

# USEIT

Use,  
Support,  
and  
Effect  
of  
Instructional  
Technology  
Study

**report eleven**  
Technical Report

# Report Eleven

## Technical Report for the USEIT Study

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Use, Support, and Effect of Instructional Technology Study

# Table of Contents

## **Chapter 1 Use, Support, and Effect of Instructional Technology Study Overview**

- 1.1 Introduction
- 1.2 Study Design
- 1.3 Study Timeline

## **Chapter 2 Instrument Development**

- 2.1 Survey Development
- 2.2 Site Visit Interview Protocol Development

## **Chapter 3 Study Participants**

- 3.1 Selection and Recruitment of Participating Districts
- 3.2 Sample Demographics
- 3.3 Survey Response Rates
- 3.4 Classifying Teachers
- 3.5 Comparing USEIT Participants to National Data Sources

## **Chapter 4 Measurement Scales**

- 4.1 Construction of Measurement Scales
- 4.2 Creating Measurement Scales
- 4.3 Measurement Scales Produced From the USEIT Data

## **Chapter 5 Site Visit Interview Analysis Design**

- 5.1 Developing Dimensions for Analysis
- 5.2 Defining Dimension Criteria
- 5.3 Factor Analysis of Dimension Ratings
- 5.4 Component Interpretation
- 5.5 Correlation of Site Visit Results to Survey Data

Use, Support, and Effect of Instructional Technology (USEIT)

## Report 11

# Technical Report

## Chapter 1: Use, Support, and Effect of Instructional Technology Study Overview

### 1.1 Introduction

Over the past decade, expenditures on, access to, and use of computer-based technologies by school-aged children have increased sharply. Between 1995 and 2001, federal expenditures on educational technology increased from \$21 to \$729 million while the student to computer ratio has decreased from 9:1 to 4:1 nationally (Glennan & Melmed, 1996; Market Data Retrieval, 1999, 2001). In 2001, the U.S. Census Bureau's Current Population Survey reported that American children between ages 9-17 use computers more than any other reported subgroup of the American population (92.6%) (A Nation Online, 2002).

Despite these large expenditures, this increased access, and nearly universal use by school-aged children, several observers have questioned the extent to which technology is impacting teaching and learning. In 1997, Oppenheimer argued that there is no solid evidence that computers have improved student performance, as measured by test scores. Others, like Stoll (1999) and Healy (1998), have criticized investments in educational technologies arguing that there is little evidence that they impact teaching and learning in a positive way and, in fact, asserted that computer use may be harming children and their learning. More recently, Cuban (2001) argued that computers have been oversold as a vehicle for reforming educational practices and are generally underused as an instructional tool by teachers at all levels of education.

While it is certainly appropriate to question the effects computer-based technologies are having on teaching and learning, the data collected to date provide incomplete and sometimes misleading images of the ways teachers and students use technology, the effects of these uses, and the factors that influence these uses. To deepen our understanding of these issues, the Technology and Assessment Study Collaborative (inTASC) at Boston College undertook a three-year study of technology use, support, and impact across school districts.

Working with 22 school districts across Massachusetts, inTASC is examining the impacts of district level education technology programs on teaching and learning. Unlike previous studies that have either focused on the impacts of individual software applications on student learning or have examined the extent to which educational agencies have established the conditions believed to be essential for supporting education technologies, the Use, Support, and Effect of Instructional Technology (USEIT) study focuses on the relationships among different types of district level supports, changes in classroom practices, and impacts on student outcomes.

To examine these relationships, several types of data collection and analyses have been and continue to be conducted. These data collection and analysis activities have been divided into two phases. The study development and first phase of the study spanned 18 months. During the first phase, data collection focused on documenting technology use and support (broadly defined) in each of the participating districts. To this end, two types of data collection occurred:

- conducted site visits during which interviews were carried out with district leaders, school leaders, and key technology personnel
- surveyed district leaders, principals, teachers, and students in Grades 5, 8, and 11

During the second phase, which began in October 2002 and continued through December 2003, three case studies and an analysis of the relationship between student and teacher use of technology and performance on state-tests was conducted. The three case studies focus on the following:

The relationship between access to different amounts of technology in the classroom (e.g., none, 6–8 per classroom, and 1 per student) and use of technology for instructional purposes;

District-level decisions and practices that facilitate or hinder instructional uses of technology;

Factors that influenced instructional uses of technology by high-end users.

The purpose of this report is to provide technical documentation for data collected during the Phase 1 of the study. To this end, this report does the following:

- describes the study design and the data collection timeline;
- describes the development of surveys and site visit protocol;
- documents the study sample, the response rate for the survey and the number of interviews conducted as part of each district's site visit, and compares the USEIT sample to national data sources;
- describes the procedures used to develop scales for the survey instruments, and presents statistical information for each of the scales formed and used in subsequent analyses; and
- describes the procedures used to develop and code factors for the site visit interviews.

Although technical in nature, the information presented in this report will assist readers in understanding how the data and scales used for analyses presented in subsequent reports were developed. This report will also assist researchers who wish to use the USEIT data to perform secondary analyses.<sup>1</sup>

## 1.2 Study Design

The Use, Support, and Effect of Instructional Technology (USEIT) study is a three-year study that was initiated in the spring of 2001 and was divided into two phases. The first phase of the study was designed to examine two overarching questions:

- a) How and to what extent are instructional technologies being used by teachers and students in the classroom and at home?
- b) What factors influence these uses?

To examine these two questions, a multi-method research design was developed. The study was developed to collect the same set of data across several districts in order to estimate the effect specific district-level, school-level, and classroom-level variables have on instructional use of technology by teachers and students. To provide a deeper understanding of district- and school-level practices that promote or obstruct technology use, the study design included quantitative and qualitative data collection. In addition, to probe key issues that arose over the course of the study, the design called for an iterative approach to data collection and analysis. As an example, it was anticipated that the survey data would allow the research team to identify classrooms within the same grade level in which technology is used frequently, classrooms in which technology is used less frequently, and classrooms in which it is rarely or never used. Based on these categorizations, a sub-set of classrooms within each level of use would be selected for further study to examine:

- a) the relationship between technology use and achievement, and
- b) the factors that contribute to or hinder use within these classrooms.

Similarly, quantitative and qualitative data were used to classify district technology programs into three levels based on their maturity and success in supporting technology use. Based on these categorizations, a subset of districts were selected for further study to identify key decisions, policies, and/or actions that occurred over the past 10 years that contributed to the success or shortcomings of each districts technology program.

To this end, two types of data were collected during the first phase of the study: interview data and survey data.

- District, school, and other personnel who play a key role in supporting technology use in each district were interviewed.
- District leaders, principals, teachers, and students in Grades 5, 8, and 11 were surveyed.

Based on past research and related literature that focuses on educational technology, 14 factors believed to influence instructional use of technology were identified. These factors include:

- District Vision for Technology
- School and District Culture
- Leadership
- Technology Resources
- Technology Support
- Professional Development
- Technology Policies and Standards
- Technology Beliefs
- Pedagogical Beliefs
- Equity
- Community
- Demographic Information
- Physical Infrastructure
- Preparedness

As is explained below, theoretical models were developed to represent how these factors may interact to influence use of technology by students and teachers. Information about each of these factors was collected through student, teacher, principal, and district leader surveys and interviews with educational leaders and key technology personnel within each participating district.

Although each of the 14 factors is believed to impact instructional uses of technology (either positively or negatively), it was observed that some of the factors reside at different levels of a school system. It was also hypothesized that these factors interacted with each other to influence technology use. As Table 1 depicts, the majority of the factors originate at the district level. At the school level, district-level factors may be moderated by local leadership and culture. At the classroom level, factors internal to the teacher and characteristics of the students may further influence the ways in which technology is and is not used for instructional and preparatory purposes.

**Table 1: Origination of Factors Influencing Instructional Use of Technology**

<b>District Level</b>	Community Vision Leadership Resources Physical Infrastructure	Support Professional Development Policies and Standards Equity
<b>School</b>	Principal Technology Beliefs Principal Pedagogical Beliefs Principal Technology Preparedness	School Leadership School Culture
<b>Classroom</b>	Teacher Technology Beliefs Teacher Pedagogical Beliefs Teacher Technology Preparedness Teacher Demographics Resources	Student Demographics: Students' Home Access Student Demographics: Students' Home Use Student Demographics: Students' Comfort With Technology Other Student Demographics

Since many of these factors may play different roles at different levels, the study was designed such that information about these factors was collected at multiple levels. Table 2 indicates how information about each factor was collected.

**Table 2: Information Collected From Specific Individuals**

	Surveys				Site Visits
	Teacher	Principal	District Leader	Students	
District Vision for Technology	•	•	•		•
School and District Culture	•	•	•	•	•
Leadership	•	•	•		•
Technology Resources	•	•	•	•	•
Technology Support	•	•	•	•	•
Professional Development	•	•	•		•
Technology Policies and Standards			•		•
Technology Beliefs	•	•	•		•
Pedagogical Beliefs	•	•			
Equity		•	•		•
Community		•	•		•
Demographic Information	•	•	•	•	
Physical Infrastructure	•	•	•	•	•
Preparedness	•	•			•

In addition, to collecting information about these factors, in some cases from several different members of a school system, the survey and site visits were designed to allow us to link students to their teachers, teachers to their principals, and principals to their district leaders. In turn, this linking allowed us to examine validity by comparing responses for a given factor across levels (e.g., amount of student use of computers in the classroom as reported by students compared to what their teacher reported). In addition, this linking will allow us to conduct multi-level analyses in which the influence of factors that reside at different levels of the school system on use of technology can be estimated.

## 1.3

### Study Timeline

As mentioned previously, data collection occurred in two phases over the course of two academic years. The data collection activities are summarized below.

#### PHASE I:

##### Documenting District and School Supports October 2001–June 2002

- A. Interviews with key district and school personnel such as the Technology Director, Curriculum Coordinator, Superintendent, Assistant Superintendent, Lead Technical Support personnel, Director of Library and/or Media Services, Professional Development Coordinator, and a sample of Principals. (Note that titles and roles varied by district.)
- B. District-level surveys focused on beliefs, resources, community support, professional development opportunities provided, leadership, and obstacles. Surveys were completed by a variety of district-level personnel including: Technology Director, Curriculum Coordinator, Superintendent, Assistant Superintendent, and the Lead Technical Support Specialist.
- C. Analysis of district documents such as past and projected budgets, technology plans, professional development plan/offerings, resource materials provided by the district to teachers related to technology, etc.

In most cases, 1–2 days were invested reviewing district documents prior to the site visits and on-site interviews were conducting over the course of 2 days. Preliminary analyses of district-level data are described in a separate document.

##### Documenting Classroom Uses of Computers March 2002–May 2002

- A. Principal and teacher surveys focused on uses of computer-related technology in and out of the classroom to support teaching and learning were administered to classroom and special education teachers. In addition, the survey collected information about teachers' level of comfort with computers, ways in which they have acquired skills and knowledge to use computers to support teaching, and additional needs.
- B. Student survey focused on uses of computers in and out the classroom was administered to students in Grades 5, 8, and 11. In addition, the survey collected information about students' level of comfort, perceived level of skill, perceived benefits of computers, and additional needs.

#### PHASE II:

##### Case Study Work and Student Achievement October 2002–December 2003

To further explore key issues that arose from our analyses of these district site visit and survey data, a set of case studies were conducted in Phase 2. To examine the impact instructional uses of technology (or more accurately, the impact teachers who use technology regularly during instruction) may have on student learning, a study that compares MCAS scores, grades, work samples, and digital literacy skills was also conducted in a sample of classrooms within a sample of schools.

## Chapter 2: Instrument Development

### 2.1 Survey Development

The teacher and student surveys were developed through a six-step process. Then, the teacher surveys were adapted for the principal and district surveys. In this section, we describe in detail each of the six steps taken to develop the teacher and student surveys. We then describe how the principal and district surveys were adapted from the teacher survey.

#### Step 1: Literature and Existing Survey Review

During the first step, a review of the literature on educational technology was performed, with a specific focus on factors that influence instructional use. In addition, surveys used in previous studies and/or surveys developed to assist schools in examining their use and support of technology were collected. The surveys collected include the following:

- The Milken PCC Assessment Tool
- NCREL Miami-Dade Surveys
- National School Network Survey
- NCREL Surveys
- Teaching, Learning and Computing CRITO Surveys (Becker et al.)
- Wellesley, MA District Surveys (M. Russell)
- Franklin Schools District Survey (T. Plati)
- LoTi Questionnaire (Learning Quest)
- DoDEA Surveys
- Connect Teacher Proficiency Scales
- California School Technology Survey

Specifically, the USEIT surveys adopted several scales developed by Becker and his colleagues (1998-2001) from the CRITO teacher surveys (with minor additions) so that the relationships among pedagogical beliefs, instructional practices, school climate, and teachers' uses of technology can be examined.

Based on a review of the literature and existing surveys, the 14 factors believed to be related to technology use were identified (see Table 1 for a list of these factors). In addition, approximately 50 ways in which technology is used by teachers and students were recorded. A list of types of instructional technology that teachers may have access to in their classrooms or schools and a list of obstacles that may influence the extent to which instructional technology is used also were generated.

## Step 2: Theoretical Models and Hypotheses

Based on the lists generated through the literature and survey reviews, a set of theoretical models that depicted the inter-relationships between the 14 factors and technology use were generated. In addition, a large number of hypotheses as to how factors influence technology use by teachers and students were developed. Four examples of hypotheses developed follow:

- a) District-level leadership and advocacy for technology influences principal leadership and advocacy for technology which in turn influences the extent to which teachers use technology;
- b) Students' access to technology at home and comfort using technology influences the extent to which teachers use technology for instructional purposes;
- c) Professional development that focuses primarily on integration of technology coupled with the availability of a technology specialist at the school level is associated with higher levels of technology use in the classroom, while professional development that focuses primarily on the mechanics of how to use a computer or specific software is associated with lower levels of technology use in the classroom;
- d) Schools that have a culture of collaboration, value experimentation, and/or allow teachers to participate in decision-making have higher levels of technology use.

## Step 3: Item Development

A set of items were developed to collect information about each of the 14 factors, as well as the extent to which teachers use technology for a variety of purposes in and out of the classroom, the types of technology teachers have access to, and obstacles to their use of technology. For the student survey, items focused primarily on their access to technology in school and at home, their comfort with technology, obstacles to their use of technology, and the extent to which they use technology at home and in school for a variety of purposes. Initially, 16 pages of items were developed for the teacher survey and 7 pages of items were developed for the student survey.

## Step 4: Item Review

Working with representatives from several of the participating districts, item sets and individual items within each set were examined. In some cases, items were eliminated because they were not deemed to be of significant value or quality. In other cases, items were modified to more accurately reflect the type of technology available at the time of survey development (e.g., PalmPilots, probes, and portable computers were added). Finally, items that district representatives indicated would provide valuable information to assist them in planning future technology acquisitions were also added (e.g., value of a telephone line in the classroom, qualities of a technology specialists that teachers felt were most desirable).<sup>2</sup>

## Step 5: Survey Review, Piloting, and Modification

Based on the item review process, draft versions of the teacher and student surveys were developed. These draft surveys included approximately half the total number of items initially developed. Decisions to eliminate items and/or item sets were based primarily on the importance of the hypothesis for which they were initially developed, the expected strength of their influence on use, and/or the perceived quality of the

item (e.g., clarity, unidimensionality, and anticipated ease of interpretation). The draft surveys were then administered to approximately 30 teachers and 20 students in each grade level (i.e., Grades 5, 8, and 11). In most cases, a member of the survey development team was present when the survey was completed; upon completion of the survey they asked participants to describe their interpretation of questions and their reasons for selecting a given response. In other cases, participants were asked to highlight ambiguous or confusing questions as they completed the survey. Based on this feedback, several items were modified and the piloting process was repeated with a smaller sample of teachers and students.

### **Step 6: Finalization**

Once the survey items were finalized, NCS Pearson Survey Development Software was used to layout the final versions of the surveys. The surveys were then reviewed by several readers to examine proper layout and to identify typographical errors. The final versions of the surveys were then printed on scan sheet forms by NCS Pearson.

Although some of these steps occurred in a purely linear fashion, it is important to note that this was not always the case. For example, Steps 1, 2, and 3 occurred in an iterative manner. While the development process began with a review of the literature, the literature was revisited frequently as models and hypotheses were developed. Similarly, new hypotheses were developed as items were developed, reviewed, and piloted. In total, the survey development process occurred over a period of 8 months and involved approximately 25 people in the item development process, 50 people in the piloting process, and the input of 4 members of the Advisory Board.<sup>3</sup>

As noted above, the principal surveys were based on the teacher surveys. For this reason, piloting was not performed with the principal survey. The district surveys were similar to the principal surveys but included additional item sets that focused specifically on district-level issues (e.g., decision-making process, funding, school committee and community involvement). The district-level survey was reviewed by a local technology director and by a former superintendent. Since much of the information collected at the district level was person-specific, separate district surveys were developed for different categories of district-level leaders.

