Address)

Dear Dr./Ms./Mr. _____:

About a month ago, I sent you a letter concerning my study of technology planning and implementation in public school systems in Tennessee. Since that time, I have received no response. Therefore, I would like to reacquaint you with the purpose of my study and make a second request for your participation in my study. The study is primarily based on a survey of district technology coordinators, principals, and teachers who are involved in technology planning for the district. The aggregate responses to the questions examined by this study should be very beneficial to district administrators in formulating and implementing their technology policies.

My purpose in this study is to establish common patterns and trends across the state of Tennessee, and no analysis will focus on the characteristics of any specific school district or how individual districts might compare with statewide trends. No specific school district names or individuals participating in the study will be identified.

If you would be willing to participate in my study, please sign the enclosed consent form. Also, please provide the name and mailing address of a person(s) who is knowledgeable about your district technology planning as a contact person who can supply your district's technology plan and a list of your district technology committee members. I am enclosing a stamped envelope for your convenience.

If you need more information about my study, please contact me. I can be reached by phone (_____) or email (_____).

Thank you for your willingness to participate in my study.

Sincerely,

Raj K. Rai

Enclosures: 2 (SASE and Consent Form)

APPENDIX D4

Third Cover Letter to the Superintendent

(Date)

Dr./Ms./Mr. _____
_____ School System
(Address)

Dear Dr./Ms./Mr. _____:

I am writing you as a follow-up to my earlier letters requesting your permission to include your school district in my dissertation study. The study is about technology planning and implementation in Tennessee school systems, and it will be a one-shot study. In this study, we are surveying selected district technology planning committee members and reviewing district technology plans. The study is intended to establish common patterns and trends across the state of Tennessee, and no analysis will focus on the characteristics of any specific school district or how individual districts might compare with statewide trends. No specific school district names or individuals participating in the study will be identified.

Your participation, though totally voluntary, is critical in helping us draw meaningful conclusions that are useful for educational leaders who are seeking to improve educational standards through the application of technology in teaching and learning. In addition, the document will be a supplementary resource for the Tennessee Department of Education. I understand that schools are very busy at this time of year. We appreciate your time and effort. Please let me know that you are willing to participate by responding to this note and sending me the name of one of your staff members who can help me by providing a copy of your current district technology plan and a list of district technology committee members by November 7.

If you have any further questions, please contact me by phone: [REDACTED] or email me: [REDACTED]. I will also be happy to send another copy of the original letter inviting your participation.

Thank you for your consideration.

Sincerely,

Raj Rai

APPENDIX D5

E-mail Message to the Superintendent

Dear ..

I am writing you this message as a follow-up to my earlier letters asking your permission to include your school district in my study. The study is about technology planning and implementation in Tennessee school systems, and it will be a one-shot study. In this study, we will do a survey of selected district technology planning committee members and will review district technology plans. The study is intended to establish common patterns and trends across the state of Tennessee, and no analysis will focus on the characteristics of any specific school district or how individual districts might compare with statewide trends. No specific school district names or individuals participating in the study will be identified.

Your participation, though totally voluntary, is very important in helping us draw meaningful conclusions to inform educational leaders who are seeking to improve educational standards through the application of technology in teaching and learning. I understand that schools are very busy at this time of year. We appreciate your time and effort. Please let me know that you are willing to participate by responding to this note and sending me the name of one of your staff members who can help me by providing a copy of your current district technology plan and a list of district technology committee members. If you have any further questions, please contact me by phone: [REDACTED] or email me: [REDACTED]. I will also be happy to send another copy of the original letter inviting your participation.
Thank you for your consideration.

Sincerely,
Raj Rai
Department of Instructional Technology and Educational Studies
The University of Tennessee, Knoxville

APPENDIX E1

First Cover Letter to the School District Contact Person

(Date)

Dr./Ms./Mr. _____
_____ School System
(Address)

Dear Dr./Ms./Mr. _____:

The Department of Instructional Technology and Educational Studies is conducting a study on technology planning and implementation in public school systems in Tennessee. Your director of schools has suggested that you are the appropriate contact person/liaison for our data collection. Therefore, we request your assistance in obtaining the following information:

1. a list of your district technology committee members (persons who assisted in developing the school district's technology plan), and
2. a copy of your school district's current technology plan.

For purposes of this study, we will be sending a questionnaire to each school system's technology director/coordinator and other two members of the district technology committee. We will also be reviewing the components of your technology plan.

Since we are gathering information about technology plans and their implementation from all Tennessee school systems, your superintendent has requested that we send a summary of the findings and conclusions of the study when it is complete. If you have any questions, please call me at [REDACTED] or email me at [REDACTED]

Thank you for your cooperation.