Surveys are available on-line at: <http://www.bc.edu/research/intasc/studies/USEIT/description.shtml>

## 2.2 Site Visit Interview Protocol Development

To provide a detailed understanding of the types of support, policies, and practices districts undertake related to instructional technology, a two-day site visit was conducted in each participating district. During each site visit, two members of the research team interviewed several district, school, and technology leaders. The site visits began in January 2002 and finished in June 2002. Within each district, interview subjects included the superintendent, the director of technology, the assistant superintendent and/or the director of curriculum, the director of business/finance, and the director of networks/data administration. At one of each elementary, middle, and high school within a district the team interviewed the principal, the school technology leader (if there was one), and often the media/information specialist. At high schools the team met with each of the department heads, who often served as the subject curricular coordinators for the entire district. The team met with a classroom teacher only if particularly recommended by district or school leadership. After several site visits, the team decided to eliminate the interviews with business/finance personnel as they were not yielding relevant information towards the objectives of the study.

In each district, each interview lasted from 15-60 minutes. Two researchers went on each site visit with one serving as the interviewer and the second as a note-taker. The interviewer made a digital audio recording of the conversation and the note-taker typed the interview on an AlphaSmart portable writing device. The audio files were archived for future review as needed. At the completion of a series of interviews for a particular district, the field notes were summarized into a single document. Subsequently, a “blind reader” who did not visit any of the sites also summarized site visits for validation purposes.

All interviews were guided by a set of 13 questions designed to collect data about how district level practices and beliefs affect instructional technology use in the classroom. These questions were developed over a five-month period which coincided with the survey development. Similar to the survey development, a four-step process was used to develop the site visit protocol. First, a literature review was performed to identify district-level factors believed to effect (either positively or negatively) technology use by teachers and students. Second, a series of interview questions were developed for each factor identified. With input from a current technology director and a former superintendent, the interview questions were refined and narrowed to a reasonable number. Third, the factors and interview questions for each factor were compared to the surveys to assure that both data collection tools would provide a) some information that was redundant so that validity analyses could be conducted and b) some information that was complementary so that the site visits would provide a more descriptive understanding of what districts and their leaders actually do to support technology use (in cases where this occurs). Fourth, the site visit protocol was piloted in one district. Questions were refined based on the pilot to elicit more precise information about some of the factors.

The final site visit protocol focused on six themes and contained nine opening questions. Based on responses to these opening questions, the interview team probed specific issues further with follow-up questions. The themes and opening questions included:

*Technology Vision:* “What short-term goals do you have for technology?” and “In what ways do you hope that technology will affect the way teachers teach and students learn 5 years from now?”

*Technology Use* (perceived and actual): “What are some promising instructional uses of technology that you have seen in your district?” and “When you have seen technology used successfully in the classroom, what were the conditions that enabled these successes?”

*Operational Practices*: “How does your district make decisions about curriculum, budgets, and technology?”

*Hindrances*: “What obstacles has your district encountered with regards to technology and how have you attempted to overcome them?”

*Support*: “What has your district done to support teachers in using technology? Is it working?”

*District Culture*: “What are the district level practices and expectation (policies, standards) related to technology?” and “Forgetting technology for the moment, how does change usually occur in your district?”

## Chapter 3: Study Participants

### 3.1

#### Selection and Recruitment of Participating Districts

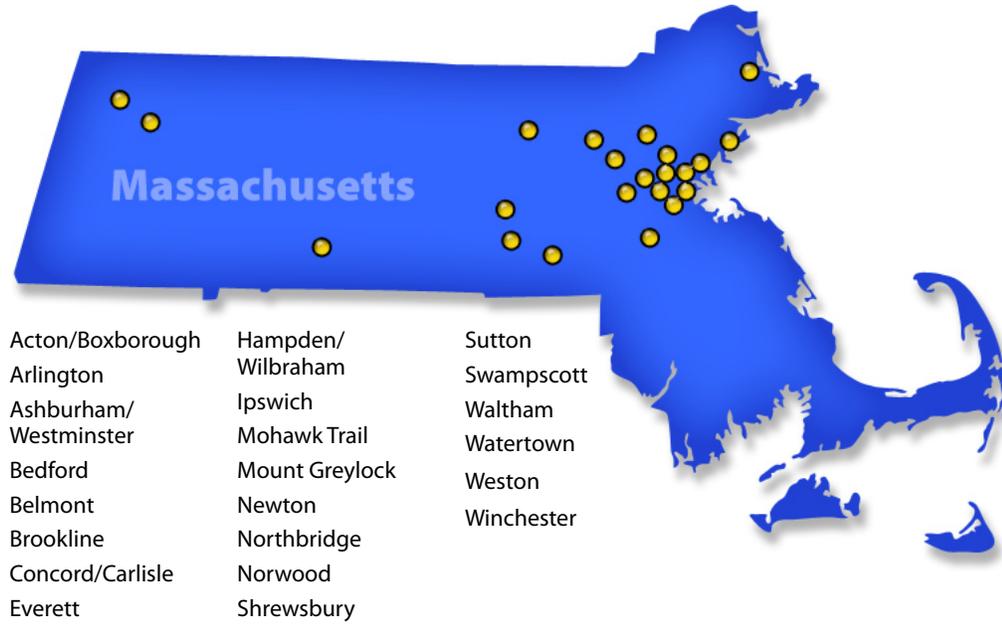
The USEIT Study was spawned by an inquiry from a group of 16 districts located in the greater-metropolitan area surrounding Boston, Massachusetts. Upon receipt of funding to conduct this study, the number of participating districts was expanded to increase the diversity of participating districts. To this end, 5 of the original districts were dropped from the study and 12 districts located across the state of Massachusetts were invited to participate. Of these 12 districts, 11 opted to join the study for a total of 22 districts.

To identify the 5 districts dropped from the study, two criteria were applied. First, districts that had similar demographics were grouped into one of three categories – small urban, high SES suburban, and middle SES suburban. Given the limited number of small urban districts, it was determined that all of the small urban districts would be retained. Within high and middle SES suburban categories, districts were probed as to the probability that they could complete all the data collection requirements. Through this process, 3 districts determined that recent changes in their administration would make data collection difficult, 1 district determined that their participation in another large study would hinder data collection, and 1 district that was experiencing difficulty negotiating a union contract believed that teacher and student surveying would be unsuccessful. Therefore, these districts were dropped from the study.

To identify districts to be added to the study, two criteria were applied. First, we sought to increase the number of small and rural districts while also including some suburban districts located outside of the greater-Boston metropolitan area. Specifically, we sought to include 5 rural districts, 2 additional small urban districts, and 3-4 additional suburban districts. Second, we sought to include districts that had made some effort to establish technology programs. To this end, the research team asked several technology leaders to suggest districts that had a solid technology program in place. Based on these suggestions, the research team conducted telephone interviews with the technology director and superintendent in each district during which background information about their technology program was collected. The purpose of these interviews was to provide some assurance that the district had invested sufficient efforts in establishing a technology program for us to study the effects of the program on teacher and student use of technology. This process resulted in 12 potential districts, all of which were invited to participate. Although it was anticipated that approximately half would opt to participate, 11 of the districts indicated that they would join the study.

When data collection began, the study included 22 districts located throughout Massachusetts. Of these, 3 are considered small urban districts, 5 are rural districts, and the remaining 14 are suburban districts. Figure 1, below, shows the geographic location of the participating school districts.

**Figure 1 Geographic Locations of the USEIT Participating School Districts**



### 3.2 Sample Demographics

Each year the state of Massachusetts provides basic demographic information for each of the 372 school districts operating in the state. In addition the Massachusetts Department of Education’s Instructional Technology Group published a “state of the state” report in 2002 which was culled from submitted mandatory school technology plans. When combined, these two sources allow us to compare the participating USEIT districts to the state averages on demographic variables as well as on some technology measures. Table 3 summarizes this information.

**Table 3 Selected Demographic Data Comparing USEIT Districts and the State**

District Name	# of Students	Elem. Schools	Middle Schools	High Schools	% White	% Free Lunch	A/B Computers	All Computers
Acton	2,386	5	0	0	87%	3%	7.1	5.5
Acton-Boxborough	2,269	0	1	1	88%	1%	6.0	4.1
Arlington	4,178	7	1	1	87%	10%	8.1	4.9
Ashburham-Westminster	3,820	3	1	1	96%	7%	N/A	N/A
Bedford	2,086	2	1	1	89%	4%	4.6	4.3
Belmont	3,608	4	1	1	86%	7%	11.0	9.2
Boxborough	634	1	0	0	89%	3%	4.21	4.08
Brookline	6,044	9	0	1	65%	10%	5.13	3.82
Carlisle	787	1	1	0	94%	0%	15.13	5.39
Concord	2,063	3	1	0	90%	4%	5.25	4.32
Concord-Carlisle	1,016	0	0	1	86%	4%	6.3	26.9
Everett	5,377	7	0	1	74%	37%	7.15	5.83
Hampden-Wilbraham	3,820	6	1	1	96%	6%	6.85	6.85
Ipswich	1,953	2	1	1	97%	8%	3.5	2.96
Mohawk Trail	1,719	4	0	1	97%	23%	1.17	0.9
Mount Greylock	833	0	0	1	94%	9%	5.05	5.05
Newton	11,248	16	4	2	82%	5%	9.54	6.14
Northbridge	2,422	4	1	1	95%	28%	N/A	N/A
Norwood	3,539	6	1	1	87%	9%	6.85	6.85
Shrewsbury	4,512	6	1	1	88%	5%	N/A	N/A
Sutton	1,593	2	1	1	99%	2%	N/A	N/A
Swampscott	2,379	4	1	1	96%	4%	8.78	8.47
Waltham	5,187	9	2	1	65%	26%	10.5	7.84
Watertown	2,657	3	1	1	92%	19%	6.12	4.18
Weston	2,147	3	1	1	81%	3%	N/A	N/A
Winchester	3,285	5	1	1	93%	3%	8.37	6.77
<b>TOTAL USEIT</b>	<b>81,562</b>	<b>112</b>	<b>23</b>	<b>23</b>	<b>88%</b>	<b>9%</b>	<b>7.335</b>	<b>6.7175</b>
<b>MASSACHUSETTS</b>	<b>979,593</b>	<b>1270</b>	<b>282</b>	<b>318</b>	<b>76%</b>	<b>25%</b>	<b>5.7</b>	<b>4.8</b>

Table 3 shows the basic topography of the participating school districts. In most cases, a school district had at least one middle school and one high school and about five elementary schools. In some cases, a regional high school was shared across two school districts (for example Concord-Carlisle and Acton-Boxborough). The participating USEIT districts differ from the state average on free/reduced lunch participation and ethnic composition. Specifically, the USEIT sample districts are comprised of 88% white students compared to the state average of 76%. Nine percent of the USEIT district students participate in a free/reduced lunch program compared to the state average of 25%. Looking specifically at access to technology in schools, the state reports more computers per students than the USEIT districts report. When examining only A/B type computers, the USEIT districts and the Massachusetts averages are 7.3 and 5.7 students per computer, respectively. Across all types of computers this relationship changes little with 6.7 and 4.8 students per computer reported for the USEIT and total state averages, respectively. Thus, the USEIT districts contain less minority and financially burdened students than the state. However, the districts participating in the USEIT study have fewer computers than the state's average.

### 3.3 Survey Response Rates

#### District Survey

Data were collected from the “district-level” administration office in each district in fall 2001 via a district-level administration survey. Those surveyed included the Superintendent, Curriculum Director, Professional Development Director, Technology Director, and Head Technician for each participating district. Table 4 shows the response rate of the district-level administration survey as of September 2002.

**Table 4 District-Level Administration Survey Responses**

	Technology Director	Superintendent	Curriculum Director	Professional Development Director	Technician	Total:
Acton-Boxborough	1	1	1	1	1	5
Arlington	1				1	2
Ashburham-Westminster						0
Bedford	1	1	1		1	4
Belmont	1	1	8	1		11
Brookline		1	8	1		10
Concord/Carlisle	1	1	1	1	1	5
Everett	1	1	1	1	1	5
Hampden-Wilbraham	1	1	1	1	1	5
Ipswich	1	1	1	1		4
Mohawk Trail	1	1	1			3
Mt. Greylock	1	1				2
Newton	1	1	1	1		4
Northbridge	1	1	1	1	1	5
Norwood	1	1	1	1	1	5
Shrewsbury	1	1	1	1	1	5
Sutton	1	1	1	1	1	5
Swampscott	1	1		1	1	4
Waltham	1	1*	8	1	1	12
Watertown	1	1	1	1	1	5
Weston	1	1	1	1		4
Winchester	1	1	1	1	1	5
<b>Total:</b>	<b>20</b>	<b>20</b>	<b>39</b>	<b>17</b>	<b>14</b>	<b>110</b>

\*Assistant Superintendent

From Table 4 it is evident that only one district (Ashburham-Westminster) failed to return any district-level administration surveys. Although some districts did not return surveys for each administrator in their district (most notably the “Technician” and “Professional Development Director” surveys) this is often attributable to the fact that some districts do not have these administrative positions.

### Teacher Survey

The research design for the USEIT study involved surveying every mathematics, science, social studies, and English/language arts teacher in each of the participating schools. Each district was responsible for distributing and collecting their teacher surveys during a staff meeting. This was a requirement for participation in the study. However, it was impractical to survey only the teachers of the four subjects, so in nearly all schools all teaching faculty were surveyed. Using a state supplied database we calculated the total number of teachers in each school within each district. To ensure accuracy, a sample of schools was telephoned to confirm and update our estimates. Fifteen percent was added to each of our estimates to err on the side of sending too many surveys, rather than too few.

In January and February 2002, 8,361 teacher surveys were sent to the 22 districts to cover our estimation of 7,270 teachers (with an additional 15%). By June 2002, 4,308 teacher surveys were returned. Thus, the teacher surveys had an overall response rate of 59.3%. However, the 41% of missing responses was by no means random. Since the purpose of the survey was not to be statistically representative of each district, districts were not required to survey students and teachers in each school within a district. However, it was required that each participating district survey had at least one high school, one middle school, and four elementary schools. For instance, if a district had three middle schools, we asked that districts survey teachers in two of those middle schools and not to survey teachers from the third school. Across a number of participating districts, 20 schools were not surveyed because the district was able to meet the participating requirements with their other schools. When these 20 schools are dropped from the initial teacher count, the sample response rate climbs to 68.6%. Thus, across all of the 143 schools that participated in the teacher data collection procedures, our sample constitutes 69% of the faculty population (4,308 surveys). Table 5 outlines the teacher survey response rate.

**Table 5 Teacher Survey Response Rates**

	# of Districts	# of Schools	Population	Returned Surveys	Rate
All Districts/Schools	22	163	7270	4308	59.2%
No zero response schools	22	143	6272	4308	68.7%

### Principal Survey

One principal survey was sent to each of the 165 schools within the 22 participating districts. The surveys were to be completed by each school’s senior principal. As of June 2002, 121 completed surveys were returned resulting in a 73% response rate. When the two districts that did not survey their teachers or principals are removed from the analysis the response rate climbs to 80.5% with 116 out of 144 principals responding. For the purposes of our study, this sample is adequate.

### Student Survey

It was central to various aspects of the USEIT study to acquire the “voice” of the student in our data collection. However, it was both impractical and unnecessary to survey every student across the 22 participating districts. Grades 5, 8, and 11 were selected to collect information from the upper ranges of elementary, middle and high schools, respectively. State databases were consulted to determine the number of surveys needed in each district. Again, a sample of schools was telephoned to confirm and update the accuracy of our student estimates. Additionally, 15% extra surveys were sent to the schools to ensure that there would be enough surveys for every student at each of the three grade levels. Our estimated population of Grade 5, 8, and 11 across the 22 districts was 19,624 students. As of June 2002, we received 13,388 responses for an overall student response rate of 68%.

As with the teacher survey responses, the “missing” 32% of the student surveys are not random. When looking across the three sampled grades (5<sup>th</sup>, 8<sup>th</sup>, and 11<sup>th</sup>) the response rate declines as students get older. Specifically, the response rates for fifth, eighth and eleventh grade students are 76%, 70%, and 57%, respectively. Additionally, one district did not participate in the student data collection. When this district is dropped from the analysis, the overall student response rate rises 5% to 73%. Table 6 outlines the response rates for the 21 districts participating in the collection of student data. As was seen with the teacher surveys, 13 schools within participating districts also chose not to distribute the surveys to their students. When these 13 schools are removed from the analyses, the response rate climbs to 83% across all grades. Specifically, the individual Grade 5, 8, and 11 student response rates increase to 88%, 84%, and 75%, respectively. Thus, across all schools that participated in student survey data collection, we have 83% of the Grade 5, 8, and 11 student population in our sample (13,388 surveys).

**Table 6: Student Survey Response Rates**

	Districts	Schools	Population	Returned Surveys	Rate
All Districts/Schools*	21	153	18,271	13,388	73.3%
No zero response schools	21	144	16,125	13,388	83.0%

\* One USEIT district did not participate in the collection of student data.

### Linking Students, Teachers, and Schools

To facilitate future analyses, data collection was structured so that students could be linked to teachers, teachers to principals or schools, and principals to districts. Each survey that was collected was coded with a number that identified the school and district from which they came. Additionally, teachers were asked to put the first four letters of their last names on each survey and students were asked to write the first four letters of their teacher’s last name on their survey. Grade 5 students used their classroom teachers name while Grade 8 and 11 students put the first four letters of their science, mathematics, social studies, and English/language arts teachers’ last names. This type of linking allows for an analysis of the relationship between teacher and student responses to the same questions.

Of the 5,184 fifth grade student surveys collected, 71% (n = 3,699) have been successfully linked to their fifth grade teachers. This means that for 71% of the student surveys, we can examine the relationship between the teachers and their specific students. Since the eighth and eleventh grade students typically reported having more than a single teacher, it is necessary to look at the matching data by subject area. Table 7 shows the numbers of successfully linked students for the eighth and eleventh grade samples.

**Table 7: Successfully Matched Eighth and Eleventh Grade Students by Subject**

	Total Number at 8 <sup>th</sup> Grade: 4762		Total Number at 11 <sup>th</sup> Grade: 3293	
	Linked at the 8th grade	% Linked at the 8th grade	Linked at the 11th grade	% Linked at the 11th grade
<b>English</b>	3377	70.9%	2596	78.8%
<b>Mathematics</b>	2818	59.2%	2482	75.4%
<b>Science</b>	2883	60.5%	2204	66.9%
<b>Social Studies</b>	2400	50.4%	2371	72.0%

### 3.4 Classifying Teachers

The teacher survey contained two items designed to collect information about the subject area(s) and grade level(s) taught during the year the survey was administered. Since many of our planned analyses focused on teachers who teach specific subject areas, it was necessary to classify teachers as subject area teachers, classroom teachers who teach multiple subjects, special education teachers, or teachers of “special” subjects (e.g., music, art, physical education). Similarly, since some of our planned analyses focused on school levels, it was necessary to classify teachers into one of three levels, namely elementary, middle, or high school. Below, we describe the logic applied when classifying teachers by school level and by subject area.

#### By School Level

To classify teachers by school level, the following logic was applied:

- Teachers who reported teaching grades K, 1, 2, 3, 4, and/or 5 only were classified as Lower Grade Level teachers.
- Teachers who reported teaching in grades 6, 7, and/or 8 only were classified as Middle Grade Level teachers.
- Teachers who reported teaching in grades 9, 10, 11, and/or 12 only were classified as Upper Grade Level teachers.
- If a teacher who indicated s/he teaches Grade 6 works in a school whose grade levels range from K–6 or from 2–6, then the teacher was classified as a Lower Grade Level teacher.
- If a teacher who indicated s/he teaches Grade 6 works in a school whose grade levels range from 4–8 or from K–8, then the teacher was classified as a Middle Grade Level teacher.
- If a teacher who indicated s/he teaches Grade 7 and/or 8 works in a school whose grade levels range from 7–12, then the teacher is classified as a Middle Grade Level teacher.

## Subject Area Classification Rules

To classify teachers by subject area, the following logic was applied:

- Teachers who submitted surveys containing a district code from a district that decided not to participate in the study after surveys were sent to the district office were removed.
- Teachers who did not report teaching any grade level were removed.
- Only those teachers who indicated they taught mathematics, science, English/Language Arts, social studies, and/or all subject areas in a self-contained classroom setting were selected.
- Retain teachers who indicated they taught special education but indicated that less than 50% of their students are special needs or perform below average. (It was reasoned that these teachers indicated they teach special education because there are some special education students in their classrooms, but they are not in fact full-time special education teachers.)
- Teachers who reported teaching in a grade level that was outside of their School Level Classification were removed.
- All teachers who indicated they were Librarians were removed.

The SPSS syntax used to classify teachers by school level and by subject area is contained in Appendix E.

## 3.5 Comparing USEIT to National Data Sources

The USEIT Study was designed to enable intense and sustained investigation of a series of issues across multiple school districts. Many of the issues examined are generally encountered by schools across the nation. The 22 districts that participated in this study were selected to allow us easy and extensive access to their schools. When selecting participating districts, we made a concerted effort to include districts in rural, suburban, and small urban settings. In addition, we included districts that were believed to have educational technology programs that were in different stages of development – from very advanced and well established to those that are still being established.

We recognize that districts from across the nation will be interested in using the information provided by this study to inform their own educational technology programs. We also understand that districts across the nation will ask how similar the study districts are to themselves. For this reason, we provide several comparisons of the characteristics of the study participants with schools, students, and teachers across the nation. In doing so, we emphasize that we are not attempting to argue that the set of districts that participated in the study are representative of districts across the nation. Rather, we present these comparisons to help readers better understand the characteristics of the study participants and how these characteristics compare with other groups of schools, students, and teachers.

### Student Access to and Use of Computers

In early 2001, a nationally representative survey was conducted of 7<sup>th</sup>–12<sup>th</sup> graders by Harris Interactive, Inc. Table 8 outlines the differences between the two data sources.

**Table 8: Comparison of USEIT and Harris Data Sources**

	USEIT	Harris
Methodology	Questionnaire	Telephone survey
Date of data collection	Spring 2002	January 15–28, 2001
Sample (n)	8,371	500
Sample (Grades)	8th and 11th	7th–12th
Sample (Geography)	Massachusetts	Across USA
Data collected in:	Classroom (School)	Student’s home

The two surveys have some overlap in their survey content. In some cases, the questions are nearly identical. In other cases, the questions differ in scale, wording, and tone, yet, the general content is similar enough to allow comparison.

Both surveys addressed students’ access to technology at home and the responses were similar. The Harris Poll reported that 94% of the surveyed students had *computer access* in their home. Similarly, in the USEIT survey 95% of all Grade 8 and 11 students report having a computer at home. Both surveys asked students about their access to the *Internet* in their home. Again, the responses from the two surveys are similar with 88% of Harris Poll students reporting Internet access at home and 91.4% in the USEIT sample reporting home access.

Both surveys also addressed students’ access to technology in their schools. Although most of the items in the two surveys address different topics or were worded differently and do not allow direct comparison, some of the items are similar enough to provide a meaningful comparison. One item asks students about the availability of computers at their schools. Table 9 shows the differences in the questions as well as the responses from both survey instruments.

**Table 9: Comparison of Ease of Students’ Computer Access in School**

	USEIT–Student*	Harris*
	When you want to use a computer in school is it...	Which of the following best describes the availability of computers at your school?
Always easy to find a computer	29%	47%
Usually easy to find a computer	44%	43%
Sometimes difficult to find a computer	18%	8%
Always hard to find a computer	7%	2%

\* USEIT Study (grades 8 and 11), Harris Poll (grades 7 through 12)

Generally, the USEIT results indicate that students have more difficulty accessing technology in schools as compared to the Harris results. Specifically, 18% more students in the Harris Poll than the USEIT survey reported that it is “always easy to find a computer”.

Since both surveys ask students about their use of technology in different subjects it is possible to compare results for English, mathematics, science, and social studies classes. Table 10 shows the percentage of students who use computers across the four main subject areas.

**Table 10 Comparison of Student Computer Use in English, Math, Science and Social Studies**

	USEIT–Student*	Harris*
	How often do you use a computer in [subject] class?‡	In which of the following classes do you use computers?
English	49%	61%
Math	29%	26%
Science	53%	50%
Social Studies	64%	55%

\* USEIT Study (grades 8 and 11), Harris Poll (grades 7 through 12)

‡ The percentage represents students who report using computers a couple of times a year or more.

Table 10 shows that across the two surveys, student use is very similar in mathematics and science, but differs in English and social studies. It is important to note that these results do not address the relative frequency of students’ technology use in these classes; only whether they have used technology in the class or not. Unfortunately, a more detailed comparison is not possible since the two instruments employ different scales.

Another question that was similar enough to allow meaningful comparison addressed where students use technology the most in their schools. Table 11 displays the frequencies of responses across both samples of students.

**Table 11 Comparison of Where Students Use Technology the Most in School**

	USEIT–Student*	Harris*
	Where do you use technology (computers, AlphaSmarts, etc.) most in school?	Where do you use computers most often in school?
In the classroom	10%	24%
In a computer lab	68%	39%
In the library/media center	20%	35%

\* USEIT Study (grades 8 and 11), Harris Poll (grades 7 through 12)

Note: Table percentages do not equal 100% because of missing data.

Again, there are differences in the school use of technology between the two groups. Specifically, the USEIT eighth and eleventh grade students predominately

access technology in computer labs (68%). While the highest percentage of Harris Grade 7–12 students use computers in the computer lab, they use computers more regularly in classrooms and in the library/media center than do USEIT students.

These comparisons suggest that the USEIT and Harris samples are quite similar in home access, but differ regarding use of technology in school. Specifically, the Harris study reported greater access to technology in school as compared to the students participating in the USEIT study. Moreover, the USEIT sample appears to lack technology access in the classroom and library as compared to the Harris respondents. With respect to where students learn new things about technology and computers, Table 12 indicates that a higher percentage of USEIT students reported learning new things at home as compared to the Harris sample.

**Table 12 Comparison of Where Students Learn New Things With Technology**

	<b>USEIT–Student*</b>	<b>Harris*</b>
	Where do you usually learn how to do new things with computers?	Where have you learned the most about using computers?
At home	70%	56%
At school	25%	39%

\* USEIT Study (grades 8 and 11), Harris Poll (grades 7 through 12)

### Teacher Access to Technology

It is also useful to examine how closely the participating USEIT teacher responses resemble teachers’ access to technology across the nation. Unfortunately, a direct comparison is not possible since no national surveys of teachers’ technology access have been conducted recently. However, in Becker’s fall 1998 Teaching, Learning and Computing Survey, 80% of teachers reported that they had a computer at home. Similarly, the 2002 U.S. Census Current Population Survey “A Nation Online” reports that between 1998 and 2002 home access to computers for adults who have earned a college degree has grown at a rate of 5.3% per year. Since teachers have college degrees, it is reasonable that their growth rate is similar to 5.3% a year. Applying a growth rate of 5.3% a year to Becker’s findings, one would expect a 15.9% increase in the number of teachers who own a computer at home which results in an estimated 95.9% of teachers who have a computer in their home. The percentage of USEIT teachers who own a home computer is remarkably similar, 95%. Although there are no other data that can be compared directly or indirectly to national data sources related to teachers’ use of computers in or out of school, it appears that home access to computers for the teachers participating in the USEIT study is similar to the projected access of teachers nationwide

## Chapter 4: Measurement Scales

### 4.1

#### Construction of Measurement Scales

When survey data is analyzed, responses to several questions or items are often combined into one single measure, commonly referred to as a scale. A scale is a group of items that measure a single attribute. Typically at the design stage of the survey, items are written with the intent that they will hang together in one scale measuring a single attribute or construct. The use of a scale to measure an attribute has a couple of advantages over the use of a single item. First, measurement relying on a single item will likely contain more error than measurement made with a scale containing multiple items. Second, the use of more than one item to measure an attribute has important consequences for the validity of the measure.

A scale, through its individual items, can often represent the multiple aspects of a concept in a single measure. For example, a measure of student use of technology may be made up of items about students' use of technology at home, in the classroom, for leisure, or for school work. Measurement of the attribute using just a single item could result in the loss of information about other aspects of the attribute. By measuring many facets of an attribute and combining them into a single scale, the validity of the measure is increased. A statistical procedure referred to as principal components analysis, is used to help create scales. This technique provides evidence that a theoretical scale is measuring a single attribute.

Principal components analysis is a statistical procedure that tells us about important properties of a scale. It provides validity evidence for the creation of scales to measure a single attribute and indicates whether the theoretical scales that were created at the design stage of the survey hang together as we had theorized. If the principal components analysis finds precisely the item groupings that we intended when creating the items, we have a strong confirmation of our initial hypothesis about how the items should relate to one another. Principal components analysis is an interdependence technique in which all variables are simultaneously considered and their relationship to each other is examined. This technique helps explain the variation among many original items using relatively few derived scales. Simply put, this technique analyzes the correlations among items and is a form of data reduction.

### 4.2

#### Creating Measurement Scales

A measurement scale is created by examining the strength of the correlation between the responses to individual items or questions. The magnitude of the relationship between the items is evaluated by examining how high each item loads on a single scale and how much variability among the original number of items is explained by the created scales. For example, consider a scale created from the three items in Table 13. Each item represents some measure of how teachers use technology for preparation. When analyzed using principal components analysis, we find evidence that the three items, which were designed and written to form a scale, hang together and account for 73.39% of the variance in the item responses. The larger the percent of variance explained the more confident we can be that the scale is capturing the information in the individual items.

**Table 13 Teachers' Use of Technology for Preparation Scale**

Teachers' use of technology for preparation scale	
Factor Loadings	
How often do you make handouts for students using a computer?	0.898
How often do you create a test, quiz or assignment using a computer?	0.900
How often do you perform research and lesson planning using the Internet?	0.765
Variance Explained:73.39% Cronbach's Alpha = 0.80	

The values of the factor loadings range from 0.765 to 0.900 and represent the correlation between the individual item and the scale. The percent of variance explained, the size of the factor loadings, and the value of Cronbach's alpha support the creation of a "Teachers' Use of Technology for Preparation" scale.

When items have been identified that form a meaningful scale, each subject's score on the scale must be calculated. One way in which this can be done is to create a summated scale score. A summated scale score is formed by computing the sum or average for each person of all their responses to the items that make up the scale. Another way to calculate a subject's score on the measurement scale is to create a factor score. Unlike a summated scale score, the factor score is computed based on the loadings of all the variables on the scale. A standardized factor score has a mean of zero and a standard deviation of 1. Individuals with high values on the items with high factor loadings will receive high positive factor scores.

For all scales created using the USEIT survey data, principal component analysis was used. In addition, three criteria were applied when developing scales:

- a) the scale had to account for at least 50% of the variance in the item level responses;
- b) the minimum factor loading for any item comprising the scale was 0.5;
- c) the items comprising the scale had to relate to a sensible theoretical construct.

### 4.3 Measurement Scales Produced From the USEIT Data

Scales were created using item responses from the student, teacher and district surveys. Appendix D contains the details of the derived scales. The categories of scales for each survey are as follows.

#### Categories of Teacher Measurement Scales

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##### **Category 1 – Student use of technology as reported by teacher scales**

- Teacher-directed student use of technology during class time scale
- Student use of specific technology applications scale
- Student activities without computers scale
- Students' non-academic computer use scale

##### **Category 2 – Teacher use of technology scales**

- Teacher use of technology for preparation scale
- Teachers' professional use of email scale
- Use of computers for individual student needs scale
- Teachers direct students to use technology to create products scale

##### **Category 3 – Importance of technology scales**

- Perceived importance of technology for the school/district scale
- Technology for shaping classroom use scale

##### **Category 4 – Professional development relating to technology scales**

- Need for professional development for basic skills scale
- Need for professional development on the integration of technology scale

##### **Category 5 – Obstacles relating to technology use scales**

- Students obstruct technology use scale
- Leadership and teacher input obstructs technology use scale
- Access obstructs technology use scale
- Quality of available technology obstructs use scale
- Poor professional development obstructs use scale

##### **Category 6 – Problems relating to technology scales**

- Problems getting technology to work scale
- Problems incorporating technology obstructs use scale

##### **Category 7 – Teachers' perception of district success relating to technology scale**

- District success implementing technology program scale

##### **Category 8 – Importance of computers for teaching scale**

- Importance of computers for teaching scale

##### **Category 9 – Teachers' confidence using computers scale**

- Teacher confidence using computers scale

##### **Category 10 – Pressure scales**

- Instructional pressures around technology scale
- Pressure to use technology scale

##### **Category 11 – Support for change scales**

- Community support for change scale
- Support for growth scale
- Teacher relationship with principal scale
- Perceived support for innovation scale

##### **Category 12 – Attitudes toward technology scales**

- Computers harm students learning scale
- Teacher-directed instruction scale
- Computers help students scale
- Teacher beliefs about student-centered instruction scale
- Technology support focuses on integration scale

## Categories of Student Measurement Scales

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### Category 1 – Student use of technology scales

- Student reported use of computers for writing and research scale
- Student reported high-end home use of technology scale
- Student reported recreational home use scale

### Category 2 – Student belief scale

- Students report that computers help their work scale

### Category 3 – Student self-reported skills scales

- Student reports of how well they use for research and writing scale
- Student reports of how well they use for high-end use scale

### Category 4 – Students general comfort level with technology scale

- Student reported general comfort level with technology scale

### Category 5 – Technology in the home scales

- Student reported amount of technology in the home scale
- Student reported ease of access at home scale

## Categories of District Measurement Scales

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### Category 1 – Policy scales

- Number of restrictive policies relating to technology use scale.

### Category 2 – Personal use scales

- Personal use scale
- Communicating beyond school scale
- Internet use scale

### Category 3 – Belief scales

- Technology helps students
- Variety of external funding for technology scale
- Line item funding for technology scale

### Category 4 – Funding scales

- General funding for technology scale
- Variety of external funding for technology scale
- Line item funding for technology scale

### Category 5 – Equity scales

- Equity of use and access for elementary school scale
- Equity of use and access for special populations scale
- Equity of use and access for middle and high school students scale

### Category 6 – Leadership scales

- Leaders discuss technology scale
- Evaluations consider technology scale

### Category 7 – Decision-making scales

- Principals' technology discretion scale

### Category 8 – Maturity of technology program scales

- Strength of upgrading procedures scale

### Category 9 – Professional development scales

- Professional development focuses on integration scale
- Variety of technology professional development scale

## Chapter 5: Site Visit Interview Analysis Design

### 5.1 Developing Dimensions for Analysis

As described previously, site visits were conducted in each of the participating districts. These site visits included interviews with district and school leaders as well as personnel who work specifically on technology-related issues. Two researchers participated in each site visit, with one serving as the primary interviewer and the second as a note-taker. In most cases, interviews were tape recorded. Following each site visit, the research team would review all notes and tape recordings (as needed) and would then write a 15–20 page summary report.