Sincerely,

Raj Rai

APPENDIX E2

Form to Collect District Technology Committee Members' Contact Information

List of District Technology Committee Members (persons who assisted in developing the school district's technology plan)
_____ **School System**

Name	Title	Mailing Address	Phone Number

APPENDIX E3

Second Cover Letter to the Contact Person

(Date)

Dr./Ms./Mr. _____
_____ School System

(Address)

Dear Dr./Ms./Mr. _____:

The Department of Instructional Technology and Educational Studies is conducting a study on technology planning and implementation in public school systems in Tennessee. Your superintendent has agreed that the _____ School System will participate and suggested that you are the appropriate contact person/liaison for our data collection. About a month ago, I sent a letter requesting your assistance in obtaining the following information:

3. a list of your district technology committee members (persons who assisted in developing the school district's technology plan), and
4. a copy of your school district's current technology plan.

Since that time, I have received no response. Therefore, I would like to reacquaint you with the purpose of my study and make a second request for your assistance. For purposes of this study, we will be sending a questionnaire to each school system's technology director/coordinator and other two members of the district technology committee. We will also be reviewing the components of your technology plan.

We are gathering information about technology plans and their implementation from all Tennessee school systems. The study is intended to establish common patterns and trends across the state of Tennessee, and no analysis will focus on the characteristics of any specific school district or how individual districts might compare with statewide trends. No specific school district names or individuals participating in the study will be identified. Your superintendent has requested that we send a summary of the findings and conclusions of the study when it is complete. If you have any questions, please call me at [REDACTED] or email me at [REDACTED].

Thank you for your cooperation.

Sincerely,

Raj Rai

APPENDIX E4

First E-mail Message to the Contact Person



Dear

I am writing this email message as a reminder and an alternative way of providing me the information I need. If you have not yet mailed your responses to my request (list of your district technology committee members and a copy of the district technology plan), you also may send them as an email attachment. If you have already sent the information to me, please discard this message.

I very much appreciate your cooperation.

With regards,

Raj Rai

Department of Instructional Technology and Educational Studies
The University of Tennessee, Knoxville

APPENDIX E5

Second E-mail Message to the Contact Person

Dear

I am writing this message as a reminder of my earlier letter written to you requesting your assistance with my study on technology planning and implementation in Tennessee School Systems. I understand that this is a very busy time of the year for all school district personnel and teachers. I appreciate your time and consideration.

I am very grateful that your superintendent has agreed to participate in our study. Therefore, it would be appreciated, if you could provide the name and mailing address of your district technology committee members at your earliest convenience so that I can proceed with sending my survey forms to the participants. In addition, I would also like to request a copy of your current district technology plan.

Thank you for your cooperation.

Sincerely,

Raj Rai

Department of Instructional Technology and Educational Studies

The University of Tennessee

A535 Claxton Complex

1126 Volunteer Blvd.

Knoxville, TN 37996-3456

Phone: 865-621-0756

APPENDIX F1

First Cover Letter to Participants

(Date)

Dr./Ms./Mr. _____

_____ School System

(Address)

Dear Dr./Ms./Mr. _____:

With the complexities of its nature, implementation of technology in schools has been a great challenge to educators. Many technology proponents have advocated for careful technology planning as a primary step to successfully implementing and integrating technology into teaching and learning. The University of Tennessee is conducting research to learn more about Technology Planning and Implementation in Tennessee School Systems. As a technology resource person, you have been selected by your school district to participate in this study. This letter is requesting your assistance in collecting data for the study. You are being asked to complete a survey questionnaire with 23 questions, including two open-ended questions. The questionnaire should take about 15 to 20 minutes to complete.

Your responses to the survey will be held in the strictest confidence. You may choose not to participate at any time without indicating any reason(s). Although your participation is totally voluntary, your input will be invaluable in helping us accomplish the purpose of the study. Please consider giving us a few minutes of your time to share your experience of this matter. The survey packet is coded to identify each participating school district. This information will be used only to determine the demographic representation of the dataset to be analyzed.

If you have any further questions about this study, please contact me by phone [REDACTED] or by email [REDACTED]. You may also reach me at the following address. **Please mail a signed copy of this letter and the completed survey form to Raj Rai at the following address using the enclosed postal paid envelope.**

Thank you for your participation.

With regards,

Raj K. Rai
A535 Claxton Complex
1126 Volunteer Blvd.
Knoxville, TN 37996-3456

I understand the explanation of the project and I agree to participate by completing the enclosed survey.

Participant's Name (Please print)

Signature

Date

APPENDIX F2

Second Cover Letter to Participants

(Date)

Dr./Ms./Mr. _____
_____ School
(Address)

Dear Dr./Ms./Mr. _____:

I am sending to you the enclosed survey form and the consent letter. Since I have not received back the form sent to you earlier, I assume that it may have been misplaced. Please complete this form and return it to me by November 18.

If you have any questions, please contact me by phone: [REDACTED] or by e-mail:

[REDACTED]

Thank you in advance for your cooperation in this statewide study.

Sincerely,

Raj Rai

APPENDIX F3

Third and Last Cover Letter to Participants

(Date)

Dr./Ms./Mr. _____
_____ School System
(Address)

Dear Dr./Ms./Mr. _____:

This is a follow-up to my earlier request that you complete a survey regarding technology planning and implementation in your school system. Since the timeline for the data collection is approaching to its end, please complete the survey and return it to me at your earliest convenience.