After the interviewers and the “blind reader” summarized all the field notes, a team of two researchers proceeded with the data analysis. This process started with both researchers analyzing the data independently to search for recurring themes in the data. The goal of this analysis was to extract from the data dimensions that appeared to contribute or hinder technology use in schools. In addition to independent analysis by the two researchers, this process also involved discussions between the two researchers as well as lengthy discussions with other team members. Twenty-one dimensions of technology use emerged from this process:

*Professional Development:* The level of professional development programs offered, attended, and their apparent usefulness to the teachers.

*Leadership:* Strength of district leadership regarding technology.

*Resources:* Amount of computers, recent software, and other related equipment available in the district, electrical power and data capabilities, and network access of computers and peripherals.

*Technology Plan:* District has a well-written technology plan and the extent to which the plan is followed.

*Integration Specialist:* Do schools have separate FTE positions for classroom or school integration specialists?

*Teacher Support:* Level of technology support for teachers separate from professional development (e.g. just-in-time support, building level support).

*Testing:* Degree to which the state test (MCAS) plays a role in the educational mission of the district.

*Tech Director Background:* Does the District Technology Director come from the classroom or from the IT/computer industry?

*External Programs:* The extent to which the district participates in technology education programs and projects outside the district, including grants, collaborative projects, e.g. Project MEET, Gen WHY, PT3.

*Funding Level:* The districts’ operational budget funding level for technology.

*Bottom-up:* The extent to which teachers feel empowered to initiate changes and participate in the decision-making process.

*Curriculum Council:* The district maintains a curriculum council staffed with members from every school.

*Community:* The extent to which the community supports technology.

*Tech Director Decision-Making Powers:* The extent to which the District Technology Director has the power to make purchase decisions.

*Collaboration:* The extent to which teachers collaborate on any educational objective.

*Building Projects:* The role new building construction or renovation projects play in equipment acquisition.

*Technology Supports Goals:* The extent to which technology supports non-technology short-term district goals.

*Technology Standards:* Whether or not school districts have technology standards or competencies and the extent to which teachers and students are accountable for those standards.

*Vision:* The extent to which the district has a clear technology vision.

*Obstacles:* The extent to which obstacles mentioned by interviewees reflected a range of complicated issues besides “time and money.”

*Equity:* Whether or not equipment and resources were equitably distributed between schools and within schools.

One goal of the USEIT project is to provide districts with models for technology implementation and improvement. With that end in mind, the research team decided early on to use the site visit data as a springboard to identify exemplary technology programs within the participating districts. Consequently, after identifying and agreeing on the 21 dimensions of technology use, the team adopted a rating system to rate districts across the 21 dimensions. This process achieved two objectives: identifying exemplary technology programs and identifying particular areas of strength and weaknesses within each participating district.

The rating process involved rating each of the 22 participating districts across the 21 dimensions. The two researchers responsible for the site visit data analysis independently rated each district on each dimension. The researchers rated districts on each dimension on a scale from 1 to 3. For most dimensions, a score of 3 corresponded to a high score and, conversely, a score of 1 corresponded to a low score. However, the testing and building projects dimensions were scored inversely; that is, a score of 1 indicated that testing was the district’s focus or that technology upgrades were mostly achieved through building projects (e.g., the building or renovation of schools). In addition to a score on each dimension, each district was also given an overall rating which represented the average score on all the dimension scores. The overall rating enabled the research team to rank districts from high to low scoring districts based on their overall rating.

After carefully examining the field notes and summaries for each district and then rating each district across the 21 dimensions, the two researchers met on a number of occasions to discuss their independent ratings. The purpose for the multiple meetings and discussions was to reach a consensus in terms of each district’s overall rating and relative standing on the district ranking scale. In the event that the two researchers were unable to reach a consensus, then the project director was enlisted as a facilitator to help reach a consensus. Finally, after all the districts had been rated and ranked, one of the site visit interviewers who did not participate in the rating process was consulted for validation purposes.

At the end of this process, a list of high scoring, middle scoring, and low scoring districts emerged. Additionally, the lengthy discussions about the dimensions and characteristics that defined each dimension resulted in an objective and concrete con-

ceptualization of each of the dimensions. From a quantitative research epistemology, the process of establishing and refining rating criteria after the rating process, appears to be backwards. However, the research team felt that this endeavor would be more representative of the true characteristics of technology dimensions if approached from a qualitative epistemological perspective. Hence, dimension characteristics emerged from the data rather than being imposed by the researchers a priori.

## 5.2 Defining Dimension Criteria

Researchers involved in the qualitative study developed rating criteria collaboratively to rate and rank school districts on various technology dimensions. However, reliability measures for the first rating process were lower than expected. Consequently, the team decided to revise rating rubrics to ensure more reliable and consistent ratings. Moreover, based on the results of a factor analysis conducted on the first ratings, the team decided to eliminate 7 of the original dimensions, leaving a final set of 14 dimensions. Subsequently, the team re-rated the districts across the 14 dimensions. This endeavor resulted in an inter-rater reliability of 75% and Cohen’s Kappas ranging between .406 and .724, a considerable improvement from the original 59% obtained with the original criteria. Table 14 below displays the inter-rater reliability results.

**Table 14 Inter-rater Reliability for Site Visit Data**

Percent Agreement and Kappa for Ratings with Original Criteria															
Dimensions	Resources	Tech Plan	Leadership	Funding	Community	Integration Specialist	Teachers Support	PD	Goals	External Grants	Collaboration	Tech. Standards	Vision	Obstacles	Total Agreement
<b>% agreement</b>	60	80	75	65	65	80	70	65	65	55	45	90	60	70	67.5
<b>Cohen’s Kappa</b>	.41	.60	.61	.45	.35	.68	.44	.48	.38	.28	.13	.44	.36	.50	
Percent Agreement with Revised Criteria															
Dimensions	Resources	Tech Plan	Leadership	Funding	Community	Integration Specialist	Teachers Support	PD	Goals	External Grants	Collaboration	Tech. Standards	Vision	Obstacles	Total Agreement
<b>% agreement</b>	65	80	75	75	75	80	70	65	80	80	70	90	75	70	75
<b>Cohen’s Kappa</b>	.41	.60	.61	.60	.54	.68	.44	.48	.66	.66	.55	.73	.58	.50	

### 5.3 Factor Analysis of Dimension Ratings

The analysis team decided to conduct a factor analysis to understand the relationships between the different dimensions, and to reduce the dimensions into a smaller number of underlying factors. This process encompassed a number of analyses to reduce the number of dimensions into a smaller number of principal components, and to accommodate the various rating procedures. The team first conducted a factor analysis on the ratings obtained with the original rating criteria for the 21 dimensions, using principal components analysis with Varimax rotation. The factoring criterion used for this pass was minimum eigenvalue of one. After a number of factoring attempts using the scree plot criteria, and based on the team’s theoretical understanding of the data, a final 5-factor solution emerged.

Subsequently, the 5 factors were factored individually to obtain factor scores and to ensure that no other factors were present in the data. However, since researchers revised the criteria used to rate the districts on the dimensions, the team conducted further factor analyses to investigate whether new patterns emerged in the data. The second set of exploratory factor analyses were conducted using principal components factoring with Varimax and Oblimin rotation. The team used two and three factor extraction criteria for analyses based on scree plot results as well as hypotheses resulting from knowledge of the data. The factor solution adopted was a 3-factor solution. The solution supported the research hypothesis that leadership is an important factor in determining successful technology use in schools. It is important to note that the Oblimin solution allows for the correlation of factors, which is consistent with prior qualitative and quantitative data analyses that have found correlated factors. Table 15 displays the final factor solution and Table 16 presents the variance explained by each factor.

**Table 15: Final Factor Solution**

	Component 1	Component 2	Component 3
Leadership	.900		
Collaboration	.861		
Professional Development	.824		
Funding	.760		
Vision	.743		
Community	.674		
Resources	.542		
Technology Plan		.839	
Teacher Support		.540	
External Programs		.514	
Obstacles			.844
Goals			.582
Tech Standards			.500

**Table 16: Variance Explained by Final Factor Solution**

Component	Component Name	Dimensions Included	Variance Explained
Component 1	Leadership	leadership, vision, collaboration, funding, professional development, community, and resources	49.5%
Component 2	Addressing teachers' technology needs	tech plan, teacher support, external program	12%
Component 3	Overcoming obstacles	obstacles, goals, tech standards	10%
Total variance			71.5%

## 5.4 Component Interpretation

Component 1 refers to the level of technology leadership in the district. The dimensions that comprise this component are leadership, vision, collaboration, professional development, community, funding and resources. One may interpret the relationships in this component as follows:

- Leaders in districts that have strong technology leadership have a clear technology vision, higher levels of teacher collaboration, professional development programs that address teachers' technology needs and time constraints, and better funding and better resources.

Component 2 refers to the way in which districts address teachers' technology needs. One can state the relationships represented by this component as follows:

- Districts that have and implement long-term technology plans have better teacher support systems and make use of external programs as a means to train teachers and implement technology in schools.

Component 3 refers to the way in which districts overcome obstacles. Specifically, the relationships represented in this component show that districts that have successful technology programs have obstacles. However, they identify these obstacles as pertaining specifically to technology, recognize what the obstacles are and overcome them by including technology in their overall short-term goals and by implementing technology standards.

## 5.5 Correlation of Site Visit Results to Survey Data

In an effort to partially assess the validity of the surveys and the site visit ratings it is useful to examine the relationship between the site visit ratings and the district level survey data. Rather than comparing the site visit interview domain ratings to individual survey items, it is more reliable and appropriate to focus on the district level aggregated mean scale scores from the survey. In other words, instead of looking at individual administrators’ responses to survey items, we are looking at the average of responses from all administrators within a school district on a combination of survey items relating to a single domain. In essence, this comparison examines the extent to which the data collected through the site visit interviews provides information that is consistent with the data collected through the district level surveys. It is necessary to look at only those domains that were found in both measures. These include:

- leadership,
- funding,
- equity,
- technology plan/maturity and
- professional development.

The most common way of measuring the relationship between two different measures (or variables) is the correlation. If the site visit interview data and district level surveys are accurately measuring the same thing, we would expect a positive correlation. In the present analysis, the funding scale correlation between the two measures (interview and survey) is .68. This suggests that the two measures are indeed measuring the same concept. The two measures of district level leadership correlate .65 with each other. The maturity of the district’s technology program (as measured in the survey) and the district’s technology plan (as measured in the site visit) correlate .63 with each other. The two measures of Professional Development correlate at .45 (Professional Development questions in the surveys targeted specific areas and activities whereas the interview questions asked about generic issues, so .45 is considered an adequate correlation). Table 17 shows the correlations between the survey scales and the site visit interview ratings.

**Table 17: Correlations Between District Survey Scales and Site Visit Interview Dimensions**

Interview Dimensions	Scales from District Survey				
	Professional Development	Leadership	Maturity of Tech Program	Funding	Equity
Professional Dev.	<b>0.45</b>	0.33	0.25	0.48	0.46
Leadership	0.29	<b>0.65</b>	-0.06	0.15	0.39
Technology Plan	0.47	-0.06	<b>0.63</b>	0.56	0.51
Funding Level	0.42	0.19	0.36	<b>0.68</b>	0.58
Vision	0.36	0.62	-0.05	0.36	0.45

Bold figures represent strong correlations that support the idea that both data collection methods measure the same construct.

All of the correlations between the two measures of the same domain are positive and reasonably high. These results are logical and support the notion that within these domains both pieces of data are measuring similar constructs. Thus, there is reasonable evidence for validity between the two data collection procedures.

## Endnotes

- 1 The USEIT data file will be released for public use by June 2004.
- 2 Although these items may prove useful during analyses, they were added primarily to increase the value of the survey for participants.
- 3 The Advisory Board includes Hank Becker, Chris Dede, David Dwyer, Cheryl Lemke, and Linda Roberts.

# APPENDIX A

## Variable Names and Labels for Survey Items

### Teacher Questionnaire Guide

Questionnaire Location	Variable Name	Description
TEAQ1	v1name	What are the first four letters of your last name?
TEAQ2	v2yeart	How many years have you taught at your current school?
TEAQ3	v3yearc	How many years have you taught throughout your career?
TEAQ4	v4gender	What is your gender?
TEAQ5	v5age	Please mark the appropriate range for your age.
TEAQ6	v6school	How do your school's results on the state-mandated test compare to those of other schools in your state?
TEAQ7	v7usete	With your class(es), are you currently using technology during instruction as much as you would like?
TEAQ8a	v8adep.h	Are you a department head?
TEAQ8b	v8ball	Do you teach at the elementary level?
TEAQ8c	v8cengl	Do you teach English/language arts?
TEAQ8d	v8dmath	Do you teach Math?
TEAQ8e	v8essge	Do you teach Social Studies/Geography/History?
TEAQ8f	v8fspe	Do you teach Special Education?
TEAQ8g	v8gs cien	Do you teach Science?
TEAQ8h	v8hlibra	Are you a librarian?
TEAQ8i	v8ifor	Do you teach foreign languages?
TEAQ8j	v8jtech.	Do you teach Technology Education?
TEAQ8k	v8kmusi	Do you teach Music/arts?
TEAQ8l	v8l other	Do you teach something other than above?
TEAQ9a	v9ak	Do you teach Kindergarten?
TEAQ9b	v9b1	Do you teach first grade?
TEAQ9c	v9c2	Do you teach second grade?
TEAQ9d	v9d3	Do you teach third grade?
TEAQ9e	v9e4	Do you teach fourth grade?
TEAQ9f	v9f5	Do you teach fifth grade?
TEAQ9g	v9g6	Do you teach sixth grade?
TEAQ9h	v9h7	Do you teach seventh grade?
TEAQ9i	v9i8	Do you teach eighth grade?
TEAQ9j	v9j9	Do you teach ninth grade?
TEAQ9k	v9k10	Do you teach tenth grade?
TEAQ9l	v9l11	Do you teach eleventh grade?
TEAQ9m	v9m12	Do you teach twelfth grade?
TEAQ10a	v10aproj	How often do you use an LCD projector/Computer Projection System in your classroom?
TEAQ10b	v10btvv	How often do you use a TV monitor/VCR in your classroom?
TEAQ10c	v10cscan	How often do you use a scanner in your classroom?
TEAQ10d	v10ddigi	How often do you use a digital camera in your classroom?
TEAQ10e	v10eover	How often do you use an overhead projector in your classroom?
TEAQ11a	v11awo	During class time, how often did students work individually on school work without using computers this year?
TEAQ11b	v11bwco	During class time, how often did students work individually on school work using computers this year?
TEAQ11c	v11cgr	During class time, how often did students work in groups on school work without using computers this year?
TEAQ11d	v11dgr	During class time, how often did students work in groups on school work using computers this year?
TEAQ11e	v11eres.	During class time, how often did students perform research or find information without using a computer this year?
TEAQ11f	v11fres.	During class time, how often did students perform research or find information using the internet or CD-ROM this year?
TEAQ11g	v11gdev.	During class time, how often did students use a computer or portable writing device for writing this year?
TEAQ11h	v11hsolv	During class time, how often did students use a computer to solve problems this year?
TEAQ11i	v11keyyb	During class time, how often did students learn keyboarding skills this year?
TEAQ11j	v11jedg	During class time, how often did students use a computer to play educational games this year?

### Teacher Questionnaire cont.

Questionnaire Location	Variable Name	Description
TEAQ11k	v11kfun	During class time, how often did students use a computer to play games for fun this year?
TEAQ11l	v11linfo	During class time, how often did students present information to the class without using a computer this year?
TEAQ11m	v11minfo	During class time, how often did students present information to the class using a computer this year?
TEAQ11n	v11nanal	During class time, how often did students use a spreadsheet/database to record, explore or analyze data this year?
TEAQ11o	v11oprob	During class time, how often did students use probes (e.g., thermometers, etc.) attached to a computer this year?
TEAQ11p	v11pemail	During class time, how often did students use email to consult "experts" this year?
TEAQ11q	v11qemail	During class time, how often did students use computers to communicate with students in other schools this year?
TEAQ11r	v11routs	How often did students do a project or paper using a computer outside of class time this year?
TEAQ12a	v12ainst	How often did you use a computer to deliver instruction to your class?
TEAQ12b	v12bgrad	How often did you record student grades using a computer?
TEAQ12c	v12ciep	How often did you prepare or maintain IEPs using a computer?
TEAQ12d	v12dindi	How often did you adapt an activity to students' individual needs using a computer?
TEAQ12e	v12ehand	How often did you make handouts for students using a computer?
TEAQ12f	v12ftest	How often did you create a test, quiz or assignment using a computer?
TEAQ12g	v12grese	How often did you perform research and lesson planning using the internet?
TEAQ12h	v12hemai	How often did you email teachers in your school?
TEAQ12i	v12iemai	How often did you email communication with school and district administration?
TEAQ12j	v12jemai	How often did you email students' parents?
TEAQ12k	v12kinte	How often did you create web-quests or build the internet into a lesson?
TEAQ12l	v12lweb	How often did you create and maintain web pages?
TEAQ13a	v13arepo	How often do you ask students to produce reports and term paper using technology?
TEAQ13b	v13bproj	How often do you ask students to produce multimedia projects using technology?
TEAQ13c	v13cweb	How often do you ask students to produce web pages, web sites or other web-based publications using technology?
TEAQ13d	v13dart	How often do you ask students to produce pictures or artwork using technology?
TEAQ13e	v13estor	How often do you ask students to produce stories or books using technology?
TEAQ13f	v13fgrap	How often do you ask students to produce graphs or charts using technology?
TEAQ13g	v13gvide	How often do you ask students to produce videos or movies using technology?
TEAQ14a	v14acomp	For how many years have you had a computer in your classroom?
TEAQ14b	v14binte	For how many years have you had an internet connection in your classroom?
TEAQ14c	v14ccomp	For how many years have you had a computer at home?
TEAQ14d	v14dinte	For how many years have you had an internet connection in your home?
TEAQ15a	v15astud	How many years ago did you first require students to complete assignments using a computer?
TEAQ15b	v15bteac	How many years ago did you first use a computer for your own work; grading, handouts, transparencies?
TEAQ15c	v15cpers	How many years ago did you first use a computer for other activities; personal email, work processing, web-surfing?
TEAQ15d	v15dinst	How many years ago did you first use a computer for instructional purposes in your classroom?
TEAQ16a	v16a1com	How many desktop computers do you have access to in your classroom?
TEAQ16b	v16a2com	How many desktop computers in the lab/media center do you have access to?
TEAQ16c	v16a3com	How many desktop computers in the library do you have access to?
TEAQ16d	v16a4pri	How many printers are in your classroom?
TEAQ16e	v16a5lap	How many laptop computers do you have permanently in your classroom?
TEAQ16f	v16a6lap	How many shared laptop computers do you have access to?
TEAQ16g	v16a7alp	How many AlphaSmarts are in your classroom?
TEAQ16h	v16a8alp	How many AlphaSmarts do you have access to that are shared by other teachers?
TEAQ16i	v16a9pda	How many PDAs do you have access to?
TEAQ16ai	v16b1com	How often do you use desktop computers in your classroom?
TEAQ16bi	v16b2com	How often do you use desktop computers in the lab/media center?
TEAQ16ci	v16b3com	How often do you use desktop computers in the library?
TEAQ16di	v16b4pri	How often do you use printers in your classroom?
TEAQ16ei	v16b5lap	How often do you use laptop computers that you have permanently in your classroom?
TEAQ16fi	v16b6lap	How often do you use the shared laptop computers that you have access to?
TEAQ16gi	v16b7alp	How often do you use the AlphaSmarts that are in your classroom?

### Teacher Questionnaire cont.

Questionnaire Location	Variable Name	Description
TEAQ16hi	v16b8alp	How often do you use the AlphaSmarts that you have access to that are shared by other teachers?
TEAQ16ii	v16b9pda	How often do you use the PDAs that you have access to?
TEAQ17a	v17aphon	Do you have a telephone with an outside line in your classroom?
TEAQ17b	v17binte	Do you have Internet access in your classroom?
TEAQ17c	v17c4co	Do you have 4 desktop computers in your classroom?
TEAQ17d	v17d4la	Do you have 4 wireless laptops in your classroom?
TEAQ17e	v17e1fo	Do you have one desktop computer for each student in a lab?
TEAQ17f	v17f1la	Do you have one wireless laptop for each student in your classroom?
TEAQ17g	v17gdigi	Do you have a digital camera in your classroom?
TEAQ17h	v17hprin	Do you have one classroom printer?
TEAQ17i	v17impr	Do you have multiple classroom printers?
TEAQ17j	v17jtvv	Do you have a TV monitor with a VCR?
TEAQ17k	v17klcd	Do you have an LCD projector/computer projection system in your classroom?
TEAQ17l	v17lpalm	Do you have a Palm Pilot for each student?
TEAQ17m	v17mwrit	Do you have a portable writing device (e.g., AlphaSmart) for each student?
TEAQ17n	v17ncomp	Do you have a desktop computer the teachers can access in their classroom available to you?
TEAQ17o	v17olapt	Do you have a laptop for teacher use available to you?
TEAQ17p	v17ppalm	Do you have a Palm Pilot for teacher use available to you?
TEAQ17q	v17qover	Do you have an overhead projector available to you?
TEAQ18a	v18aphon	How valuable to you would a telephone with an outside line be in your classroom?
TEAQ18b	v18binte	How valuable to you would Internet access in your classroom be?
TEAQ18c	v18c4co	How valuable to you would 4 desktop computers in your classroom be?
TEAQ18d	v18d4la	How valuable to you would 4 wireless laptops in your classroom be?
TEAQ18e	v18e1co	How valuable to you would one desktop computer for each student in a lab be?
TEAQ18f	v18f1la	How valuable to you would one wireless laptop for each student in your classroom be?
TEAQ18g	v18gdigi	How valuable to you would a digital camera in your classroom be?
TEAQ18h	v18h1pr	How valuable to you would one classroom printer be?
TEAQ18i	v18impr	How valuable to you would multiple classroom printers be?
TEAQ18j	v18jtvv	How valuable to you would a TV monitor with a VCR be?
TEAQ18k	v18klcd	How valuable to you would an LCD projector/computer projection system in your classroom be?
TEAQ18l	v18lpalm	How valuable to you would a Palm Pilot for each student be?
TEAQ18m	v18mwrit	How valuable to you would a portable writing device (e.g., AlphaSmart) for each student be?
TEAQ18n	v18ncomp	How valuable to you would a desktop computer the teachers can access in their classroom be?
TEAQ18o	v18olapt	How valuable to you would a laptop for your use be?
TEAQ18p	v18pplam	How valuable to you would a Palm Pilot for your use be?
TEAQ18q	v18qover	How valuable to you would an overhead projector be?
TEAQ19	v19tech	Which would be more valuable; 4 desktop computers in your classroom, one desktop computer for each student in a lab, a mobile cart with one wireless laptop for each student available for sign-out?
TEAQ20	v20email	Which of the following describes the e-mail system in your school?
TEAQ21a	v21aaimp	How important is using technology to improve classroom instruction in your school/districts technology vision?
TEAQ21b	v21abimp	How important is using technology to improve student performance in your school/districts technology vision?
TEAQ21c	v21actea	How important is student proficiency in teaming and collaboration in your school/districts technology vision?
TEAQ21d	v21addat	How important is student proficiency in data analysis in your school/districts technology vision?
TEAQ21e	v21aetea	How important is increasing teacher proficiency in the use of technology in your school/districts technology vision?
TEAQ21f	v21affut	How important is preparing students for future jobs in your school/districts technology vision?
TEAQ21g	v21agtes	How important is improving student test scores in your school/districts technology vision?
TEAQ21h	v21ahlea	How important is promoting active learning strategies in your school/districts technology vision?
TEAQ21i	v21airef	How important is supporting instructional reform in your school/districts technology vision?
TEAQ21j	v21ajpar	How important is satisfying parents' and community interests in your school/districts technology vision?
TEAQ21k	v21akski	How important is improving student computer skills and abilities in your school/districts technology vision?
TEAQ21l	v21alres	How important is improving student proficiency in research in your school/districts technology vision?
TEAQ21m	v21amtea	How important is improving productivity and efficiency in your school/districts technology vision?

### Teacher Questionnaire cont.

Questionnaire Location	Variable Name	Description
TEAQ21n	v21anlev	How important is target level of technology (i.e., student/computer ratio) in your school/districts technology vision?
TEAQ21ai	v21baimp	How important is using technology to improve classroom instruction in shaping computer use in your classroom?
TEAQ21bi	v21bbimp	How important is using technology to improve student performance in shaping computer use in your own classroom?
TEAQ21ci	v21bctea	How important is student proficiency in teaming and collaboration in shaping computer use in your own classroom?
TEAQ21di	v21bddat	How important is student proficiency in data analysis in shaping computer use in your own classroom?
TEAQ21ei	v21betea	How important is increasing teacher proficiency in the use of technology in shaping computer use in your own classroom?
TEAQ21fi	v21bffut	How important is preparing students for future jobs in shaping computer use in your own classroom?
TEAQ21gi	v21bgtes	How important is improving student test scores in shaping computer use in your own classroom?
TEAQ21hi	v21bhlea	How important is promoting active learning strategies in shaping computer use in your own classroom?
TEAQ21ii	v21biref	How important is supporting instructional reform in shaping computer use in your own classroom?
TEAQ21ji	v21bjpar	How important is satisfying parents' and community interests in shaping computer use in your own classroom?
TEAQ21ki	v21bkski	How important is improving student computer skills and abilities in shaping computer use in your own classroom?
TEAQ21li	v21blres	How important is improving student proficiency in research in shaping computer use in your own classroom?
TEAQ21mi	v21bmtea	How important is improving productivity and efficiency in shaping computer use in your own classroom?
TEAQ21ni	v21bnlev	How important is target level of technology (i.e., student/computer ratio) in shaping computer use in your own classroom?
TEAQ22	v22scl	How aware are you of your school/districts vision for the use of technology in your classes?
TEAQ23a	v23afit	Where is your school today in terms of teacher flexibility versus district control?
TEAQ23b	v23b5ye	Where was your school 5 years ago in terms of teacher flexibility versus district control?
TEAQ24	v24skill	Where does the greatest focus of your district's technology standards lie?
TEAQ25a	v25abyo	Are technology related workshops and seminars; run by an outside source available to educators at your school?
TEAQ25b	v25bbyd	Are technology related workshops and seminars; run by district personnel available to educators at your school?
TEAQ25c	v25cinw	Are technology related University or college coursework supported by the district in whole or in part available to educators at your school?
TEAQ25d	v25dment	Are technology related mentor/colleagues available to educators at your school?
TEAQ25e	v25econ	Is attendance at technology related conferences available to educators at your school?
TEAQ25f	v25fdist	Are technology related district or school sponsored courses (over several weeks) available to educators at your school?
TEAQ25g	v25gonli	Are technology related online or web based professional development available to educators at your school?
TEAQ25h	v25htra	Are technology related one-on-one or group training with technology staff available to educators at your school?
TEAQ25i	v25idept	Is release time available for department or grade level planning related to technology?
TEAQ25j	v25jindi	Is release time available for individual professional development related to technology?
TEAQ26a	v26abyo	Did you participate in a technology related workshop or seminars; run by an outside source?
TEAQ26b	v26bbyd	Did you participate in a technology related workshop or seminars; run by district personnel?
TEAQ26c	v26cinw	Did you participate in a technology related University or college coursework supported by the district in whole or in part?
TEAQ26d	v26dment	Did you have a technology related mentor/colleague available?
TEAQ26e	v26econ	Did you attend a technology related conferences?
TEAQ26f	v26fdist	Did you participate in a technology related district or school sponsored courses (over several weeks)?
TEAQ26g	v26gonli	Did you participate in technology related online or web based professional development?
TEAQ26h	v26htra	Did you participate in a technology related one-on-one or group training with technology staff?
TEAQ26ii	v26idept	Did you receive technology related release time for department or grade level planning related to technology?
TEAQ26j	v26jindi	Did you receive technology related release time available for individual professional development?
TEAQ27a	v27asupe	How much emphasis does your superintendent or assistant superintendent place on technology?
TEAQ27b	v27bprin	How much emphasis does your principal place on technology?
TEAQ27c	v27cdept	How much emphasis does your department head place on technology?
TEAQ27d	v27dyour	How much emphasis do you place on technology?
TEAQ28	v28prof.	What best describes your school's focus on professional development related to technology?
TEAQ29a	v29amana	Beneficial professional development: managing my computer desktop (opening programs, printing etc.)?
TEAQ29b	v29butil	Beneficial professional development: learning to utilize network services efficiently (e-mail, saving to the server)?
TEAQ29c	v29csour	Beneficial professional development: learning about research sources on the Internet?
TEAQ29d	v29ddata	Beneficial professional development: learning how to manipulate data and constructing graphs?
TEAQ29e	v29etech	Beneficial professional development: integrating technology with student writing?

### Teacher Questionnaire cont.

Questionnaire Location	Variable Name	Description
TEAQ29f	v29ftech	Beneficial professional development: integrating technology into my classroom activities?
TEAQ29g	v29gappl	Beneficial professional development: learning specific applications/software (Microsoft Word, PowerPoint)?
TEAQ29h	v29honli	Beneficial professional development: learning to use the Internet to engage in online interactions and/or mentoring?
TEAQ30a	v30ahard	The ideal Technology Specialist in my school would be a computer hardware/software specialist.
TEAQ30b	v30bcurr	The ideal Technology Specialist in my school would be a curriculum specialist.
TEAQ30c	v30clas	The ideal Technology Specialist in my school would be a classroom teacher.
TEAQ30d	v30dcomp	The ideal Technology Specialist in my school would be a computer teacher
TEAQ31a	v31alack	Is the lack of computers in the classroom an obstacle for you making more effective use of technology?
TEAQ31b	v31bdif	Is the difficulty in accessing computers in labs and/or library an obstacle for you making more effective use of technology?
TEAQ31c	v31cnot	Is not having enough computers for all of your students an obstacle for you making more effective use of technology?
TEAQ31d	v31dnop	Is the unavailability of software that your professional development has trained you to use an obstacle for you making more effective use of technology?
TEAQ31e	v31enot	Is the lack of practice with software that your professional development has trained you to use an obstacle for you making more effective use of technology?
TEAQ31f	v31fnos	Is insufficient or inadequate software an obstacle for you making more effective use of technology?
TEAQ31g	v31gnos	Is insufficient or inadequate support on how to use technology in the classroom an obstacle for you making more effective use of technology?
TEAQ31h	v31hdon	Are unpredictable computers an obstacle for you making more effective use of technology?
TEAQ31i	v31iold	Are outdated computers/software an obstacle for you making more effective use of technology?
TEAQ31j	v31jfast	Is increased speed and improved technology an obstacle for you making more effective use of technology?
TEAQ31k	v31klack	Is the lack of student's keyboarding skills an obstacle for you making more effective use of technology?
TEAQ31l	v31ltoo	Does having too many students in your class act as an obstacle for you making more effective use of technology?
TEAQ31m	v31mdif.	Do differences between the computers you have at home and those at school act as an obstacle for you making more effective use of technology?
TEAQ31n	v31nnos	Is the lack of students' skills using a computer effectively an obstacle for you making more effective use of technology?
TEAQ31o	v31otoo	Does the amount of course material you have to cover in a year act as an obstacle for you making more effective use of technology?
TEAQ31p	v31plack	Does teachers' lack of input into technology decisions act as an obstacle for you making more effective use of technology?
TEAQ31q	v31qlack	Do difficulties connecting with the school technology specialist act as an obstacle for you making more effective use of technology?
TEAQ31r	v31rtoo	Does a slow internet act as an obstacle for you making more effective use of technology?
TEAQ31s	v31slack	Does lack of leadership related to technology act as an obstacle for you making more effective use of technology?
TEAQ31t	v31tnoi	Does not knowing how the district wants you to use technology in the classroom act as an obstacle for you making more effective use of technology?
TEAQ31u	v31ulack	Does a lack of flexibility in deciding how to you use computers in your classroom act as an obstacle for you making more effective use of technology?
TEAQ31v	v31vrel	Is not being sure how to make technology relevant to your subject area act as an obstacle for you making more effective use of technology?
TEAQ31w	v31wtech	Does a wide variety of computer skills among the students in your classroom act as an obstacle for you making more effective use of technology?
TEAQ31x	v31xacad	Does a wide variety of academic skills among the students in your classroom act as an obstacle for you making more effective use of technology?
TEAQ32a	v32a1com	Do you have problems getting the computer to work?
TEAQ32b	v32a2sof	Do you have problems getting the software to work?
TEAQ32c	v32a3pri	Do you have problems getting the printer to work?
TEAQ32d	v32a4acc	Do you have problems accessing network folders/files?
TEAQ32e	v32a5int	Do you have problems connecting to the internet?
TEAQ32f	v32a6ema	Do you have problems emailing?
TEAQ32g	v32a7inc	Do you have problems incorporating technology into lessons?
TEAQ32h	v32a8man	Do you have problems managing students when they use computers?
TEAQ32ai	v32b1com	If you have problems getting the computer to work, typically how long does it take to resolve?
TEAQ32bi	v32b2sof	If you have problems getting the software to work, typically how long does it take to resolve?
TEAQ32ci	v32b3pri	If you have problems getting the printer to work, typically how long does it take to resolve?
TEAQ32di	v32b4acc	If you have problems accessing network folders/files, typically how long does it take to resolve?
TEAQ32ei	v32b5int	If you have problems connecting to the internet, typically how long does it take to resolve?
TEAQ32fi	v32b6ema	If you have problems emailing, typically how long does it take to resolve?
TEAQ32gi	v32b7inc	If you have problems incorporating technology into lessons, typically how long does it take to resolve?
TEAQ32hi	v32b8man	If you have problems managing students when they use computers, typically how long does it take to resolve?