If you have any questions, please feel free to call me at [REDACTED] or e-mail me at [REDACTED]. Thank you in advance for the cooperation.

Sincerely yours,

Raj Rai

APPENDIX G1

Parties Responsible for Developing Technology Plans in School Systems

Table 11: Parties responsible for developing technology plans in school systems

School system	District technology coordinator	Principal	Teacher
SS1	Individual	----	----
SS2	Individual	----	----
SS3	Committee	Individual	----
SS4	Committee	----	----
SS5	Committee	----	----
SS6	Committee	----	----
SS7	Committee	----	Don't know
SS8	Committee	----	----
SS9	Committee	----	----
SS10	Committee	----	Committee
SS11	Committee	----	----
SS12	Committee	----	Committee
SS13	Committee	----	----
SS14	Individual	Individual	----
SS15	Individual	----	----
SS16	Committee	----	Individual
SS17	Committee	----	Don't know
SS18	Individual	----	----
SS19	Individual	----	----
SS20	Committee	----	----
SS21	Individual	----	----
SS22	Committee	Committee	Committee
SS23	Committee	Individual	----
SS24	Committee	----	----
SS25	Committee	----	----
SS26	Committee	----	Committee
SS27	----	Individual	Individual
SS28	Committee	Don't know	----
SS29	Committee	Committee	----
SS30	----	Committee	----
SS31	Committee	Committee	Committee

APPENDIX G2

Parties Responsible for Selecting Technology Committee Members

Table 13: Parties responsible for selecting technology committee members

School system	District technology coordinator	Principal	Teacher
SS1	----	----	----
SS2	----	----	----
SS3	Superintendent	Superintendent	----
SS4	Technology coordinator	----	----
SS5	Technology coordinator	----	----
SS6	Superintendent	----	----
SS7	Superintendent	----	----
SS8	Principal recommendations and volunteers	----	----
SS9	Technology coordinator	----	----
SS10	Technology coordinator	----	Superintendent and district technology coordinator
SS11	Superintendent and Principals	----	----
SS12	Assistant superintendent		Assistant superintendent and principals
SS13	Superintendent	----	----
SS14	----	----	----
SS15	----	----	----
SS16	Person responsible for district plan	----	Technology coordinator and principals
SS17	Superintendent and technology coordinator	----	----
SS18	----	----	----
SS19	----	----	----
SS20	Technology coordinator	----	----
SS21	Technology coordinator	----	----
SS22	Technology coordinator	Technology coordinator	Technology coordinator
SS23	Superintendent	----	----
SS24	Technology coordinator with board approval	----	----
SS25	Technology department with campus input	----	----

School system	District technology coordinator	Principals	Teachers
SS26	Assistant superintendent	----	Principals and/or teacher volunteers
SS27	----	Not available	----
SS28	Supervisor of instruction	----	----
SS29	Technology coordinator	Technology coordinator	----
SS30	----	Technology coordinator and principals	----
SS31	Superintendent and asst. superintendent	Superintendent	Committee is school level technology coordinator

APPENDIX G3

Formation of Sub-Committees in School Systems

Table 15: Formation of sub-committees in school systems

School system	District technology coordinator	Principal	Teacher
SS1	----	----	----
SS2	----	----	----
SS3	No	No	----
SS4	No	----	----
SS5	No	----	----
SS6	No	----	----
SS7	No	----	----
SS8	Yes	----	----
SS9	No	----	----
SS10	No	----	----
SS11	No	----	----
SS12	Yes	----	Yes
SS13	No	----	----
SS14	----	----	----
SS15	----	----	----
SS16	No	----	No
SS17	No	----	----
SS18	----	----	----
SS19	----	----	----
SS20	No	----	----
SS21	----	----	----
SS22	No	No	No
SS23	No	----	----
SS24	Yes	----	----
SS25	Yes	----	----
SS26	No	----	----
SS27	----	No	----
SS28	Yes	----	----
SS29	No	No	----
SS30	----	Yes	----
SS31	No	Yes	Yes

VITA

Raj Kumar Rai was originally from Nepal and born in 1962. He pursued his Master's degree in physics at Tribhuvan University in 1989. He taught Math and Science in high school for three years and physics to undergraduate students for seven years. He received a scholarship from Nepal government to pursue a Master's degree in Education at the University of Maryland, USA in 1995. After pursuing a Master of Arts in Education at the University of Maryland, USA, he returned to Nepal and worked for two years as a researcher at Tribhuvan University, Nepal.

He was admitted to the University of Tennessee in Spring of 2000. While pursuing a Ph.D. at the University of Tennessee, he served as a graduate assistant in various departments within the College of Education, Health, and Human Services. He is currently teaching at the Pellissippi State Technical Community College, Tennessee as an adjunct faculty member.

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