### Teacher Questionnaire cont.

Questionnaire Location	Variable Name	Description
TEAQ33a	v33aspec	When you are experiencing a problem with your classroom computer, how helpful is your Instructional Technology Specialist?
TEAQ33b	v33bhelp	When you are experiencing a problem with your classroom computer, how helpful is your Technician or District "Help Desk"?
TEAQ33c	v33clibr	When you are experiencing a problem with your classroom computer, how helpful is the librarian?
TEAQ33d	v33daid	When you are experiencing a problem with your classroom computer, how helpful are other teachers/aides?
TEAQ33e	v33estud	When you are experiencing a problem with your classroom computer, how helpful are students?
TEAQ34a	v34ateac	When your students need help with the computer in school, how often do they ask you, the teacher for help?
TEAQ34b	v34bstud	When your students need help with the computer in school, how often do they ask other students for help?
TEAQ34c	v34clibr	When your students need help with the computer in school, how often do they ask the librarian for help?
TEAQ34d	v34dspec	When your students need help with the computer in school, how often do they ask the Technology Specialist or Tech. Aide for help?
TEAQ34e	v34eothe	When your students need help with the computer in school, how often do they ask other adults in the school for help?
TEAQ35a	v35aexam	Influence on computer use: Other teachers have shared examples of how they use computers with their students
TEAQ35b	v35bdist	Influence on computer use: The fact that the district has put computers in my classroom encourages me to use them with my students
TEAQ35c	v35cdemo	Influence on computer use: The technology director and or specialist has demonstrated uses that I have adapted to the classroom
TEAQ35d	v35dclas	Influence on computer use: I have worked with my colleagues to design lessons that require classroom use of computers
TEAQ35e	v35ework	Influence on computer use: Professional development workshops led by someone outside of the school have demonstrated uses that I have adapted to my classroom
TEAQ36a	v36aprof	Rate the degree of success your district has had implementing technical professional development.
TEAQ36b	v36binte	Rate the degree of success your district has had integrating technology into the curriculum.
TEAQ36c	v36ctech	Rate the degree of success your district has had implementing technical support.
TEAQ36d	v36dhard	Rate the degree of success your district has had implementing access to hardware.
TEAQ36e	v36esoft	Rate the degree of success your district has had implementing access to software.
TEAQ36f	v36fnetw	Rate the degree of success your district has had implementing network services.
TEAQ37a	v37athis	How important have computers been in your teaching this year?
TEAQ37b	v37b3ye	How important have computers been in your teaching three years ago?
TEAQ37c	v37c5ye	How important have computers been in your teaching five years ago?
TEAQ38a	v38athis	How confident have you been when using computers this year?
TEAQ38b	v38b3ye	How confident were you when you used computers three years ago?
TEAQ38c	v38c5ye	How confident were you when you used computers five years ago?
TEAQ39a	v39agrou	How much pressure do you feel to have students work in groups?
TEAQ39b	v39buse	How much pressure do you feel to have students use computers?
TEAQ39c	v39ccove	How much pressure do you feel to cover a large quantity of curriculum content?
TEAQ39d	v39dquie	How much pressure do you feel to keep your class quiet, even if that means students are less engaged?
TEAQ39e	v39euse	How much pressure do you feel to have students use the Internet?
TEAQ39f	v39fperf	How much pressure do you feel to do performance-based assessments?
TEAQ39g	v39gproj	How much pressure do you feel to have students do projects?
TEAQ39h	v39hsame	How much pressure do you feel to use technology in the same way as other teachers in your grade?
TEAQ39i	v39istd.	How much pressure do you feel to prepare students to take standardized tests?
TEAQ39j	v39jhigh	How much pressure do you feel to do higher order thinking and "problem solving"?
TEAQ40a	v40anom	Teachers know a lot more than students; they shouldn't let students muddle around when they can just explain the answers directly.
TEAQ40b	v40bquie	A quiet classroom is generally needed for effective learning.
TEAQ40c	v40ctecac	It is better when the teacher, not the students, decides what activities are done.
TEAQ40d	v40dstud	Students will take more initiative to learn when they feel free to move around the room during class.
TEAQ40e	v40estud	Students should help establish criteria on which they will be assessed.
TEAQ40f	v40finst	Instruction should be built around problems with clear, correct answers and around ideas that students can grasp quickly.
TEAQ40g	v40gteac	How much students learn depends on how much background knowledge they have, that is why teaching facts is so necessary.
TEAQ40h	v40hcoll	Instruction is most effective when teachers collaborate.
TEAQ40i	v40ibett	Students create better looking products with computers than with other traditional media.
TEAQ40j	v40jwrit	Students' writing quality is worse when they use word processors.
TEAQ40k	v40klazy	Computers encourage students to be lazy.
TEAQ40l	v40linte	Students interact with each other more while working with computers.
TEAQ40m	v40mgras	Computers help students grasp difficult curricular concepts.

### Teacher Questionnaire cont.

Questionnaire Location	Variable Name	Description
TEAQ40n	v40nweak	Computers have weakened students' research skills.
TEAQ40o	v40oavoi	Many students use computers to avoid doing more important schoolwork.
TEAQ40p	v40phard	Students work harder at their assignments when they use computers.
TEAQ40q	v40qmore	Students are more willing to do second drafts when using computer.
TEAQ40r	v40rkeep	Technology support in my school exists primarily to keep the computers running.
TEAQ40s	v40sinte	Technology support exists primarily to help teachers integrate computers with teaching.
TEAQ41a	v41howm	In the class in which you use technology the most how many students are in that class?
TEAQ41b	v41bleas	In the class in which you use technology the least how many students are in that class?
TEAQ42a	v42avg	In the class in which you use technology the most, what is the average ability level of the students?
TEAQ42b	v42bleas	In the class in which you use technology the least, what is the average ability level of the students?
TEAQ43ai	v43a1gif	In the class in which you use technology the most, what percentage of the students participated in a gifted and talented program?
TEAQ43aaii	v43a2esl	In the class in which you use technology the most, what percentage of the students participated in an ESL program?
TEAQ43aaiii	v43a3spe	In the class in which you use technology the most, what percentage of the students participated in a special education program?
TEAQ43aiv	v43a4hom	In the class in which you use technology the most, what percentage of the students have a computer at home?
TEAQ43av	v43a5hom	In the class in which you use technology the most, what percentage of the students have a computer at home with Internet access?
TEAQ43bi	v43b1lea	In the class in which you use technology the least, what percentage of the students participated in a gifted and talented program?
TEAQ43bii	v43b2lea	In the class in which you use technology the least, what percentage of the students participated in an ESL program?
TEAQ43biii	v43b3lea	In the class in which you use technology the least, what percentage of the students participated in a special education program?
TEAQ43biv	v43b4lea	In the class in which you use technology the least, what percentage of the students have a computer at home?
TEAQ43bv	v43b5lea	In the class in which you use technology the least, what percentage of the students have a computer at home with Internet access?
TEAQ44a	v44adisc	Discussion of school goals and how to achieve them is a regular part of our faculty meetings.
TEAQ44b	v44bvalu	My principal's values and philosophy of education are similar to my own.
TEAQ44c	v44crese	Research and best practices are shared and discussed in my school/district.
TEAQ44d	v44dnew	New ideas presented at in-services are discussed afterwards by teachers in this school.
TEAQ44e	v44eshar	Most teachers here share my beliefs about what the central goals of the schools should be.
TEAQ44f	v44fcont	Teachers in the school are continually learning and seeking new ideas.
TEAQ44g	v44gshar	It is common for us to share samples of students' work.
TEAQ44h	v44hpres	If the teacher is not doing a good job, they are pressed by school leaders or colleagues to improve.
TEAQ44i	v44istaf	Staff development activities are followed by support to help teachers implement new practices.
TEAQ44j	v44jhind	There are hindrances to implementing new ideas at my school.
TEAQ44k	v44kwith	I have a good working relationship with my principal.
TEAQ44l	v44lwith	I have a good working relationship with the school technology specialist.
TEAQ44m	v44minpu	Teachers have a lot of input regarding innovations, projects, and changing practices.
TEAQ44n	v44ntech	In my district, technology is an integral part of the overall education program.
TEAQ44o	v44oexpe	My school encourages experimentation.
TEAQ44p	v44pment	Formal teacher mentoring actively occurs in my school.
TEAQ45	v45envir	How would you best describe the learning environment in your school?
TEAQ46a	v46a	*
TEAQ46b	v46b	*
TEAQ46c	v46c	*
TEAQ46d	v46d	*
TEAQ46e	v46e	*

## Student Questionnaire Guide

### Student Questionnaire: Grades 3 through 8

Questionnaire Location	Variable Name	Description
STUDQ1	q1name	First four letters of teacher's last name
STUDQ2	q2gender	Gender
STUDQ3	q3ethnic	Race
STUDQ4	q4books	Number of books of your own at home
STUDQ5	q5wherel	Where do you learn new things with computers
STUDQ6	q6grade	Grade
STUDQ7a	q7teache	When you need help with a computer at school, how often do you ask a teacher for help?
STUDQ7b	q7friend	When you need help with a computer at school, how often do you ask a friend or another student for help?
STUDQ7c	q7librar	When you need help with a computer at school, how often do you ask a Librarian for help?
STUDQ7d	q7techsp	When you need help with a computer at school, how often do you ask a Technology Specialist or Technology Aide for help?
STUDQ7e	q7adult	When you need help with a computer at school, how often do you ask other adults in the school for help?
STUDQ8	q8whereu	Where do you use technology the most in school?
STUDQ9	q9hard	How hard is it to complete homework done using a computer?
STUDQ10a	q10email	How often use a computer to send and receive email?
STUDQ10b	q10draft	How often use a computer to write first drafts?
STUDQ10c	q10edit	How often use a computer to edit your papers?
STUDQ10d	q10serve	How often use a computer to open files server/network?
STUDQ10e	q10inter	How often use a computer to find info on the net?
STUDQ10f	q10ppt	How often use a computer to create a Hyperstudio or PowerPoint presentation?
STUDQ10g	q10games	How often use a computer to play computer games?
STUDQ10h	q10dbt	How often use a computer to work with spreadsheet or database?
STUDQ11a	q11email	How well able to use a computer to send and receive email?
STUDQ11b	q11draft	How well able to use a computer to write first drafts?
STUDQ11c	q11edit	How well able to use a computer to edit your papers?
STUDQ11d	q11serve	How well able to use a computer to open files on a server/network?
STUDQ11e	q11inter	How well able to use a computer to find info on the net?
STUDQ11f	q11ppt	How well able to use a computer to create a Hyperstudio or PowerPoint presentation?
STUDQ11g	q11game	How well able to use a computer to play computer games?
STUDQ11h	q11dbt	How well able to use a computer to work with spreadsheet or database?
STUDQ12	q12teach	How often does your teacher use a computer when teaching?
STUDQ13	q13class	How often use a computer in class?
STUDQ14	q14find	Finding a computer at school to use?
STUDQ15	q15perso	Statement about personal use of computer?
STUDQ16a	q16schoo	How much time do you spend using a computer at school?
STUDQ16b	q16home	How much time do you spend using a computer at home?
STUDQ17a	q17fnis	When you are using a computer do you create a better product?
STUDQ17b	q17write	When you are using a computer do you write better?
STUDQ17c	q17lazy	When you are using a computer do you take short cuts and get lazy?
STUDQ17d	q17more	When you are using a computer, do you spend more time with others?
STUDQ17e	q17bette	When you are using a computer, do you better understand?
STUDQ17f	q17harde	When you are using a computer, do you work harder?
STUDQ17g	q17copy	When you are using a computer, do you find it easy to just copy?
STUDQ17h	q17confu	When you are using a computer, do you get more confused?
STUDQ17i	q17frust	When you are using a computer, do you get frustrated more easily?
STUDQ18	q18comp	How many computers do you have at home?
STUDQ19	q19conne	What type of internet connection do you have at home?
STUDQ20	q20shar	How many people share your home computer?
STUDQ21	q21usem	Who uses your home computer the most?
STUDQ22	q22diifi	At home, how difficult to get on your computer?
STUDQ23	q23howlo	How long have you had a computer at home?

### Student Questionnaire: Grades 3 through 8 cont.

Questionnaire Location	Variable Name	Description
STUDQ24a	q24game	How often use your home PC to play games ?
STUDQ24b	q24chat	How often use your home PC to chat or instant message?
STUDQ24c	q24email	How often use your home PC to email?
STUDQ24d	q24schoo	How often use your home PC to search the net for school?
STUDQ24e	q24fun	How often use your home PC to search the net for fun?
STUDQ24f	q24music	How often use your home PC to mp3 or music?
STUDQ24g	q24write	How often use your home PC to write papers?
STUDQ24h	q24prog	How often use your home PC for programming?
STUDQ24i	q24web	How often use your home PC to create web sites?
STUDQ24j	q24photo	How often use your home PC for digital photos or movies?

### Student Questionnaire Guide: Grades 6 through 9

Questionnaire Location	Variable Name	Description
STUDQ1a	v1ascie	Four letters of science teacher's last name
STUDQ1b	v1bmath	Four letters of math teacher's last name
STUDQ1c	v1cso	Four letters of social studies teacher's last name
STUDQ1d	v1deng	Four letters of English teacher's last name
STUDQ2	v2boyg	Gender
STUDQ3	v3ethni	Race
STUDQ4	v4book	Number of books of your own at home
STUDQ5	v5where	Where do you learn new things with computers?
STUDQ6	v6grade	Grade
STUDQ7	v7uset	Where do you use technology most in school?
STUDQ8a	v8ateac	When you need help with a computer at school, how often do you ask a teacher for help?
STUDQ8b	v8bfrie	When you need help with a computer at school, how often do you ask a friend or another student for help?
STUDQ8c	v8clibr	When you need help with a computer at school, how often do you ask a Librarian for help?
STUDQ8d	v8dtech	When you need help with a computer at school, how often do you ask a Technology Specialist or Technology Aide for help?
STUDQ8e	v8eothe	When you need help with a computer at school, how often do you ask other adults in the school for help?
STUDQ9	v9sci	How often does science teacher use computers to teach?
STUDQ10	v10sci	How often do you use computers in science class?
STUDQ11	v11math	How often does math teacher use computers to teach?
STUDQ12	v12math	How often do you use computers in math class?
STUDQ13	v13eng	How often does English teacher use computers to teach?
STUDQ14	v14eng	How often do you use computers in English class?
STUDQ15	v15soci	How often does social studies teacher use computers to teach?
STUDQ16	v16soci	How often do you use computers in social studies class?
STUDQ17a	v17aema	How often do you use a computer to send and receive email?
STUDQ17b	v17bdra	How often do you use a computer to write first drafts?
STUDQ17c	v17cedi	How often do you use a computer to edit your papers?
STUDQ17d	v17dser	How often do you use a computer to open files server-network?
STUDQ17e	v17efin	How often do you use a computer to find info on the net?
STUDQ17f	v17fppt	How often do you use a computer to create a Hyperstudio or PowerPoint presentation?
STUDQ17g	v17ggam	How often do you use a computer to play computer games?
STUDQ17h	v17hspre	How often do you use a computer to work with spreadsheets or databases?
STUDQ18a	v18aema	How well able to use a computer to send and receive email?
STUDQ18b	v18bdra	How well able to use a computer to write first drafts?
STUDQ18c	v18cedi	How well able to use a computer to edit your papers?
STUDQ18d	v18dnet	How well able to use a computer to open files on a server-network?
STUDQ18e	v18efin	How well able to use a computer to find info on the net?

### Student Questionnaire Guide: Grades 6 through 9 cont.

Questionnaire Location	Variable Name	Description
STUDQ18f	v18fppt	How well able to use a computer to create a Hyperstudio or PowerPoint presentation?
STUDQ18g	v18ggam	How well able to use a computer to play computer games?
STUDQ18h	v18hspr	How well able to use a computer to work with spreadsheet or database?
STUDQ19	v19pers	Statement about personal use of computer.
STUDQ20	v20ins	Finding a computer at school to use.
STUDQ21	v21hard	How hard is it to complete homework done using a computer?
STUDQ22a	v22afin	When you are using a computer do you create a better product?
STUDQ22b	v22bwri	When you are using a computer do you write better?
STUDQ22c	v22csho	When you are using a computer do you get lazy?
STUDQ22d	v22dmor	When you are using a computer, do you spend more time with others?
STUDQ22e	v22eund	When you are using a computer, do you better understand?
STUDQ22f	v22fwor	When you are using a computer, do you work harder?
STUDQ22g	v22gcop	When you are using a computer, do you find it easy to just copy?
STUDQ22h	v22hcon	When you are using a computer, do you get more confused?
STUDQ22i	v22ifru	When you are using a computer, do you get frustrated more easily?
STUDQ23a	v23asch	How much time do you spend using a computer at school?
STUDQ23b	v23bhom	How much time do you spend using a computer at home?
STUDQ24	v24num	How many computers do you have at home?
STUDQ25	v25how	How long have you had a computer at home?
STUDQ26	v26inte	What type of internet connection do you have at home?
STUDQ27	v27sha	How many people share your home computer?
STUDQ28	v28use	Who uses your home computer the most?
STUDQ29	v29diff	At home, how difficult is it to get on your computer?
STUDQ30a	v30agam	How often use your home PC to play games?
STUDQ30b	v30bcha	How often use your home PC to chat or instant message?
STUDQ30c	v30cema	How often use your home PC to email?
STUDQ30d	v30dsea	How often use your home PC to search the net for school?
STUDQ30e	v30efun	How often use your home PC to search the net for fun?
STUDQ30f	v30fmus	How often use your home PC to mp3 or music?
STUDQ30g	v30gwri	How often use your home PC to write papers?
STUDQ30h	v30hpro	How often use your home PC for programming?
STUDQ30i	v30iweb	How often use your home PC to create web sites?
STUDQ30j	v30jpho	How often use your home PC for digital photos or movies?

## Lower and Upper Grade Student File Combined

Variable Name in Grade 5	Variable Name in Grade 8	Combined File Variable Name	Description
Q1		v1	First four letters of teacher's last name
	v1ascie	v2	Four letters of science teacher's last name
	v1bmath	v3	Four letters of math teacher's last name
	v1cso	v4	Four letters of social studies teacher's last name
	v1deng	v5	Four letters of English teacher's last name
Q2	v2boyg	v6	Gender
Q3	v3ethni	v7	Race
Q4	v4book	v8	Number of books of your own at home
q5wherel	v5where	v9	Where do you learn new things with computers?
q6grade	v6grade	v10	Grade
grade	grade	v10a	Grade
q7teache	v8ateach	v11	Ask a teacher for help?
q7friend	v8bfrie	v12	Ask a friend or another student for help?
q7librar	v8clibr	v13	Ask a Librarian for help?
q7techsp	v8dtech	v14	Ask a Technology Specialist or Technology Aide for help?
q7adult	v8eothe	v15	Ask other adults in the school for help?
q8whereu	v7uset	v16	Where do you use tech most in school?
	v9sci	v17	How often does science teacher use computers to teach?
	v10sci	v18	How often do you use computers in science class?
	v11math	v19	How often does math teacher use computers to teach?
	v12math	v20	How often do you use computers in math class?
	v13eng	v21	How often does English teacher use computers to teach?
	v14eng	v22	How often do you use computers in English class?
	v15soc	v23	How often does social studies teacher use computers to teach?
	v16soc	v24	How often do you use computers in social studies class?
q9hard	v21hard	v25	How hard is it to complete homework done using a computer?
q10email	v17aema	v26	How often do you use a computer to send and receive email?
q10draft	v17bdra	v27	How often do you use a computer to write first drafts?
q10edit	v17cedi	v28	How often do you use a computer to edit your papers?
q10serve	v17dser	v29	How often do you use a computer to open files server-network?
q10inter	v17efin	v30	How often do you use a computer to find info on the net?
q10ppt	v17fppt	v31	How often do you use a computer to create a Hyperstudio or PowerPoint presentation?
q10games	v17ggam	v32	How often do you use a computer to play computer games?
q10dbt	v17hspre	v33	How often do you use a computer to work with spreadsheets or database?
q11email	v18aema	v34	How well able to use a computer to send and receive email?
q11draft	v18bdra	v35	How well able to use a computer to write first drafts?
q11edit	v18cedi	v36	How well able to use a computer to edit your papers?
q11serve	v18dser	v37	How well able to use a computer to open files on a server-network?
q11inter	v18efin	v38	How well able to use a computer to find info on the net?
q11ppt	v18fppt	v39	How well able to use a computer to create a Hyperstudio or PowerPoint presentation?
q11game	v18ggam	v40	How well able to use a computer to play computer games?
q11dbt	v18hspre	v41	How well able to use a computer to work with spreadsheet or database?
q12teach		v42	How often does your teacher use a computer when teaching?
q13class		v43	How often do you use a computer in class?
q14find	v20ins	v44	Finding a computer at school to use
q15perso	v19pers	v45	Statement about personal use of computer
q16schoo	v23asch	v46	How much time do you spend using a computer at school?
q16home	v23bhom	v47	How much time do you spend using a computer at home?

### Lower and Upper Grade Student File Combined cont.

Variable Name in Grade 5	Variable Name in Grade 8	Combined File Variable Name	Description
q17finis	v22afin	v48	When you are using a computer do you create a better product?
q17write	v22bwri	v49	When you are using a computer do you write better?
q17lazy	v22csch	v50	When you are using a computer do you get lazy?
q17more	v22dmor	v51	When you are using a computer, do you spend more time with others?
q17bette	v22eund	v52	When you are using a computer, do you better understand?
q17harde	v22fwor	v53	When you are using a computer, do you work harder?
q17copy	v22gcop	v54	When you are using a computer, do you find it easy to just copy?
q17confu	v22hcon	v55	When you are using a computer, do you get more confused?
q17frust	v22ifru	v56	When you are using a computer, do you get frustrated more easily?
q18#comp	v24num	v57	How many computers do you have at home?
q19conne	v26inte	v58	What type of internet connection do you have at home?
q20#shar	v27sha	v59	How many people share your home computer?
q21usem	v28use	v60	Who uses your home computer the most?
q22diifi	v29diff	v61	At home, how difficult is it to get on your computer?
q23howlo	v25how	v62	How long have you had a computer at home?
q24game	v30agam	v63	How often do you use your home PC to play games?
q24chat	v30bcha	v64	How often do you use your home PC to chat or instant messaging?
q24email	v30cema	v65	How often do you use your home PC to email?
q24schoo	v30dsea	v66	How often do you use your home PC search the net for school?
q24fun	v30efun	v67	How often do you use your home PC search the net for fun?
q24music	v30fmus	v68	How often do you use your home PC to mp3 or music?
q24write	v30gwri	v69	How often do you use your home PC to write papers?
q24prog	v30hpro	v70	How often do you use your home PC for programming?
q24web	v30iweb	v71	How often do you use your home PC to create web sites?
q24photo	v30jpho	v72	How often do you use your home PC for digital photos or movies?

## Principal Questionnaire Items

Questionnaire Location	Variable Name	Description
PRIQ1	p1years	How many years have you been at your current school?
PRIQ2a	p2thisd	Have you taught in an elementary, middle, or high school setting in this school district?
PRIQ2b	p2otherd	Have you taught in an elementary, middle, or high school setting in another school district?
PRIQ2c	p2last5	Have you taught in an elementary, middle, or high school setting within the last five years?
PRIQ2d	p2nevert	No, I have never taught in an elementary, middle, or high school setting?
PRIQ3	p3age	Range for your age
PRIQ4	p4mcas	How do your school's results on the MCAS compare to those of other schools in your state?
PRIQ5a	p5phone	Whether or not your school has it, how valuable is a telephone with an outside line in each classroom?
PRIQ5b	p5intern	Whether or not your school has it, how valuable would Internet access in each classroom be?
PRIQ5c	p5desk4	Whether or not your school has it, how valuable would 4 desktop computers be in each classroom?
PRIQ5d	p5wirele	Whether or not your school has it, how valuable would 4 wireless laptops be in each classroom?
PRIQ5e	p5desk1	Whether or not your school has it, how valuable would one desktop computer for each student in a lab be?
PRIQ5f	p5wirela	Whether or not your school has it, how valuable would one wireless laptop for each student in the classroom be?
PRIQ5g	p5digica	Whether or not your school has it, how valuable would a digital camera for the classroom be?
PRIQ5h	p5printe	Whether or not your school has it, how valuable would one classroom printer be?
PRIQ5i	p5mprint	Whether or not your school has it, how valuable would multiple classroom printers be?
PRIQ5j	p5tvvcr	Whether or not your school has it, how valuable would a TV monitor with VCR be?
PRIQ5k	p5lcd	Whether or not your school has it, how valuable would an LCD projector/computer projection system be?
PRIQ5l	p5palmpi	Whether or not your school has it, how valuable would a Palm Pilot for each student be?
PRIQ5m	p5portw	Whether or not your school has it, how valuable would a portable writing device for each student be?
PRIQ5o	p5deskac	Whether or not your school has it, how valuable would a desktop computer teachers can access in their classroom be?
PRIQ5p	p5lapt	Whether or not your school has it, how valuable would a laptop for teacher use be?
PRIQ5q	p5palmpa	Whether or not your school has it, how valuable would a Palm Pilot for teacher use be?
PRIQ5r	p5projec	Whether or not your school has it, how valuable would an overhead projector be?
PRIQ6a	p6thisye	How important have computers been in your school related work this year?
PRIQ6b	p6year3	How important have computers been in your school related work three years ago?
PRIQ6c	p6year5	How important have computers been in your school related work five years ago?
PRIQ7	p7emphas	Relative to all your goals for your school, how much emphasis do you place on the integration of classroom technology?
PRIQ8a	p8compu	For how many years have you had a computer in your office?
PRIQ8b	p8intern	For how many years have you had an Internet connection in your office?
PRIQ8c	p8homeco	For how many years have you had a computer at home?
PRIQ8d	p8homein	For how many years have you had an Internet connection at home?
PRIQ9a	p9email	How many years ago did you first use computers for communication with school staff via email?
PRIQ9b	p9work	How many years ago did you first use computers for your own work?
PRIQ9c	p9person	How many years ago did you first use computers for your own personal activities?
PRIQ9d	p9presen	How many years ago did you first use computers for presentations?
PRIQ10a	p10teac	How often do you, as principal, regularly email teachers?
PRIQ10b	p10estaf	How often do you, as principal, regularly email Administrative Staff?
PRIQ10c	p10estud	How often do you, as principal, regularly email students?
PRIQ10d	p10epare	How often do you, as principal, regularly email parents?
PRIQ10e	p10eothe	How often do you, as principal, regularly email principals in other schools?
PRIQ11a	p11today	Where is your school today in terms of teacher flexibility versus district control?
PRIQ11b	p11year5	Where was your school 5 years ago in terms of teacher flexibility versus district control?
PRIQ12	p12instr	With my school, we are currently integrating technology into instructional activities as much as we need to.
PRIQ13	p13commu	How strongly does your community advocate for the presence and use of technology in your schools?
PRIQ14	p14model	How often do you model uses of technology?
PRIQ15	p15flexib	How much flexibility do you and your school-level leaders have in determining which types and how much technology is purchased for your school?
PRIQ16a	p16hardw	Does your school have a budget for hardware?
PRIQ16b	p16softw	Does your school have a budget for software?
PRIQ16c	p16suppl	Does your school have a budget for computer supplies?
PRIQ16d	p16profd	Does your school have a budget for technology related professional development?

### Principal Questionnaire Items cont.

Questionnaire Location	Variable Name	Description
PRIQ17a	p17eleme	Within your district, how equitable is student USE of computers within different elementary schools?
PRIQ17b	p17middl	Within your district, how equitable is student USE of computers within different middle schools?
PRIQ17c	p17high	Within your district, how equitable is student USE of computers within different high schools?
PRIQ17d	p17achie	Within your district, how equitable is student USE of computers for different achievement levels?
PRIQ17e	p17gende	Within your district, how equitable is student USE of computers for different gender?
PRIQ17f	p17race	Within your district, how equitable is student USE of computers for different race?
PRIQ17g	p17ses	Within your district, how equitable is student USE of computers for different SES?
PRIQ17h	p17langu	Within your district, how equitable is student USE of computers for differing primary languages?
PRIQ18a	p18teach	Extent to which all teachers influence decisions about technology.
PRIQ18b	p18techl	Extent to which teachers perceived as technology leaders influence decisions about technology.
PRIQ18c	p18state	Extent to which State Department of Education influences decisions about technology.
PRIQ18d	p18techd	Extent to which Technology Directors influence decisions about technology.
PRIQ18e	p18princ	Extent to which other Principals influence decisions about technology.
PRIQ18f	p18super	Extent to which the Superintendent influences decisions about technology.
PRIQ18g	p18commu	Extent to which the community influences decisions about technology.
PRIQ18h	p18indus	Extent to which industry influences decisions about technology.
PRIQ19a	p19profd	Degree of success your school has had in implementing technical professional development.
PRIQ19b	p19integ	Degree of success your school has had in integrating technology into the curriculum?
PRIQ19c	p19techs	Degree of success your school has had in providing technical support?
PRIQ19d	p19hardw	Degree of success your school has had in providing access to hardware?
PRIQ19e	p19softw	Degree of success your school has had in providing access to software?
PRIQ19f	p19netwo	Degree of success your school has had in providing network services/
PRIQ20a	p20nocom	Obstacle: Lack of computers in the classroom
PRIQ20b	p20noacc	Obstacle: Difficult for teachers to access computers in labs and/or library
PRIQ20c	p20noten	Obstacle: Do not have enough computers for all of the school's students
PRIQ20d	p20nosof	Obstacle: Professional development prepares teachers to use software that is not available in my school
PRIQ20e	p20notim	Obstacle: Professional development prepares teachers to use technology in the classroom but does not offer time to "practice"
PRIQ20f	p20inade	Obstacle: Insufficient or inadequate software
PRIQ20g	p20nospp	Obstacle: Insufficient or inadequate support on how to use technology in the classroom
PRIQ20h	p20crash	Obstacle: Computers are too unpredictable - they crash or the software does not work right
PRIQ20i	p20outda	Obstacle: Outdated computers/software available to teachers
PRIQ20j	p20fastc	Obstacle: Increased speed and improved technology negates teachers' previous investments in technology
PRIQ20k	p20keybr	Obstacle: Students lack keyboarding skills
PRIQ20l	p20stud	Obstacle: Too many students in each classroom
PRIQ20m	p20diffe	Obstacle: The kinds of computers and software at school are different from the computers teachers use at home
PRIQ20n	p20noski	Obstacle: The students lack the skill to use computers effectively
PRIQ20o	p20cours	Obstacle: There is too much course material to cover in a year to make room for technology use
PRIQ20p	p20noinp	Obstacle: Teachers lack input into technology decisions
PRIQ20q	p20nocon	Obstacle: Teachers have a hard time connecting with our school's technology specialist
PRIQ20r	p20toosl	Obstacle: Internet is too slow
PRIQ20s	p20noide	Obstacle: Teachers have no idea how the district wants computers to be used in the classroom
PRIQ20t	p20nofle	Obstacle: Lack of flexibility for teachers in deciding how to use computers in the classroom
PRIQ20u	p20comps	Obstacle: The computer skills of students vary so widely that it's too difficult to manage computer use
PRIQ20v	p20acdms	Obstacle: The academic skills of students vary so widely that computers are not useful in the classroom
PRIQ21	p21howlo	When your computer has a major problem, how long does it typically take for the problem to get fixed?
PRIQ22	p22netwo	If your school/district network fails, how long does it typically take to restore services?
PRIQ23	p23howea	When your teachers want to use computers with their students, how easy is it for them to find enough computers to use in a lab or in their classroom?
PRIQ24	p24where	During the school day, where do the majority of students use computers?
PRIQ25	p25exten	To what extent do you consider a teacher's instructional use of technology when evaluating a teacher?
PRIQ26	p26evals	System for evaluating teacher's instructional use of technology
PRIQ27	p27email	To what extent has the district made (mandated) email the operating mode of communication?

### Principal Questionnaire Items cont.

Questionnaire Location	Variable Name	Description
PRIQ28	p28schoo	Which statement about the integration of technology best describes your school?
PRIQ29	p29who	Who in your building do you rely on for advice or ideas related to technology?
PRIQ30a	p30homec	Approximately what percentage of your students this year have a computer at home?
PRIQ30b	p30hinte	Approximately what percentage of your students this year have a computer at home with internet access?
PRIQ31a	p31thco	Approximately what percentage of your teachers this year have a computer at home?
PRIQ31b	p31thin	Approximately what percentage of your teachers this year have a computer at home with internet access?
PRIQ32	p32flexi	How much flexibility do principals and other school level leaders have in determining which types and how much professional development is provided for their school?
PRIQ33	p33grant	Has your school obtained special grants during the last three years to support experimental programs?
PRIQ34a	p34money	Do any teachers in your school object to the amount of money spent on computer technology?
PRIQ34b	p34time	Do any teachers in your school object to the amount of staff time spent on technology?
PRIQ34c	p34train	Do any teachers in your school object to the amount of required technology training?
PRIQ35	p35visio	Does your district/school have a vision for instructional technology?
PRIQ36	p36align	How closely aligned is your school's vision for instructional technology with your district's vision for instructional technology?
PRIQ37	p37aware	How aware of the vision for instructional technology are most teachers in your school?
PRIQ38a	p38super	Is the Superintendent responsible for communicating the district's vision for technology?
PRIQ38b	p38cumdi	Are the Curriculum Directors responsible for communicating the district's vision for technology?
PRIQ38c	p38techd	Is the Technology Director responsible for communicating the district's vision for technology?
PRIQ38d	p38princ	Are the Principals responsible for communicating the district's vision for technology?
PRIQ38e	p38techs	Are the Building Technology Specialist(s) responsible for communicating the district's vision for technology?
PRIQ38f	p38commi	Is the School Committee responsible for communicating the district's vision for technology?
PRIQ39a	p39refor	How important is supporting instructional reform in your district's technology vision?
PRIQ39b	p39data	How important is collecting data for administrative decision making in your district's technology vision?
PRIQ39c	p39opera	How important is managing school operations in your district's technology vision?
PRIQ39d	p39commu	How important is improving communications among faculty and staff in your district's technology vision?
PRIQ39e	p39mngmn	How important is improving management of student report cards/records in your district's technology vision?
PRIQ39f	p39instr	How important is using technology to improve classroom instruction in your district's technology vision?
PRIQ39g	p39pfmc	How important is using technology to improve student performance in your district's technology vision?
PRIQ39h	p39tech	How important is target levels of technology in your district's technology vision?
PRIQ39i	p39teami	How important is student proficiency in teaming, collaboration, or communication in your district's technology vision?
PRIQ39j	p39anl	How important is student proficiencies in data analysis in your district's technology vision?
PRIQ39k	p39incre	How important is increasing teacher proficiency in use of technology in your district's technology vision?
PRIQ39l	p39futur	How important is preparing students for future jobs in your district's technology vision?
PRIQ39m	p39test	How important is improving student test scores in your district's technology vision?
PRIQ39n	p39learn	How important is promoting active learning strategies in your district's technology vision?
PRIQ39o	p39satis	How important is satisfy parent and community interests in your district's technology vision?
PRIQ39p	p39skill	How important is improving student computer skills and abilities in your district's technology vision?
PRIQ39q	p39resea	How important is improving student proficiency in research in your district's technology vision?
PRIQ39r	p39produ	How important is improving teacher productivity and efficiency in your district's technology vision?
PRIQ40	p40sched	Describing the daily schedule used at your school.
PRIQ41	p41work	Describing the way teachers work together in your school.
PRIQ42	p42envir	Describing the learning environment in your district.
PRIQ43	p43focus	What best describes your school's focus on professional development related to technology?
PRIQ44	p44same	What best describes how your school distributes computers among classrooms?
PRIQ45	p45free	What best describes how your teachers are directed to use technology?
PRIQ46	p46commo	What best describes your school's technology standards' focus?
PRIQ47a	p47works	Did you participate in technology related workshops and seminars; run by an outside source?

### Principal Questionnaire Items cont.

Questionnaire Location	Variable Name	Description
PRIQ47b	p47worka	Did you participate in technology related workshops and seminars; run by district personnel?
PRIQ47c	p47univc	Did you participate in technology related University or college coursework supported by the district in whole or in part?
PRIQ47d	p47mento	Is there a technology related mentor/colleagues available to you at your school?
PRIQ47e	p47confe	Did you participate in technology related conferences?
PRIQ47f	p47cours	Did you participate in technology related district or school sponsored courses?
PRIQ47g	p47onlin	Did you participate in technology related online or web based professional development?
PRIQ47h	p47group	Did you participate in technology related one-on-one or group training with technology staff?
PRIQ47i	p47deptp	Did you take release time for department or grade level planning related to technology?
PRIQ47j	p47indip	Did you take release time for individual professional development related to technology?
PRIQ48a	p48knowm	Teachers know a lot more than students; they shouldn't let students muddle around when they can just explain the answers directly
PRIQ48b	p48quiet	A quiet classroom is generally needed for effective learning
PRIQ48c	p48tdeci	It is better when the teacher, not the students decides what activities are done
PRIQ48d	p48free	Students will take more initiative to learn when they feel free to move around the room during class
PRIQ48e	p48cite	Students should help establish criteria on which they will be assessed
PRIQ48f	p48idea	Instruction should be built around problems with clear, correct, answers and around ideas that students can grasp quickly.
PRIQ48g	p48facts	How much students learn depends on how much background knowledge they have, that is why teaching facts is so necessary.
PRIQ48h	p48colla	Instruction is most effective when teachers collaborate.
PRIQ48i	p48bette	Students create better looking products with computers than with other traditional media.
PRIQ48j	p48writi	Students' writing quality is worse when they use word processors.
PRIQ48k	p48lazy	Computers encourage students to be lazy.
PRIQ48l	p48inter	Students interact with each other more while working with computers.
PRIQ48m	p48conce	Computers help students grasp difficult curricular concepts.
PRIQ48n	p48weake	Computers have weakened students' research skills.
PRIQ48o	p48avoid	Many students use computers to avoid doing more important schoolwork.
PRIQ48p	p48harde	Students work harder at their assignments when they use computers.
PRIQ48q	p48draft	Students are more willing to do second drafts when using computer.
PRIQ48r	p48runni	Technology support in my school exists primarily to keep the computers running.
PRIQ48s	p48integ	Technology support exists primarily to help teachers integrate computers with teaching.
PRIQ48t	p48impac	In my school, technology is present in sufficient quantity to impact and change the learning process.
PRIQ48u	p48chang	In my school, most educators have significantly changed their practice through the use of technology.
PRIQ48v	p48benef	My school has received benefits as the result of school/community partnerships related to technology.
PRIQ48w	p48updat	At my school, technological resources are regularly updated and replaced.
PRIQ48x	p48inves	At my school, careful plans have been made for the replacement of obsolete technology on a regular basis. Processes for re-purposing older machines are in place, resulting in the maximum benefit for dollars invested.
PRIQ48y	p48custo	At my school, both formal and informal communications concerning student performance are customized using technology for different stakeholders.
PRIQ48z	p48newwa	Technology is used in new ways to capture evidence of student performance as well as to collect and analyze data and report results.

## District Questionnaire Items

Item Name	Question
v1	What is your current role?
v2	Students interact with each other more while working with computers
v3	Computers help students grasp difficult curricular concepts
v4	Computers have weakened students' research skills
v5	Many students use computers to avoid doing more important work
v6	Students work harder at their assignments when they use computers
v7	Students are more willing to do second drafts when using a computer
v8	Students are too careless to use technology without close supervision
v9	Students access to the internet/instant messaging distracts students
v10	Students access to web encourages plagiarism
v11	Across my district, we are currently integrating technology as much as we need to into instructional activities.
v12	Relative to all of your goals for your district, how much emphasis do you place on the integration of classroom technology?
v13	How valuable are each of the following instructional uses of computers? Developing basic mathematics skills
v14	How valuable are each of the following instructional uses of computers? Developing basic reading skills
v15	How valuable are each of the following instructional uses of computers? Preparing students for standardized tests
v16	How valuable are each of the following instructional uses of computers? Drafting text
v17	How valuable are each of the following instructional uses of computers? Editing and revising text
v18	How valuable are each of the following instructional uses of computers? Communicating with people outside of school
v19	How valuable are each of the following instructional uses of computers? Teacher presentation of lessons
v20	How valuable are each of the following instructional uses of computers? Student presentations
v21	How valuable are each of the following instructional uses of computers? Accessing resources via the internet/CD ROM
v22	How valuable are each of the following instructional uses of computers? Exploring mathematical relationships
v23	How valuable are each of the following instructional uses of computers? Graphing and manipulating data
v24	How valuable are each of the following instructional uses of computers? Producing projects
v25	How valuable are each of the following instructional uses of computers? Creating web sites
v26	How much discretion do individual principals in your district have about: Purchasing software
v27	How much discretion do individual principals in your district have about: Purchasing hardware
v28	How much discretion do individual principals in your district have about: Allocation of technology in the schools
v29	How much discretion do individual principals in your district have about: Professional development activities
v30	In my district, technology is present in sufficient quantity
v31	In my district, technology is present in sufficient quantity to impact and change the learning process
v32	In my district, most educators have significantly changed their professional practice through the use of technology
v33	My district has received benefits as the result of school/community partnerships related to technology
v34	In my district, technological resources are regularly updated and replaced
v35	Technology is used in new ways to capture evidence of student performance as well as to collect and analyze data and report results
v36	In my district, careful plans have been made for the replacement of obsolete technology on a regular basis
v37	Processes for re-purposing older machines are in place, resulting in the maximum benefit for dollars invested
v38	In my district, both formal and informal communications concerning student performance are customized using technology for different stakeholders.
v39	When your computer has a major problem (one that requires some assistance), how long does it typically take for the problem to get fixed?
v40	Rate how each of the following statements describes your personal use of computers
v41	Has your district obtained special grants during the last three years to support experimental programs at the school either directly or through your district?
v42	If you answered yes to #9, please describe the grants (how much, how long, in what areas and in which schools)
v43	Over the last three years, what percentage of technology related expenditures came from: Bond/Debt issuance?
v44	Over the last three years, what percentage of technology related expenditures came from: Annual School Budget?
v45	Over the last three years, what percentage of technology related expenditures came from: Parent/Community Fundraising?
v46	Over the last three years, what percentage of technology related expenditures came from: External Grants?
v47	Over the last three years, what percentage of technology related expenditures came from: Federal Grants including e-Rate?
v48	Compared to other districts in the state, does your district support the costs of technology?
v49	Does your district budget have a line item for: Hardware?
v50	Does your district budget have a line item for: Software?
v51	Does your district budget have a line item for: Technology Support Staff?
v52	Does your district budget have a line item for: Technology Curriculum Integration Staff?

### District Questionnaire Items cont.

Item Name	Question
v53	Does your district budget have a line item for: Technology-related Professional Development?
v54	Does your district budget have a line item for: Upgrades and replacement?
v55	As of today, rate the stage of implementation and the degree of success your district has had in implementing each of the following: Professional Development
v56	As of today, rate the stage of implementation and the degree of success your district has had in implementing each of the following: Technical Support
v57	As of today, rate the stage of implementation and the degree of success your district has had in implementing each of the following: Access to Hardware
v58	As of today, rate the stage of implementation and the degree of success your district has had in implementing each of the following: Access to Software
v59	As of today, rate the stage of implementation and the degree of success your district has had in implementing each of the following: Network Services
v60	As of today, rate the stage of implementation and the degree of success your district has had in implementing each of the following: Curriculum Integration
v61	Professional Development
v62	Technical Support
v63	Access to Hardware
v64	Access to Software
v65	Network Services
v66	Curriculum Integration
v67	In school A, teachers are free to use technology as they see fit. As a result, teachers in some classrooms use technology extensively with their students while other teachers make minimal use of technology. In school B, all teachers within a grade level or course attempt to provide students with common learning experiences with technology. Mark where the schools in your district fall on the continuum below.
v68	Within your district, how equitable is student ACCESS to computers: Within elementary school classrooms
v69	Within your district, how equitable is student ACCESS to computers: Within middle school classrooms
v70	Within your district, how equitable is student ACCESS to computers: Within high school classrooms
v71	Within your district, how equitable is student ACCESS to computers: Of different achievement levels
v72	Within your district, how equitable is student ACCESS to computers: Of different gender
v73	Within your district, how equitable is student ACCESS to computers: Of different race
v74	Within your district, how equitable is student ACCESS to computers: Of different SES
v75	Within your district, how equitable is student ACCESS to computers: Of differing primary languages
v76	Within your district, how equitable is student USE of computers: Within elementary school classrooms
v77	Within your district, how equitable is student USE of computers: Within middle school classrooms
v78	Within your district, how equitable is student USE of computers: Within high school classrooms
v79	Within your district, how equitable is student USE of computers: Of different achievement levels
v80	Within your district, how equitable is student USE of computers: Of different gender
v81	Within your district, how equitable is student USE of computers: Of different race
v82	Within your district, how equitable is student USE of computers: Of different SES
v83	Within your district, how equitable is student USE of computers: Of differing primary languages
v84	District A attempts to assure that every classroom within grade levels in every school has the same number and kind of computers. District B distributes computers based on the usage needs such that some classrooms have minimal technology and others have abundant technology. Mark where your district lies.
v85	Does your district provide those students without access to computers at home with opportunities to use computers outside of the normal school day?
v86	
v87	Other than this study, has your district participated in evaluations of any aspects of its technology program?
v88	
v89	To what extent is technology considered when evaluating the principals and curriculum leaders in your district?
v90	To what extent is technology considered when evaluating the teachers in your district?
v91	For how many years, if at all, have you had: A computer in your office or work space?
v92	For how many years, if at all, have you had: An Internet connection in your office or workspace?
v93	For how many years, if at all, have you had: A computer at home?
v94	For how many years, if at all, have you had: An Internet connection in your home?
v95	Which of the following policies are implemented in your district: Students are not allowed to play games on the school computers
v96	Which of the following policies are implemented in your district: Student access to the internet is screened by a firewall
v97	Which of the following policies are implemented in your district: Students are not allowed to send email from school computers
v98	Which of the following policies are implemented in your district: Students are not allowed to receive email from school computers
v99	Which of the following policies are implemented in your district: Schools have an acceptable use policy
v100	Which of the following policies are implemented in your district: Policy regarding academic integrity with specific reference to technology
v101	Which of the following policies are implemented in your district: Students are not allowed to use spell-checker and/or grammar-checker
v102	Which of the following policies are implemented in your district: Students are not allowed to use calculators in mathematics classes

### District Questionnaire Items cont.

Item Name	Question
v103	Which of the following policies are implemented in your district: Students are not allowed to bring their own computers or Palms from home
v104	Which of the following policies are implemented in your district: Students are not allowed access to the server
v105	Which of the following policies are implemented in your district: Students are not allowed access to the server from home
v106	To what extent do you, as a district leader, raise issues about technology with the following people (via conversation, formal presentation, school newsletter, etc)? : Parents
v107	To what extent do you, as a district leader, raise issues about technology with the following people (via conversation, formal presentation, school newsletter, etc)? : School board
v108	To what extent do you, as a district leader, raise issues about technology with the following people (via conversation, formal presentation, school newsletter, etc)? : With other district leaders
v109	To what extent do you, as a district leader, raise issues about technology with the following people (via conversation, formal presentation, school newsletter, etc)? : Teachers
v110	To what extent do you, as a district leader, raise issues about technology with the following people (via conversation, formal presentation, school newsletter, etc)? : Principals
v111	To what extent do you, as a district leader, raise issues about technology with the following people (via conversation, formal presentation, school newsletter, etc)? : Your community
v112	How many years have you been in your current position?
v113	How many years have you been at your current school district?
v114	For how many years have you taught in a K-12 classroom?
v115	How do your district's results on the state-mandated test compare to those of other districts in your state?
v116	How many emails do you receive in a given day?
v117	How often do you, as a district leader, regularly email the following people? :Teachers
v118	How often do you, as a district leader, regularly email the following people? : Administrative Staff
v119	How often do you, as a district leader, regularly email the following people? : Students
v120	How often do you, as a district leader, regularly email the following people? : Parents
v121	How often do you, as a district leader, regularly email the following people? : Principals in your schools
v122	How many hours a week do you spend on the internet: Professionally
v123	How many hours a week do you spend on the internet: Personally
v124	How many years ago, if at all, did you first use computers in the following ways? : Communication with school staff via email
v125	How many years ago, if at all, did you first use computers in the following ways? : For your own work; writing documents, administrative software
v126	How many years ago, if at all, did you first use computers in the following ways? : For your personal activities; personal e-mail,
v127	How many years ago, if at all, did you first use computers in the following ways? : Presentations to school or outside community
v128	Which of the following areas of curriculum are you directly responsible for (check all that apply): Math
v129	Which of the following areas of curriculum are you directly responsible for (check all that apply): Science
v130	Which of the following areas of curriculum are you directly responsible for (check all that apply): English/Language Arts
v131	Which of the following areas of curriculum are you directly responsible for (check all that apply): Social Studies
v132	Which of the following areas of curriculum are you directly responsible for (check all that apply): Arts
v133	Which of the following areas of curriculum are you directly responsible for (check all that apply): Other
v134	Which type of professional development does your school tend to focus on?
v135	Which type of professional development would be most useful to your staff?
v136	Relative to all the professional development your district provides, how much emphasis do you place on technology related professional development?
v137	Do you have access to workshops and seminars; run by outside source
v138	Do you have access to workshops and seminars; run by district personnel
v139	Do you have access to university or college course work
v140	Do you have access to mentor/colleague
v141	Do you attend conferences
v142	Do you have access to district or school sponsored courses (over several weeks)
v143	Do you have access to online or web-based professional development
v144	Do you have access to one-on-one or group training with technology staff
v145	Do you have access to release time for department or grade level planning related to technology
v146	Do you have access to release time for individual professional development related to technology

## APPENDIX B

### District Site-Visit Questions

1. What are some promising instructional uses of technology that you have seen in your district?
2. When you have seen technology used successfully in the classroom, what were the conditions that enabled these successes?
3. What short-term goals do you have for technology?
4. What short-term goals do you have that are not specific to technology?
5. In what ways do you hope that technology will affect the way teachers teach and students learn five years from now?
6. What has your district done to promote or sell technology to teachers? to the community?
7. What has your district done to support teachers in using technology? Is it working?
8. What are the district level practices and expectation (policies, standards) related to technology?
9. How does your district make decisions about curriculum, budgets, technology?
10. Is use of technology a part of the evaluation process?
11. If you were to evaluate teachers based on their use of technology, what would your criteria be?
12. What obstacles has your district encountered with regards to technology and how have you attempted to overcome them?
13. Forgetting technology for the moment, how does change usually occur in your district? Who initiates the change process and what strategies are employed to help change occur?

## APPENDIX C

### RATING CRITERIA DIMENSIONS OF TECHNOLOGY USE

1. **Professional Development:** The level of professional development programs offered and attended, and their apparent usefulness to the teachers.

Criteria:

- Professional development programs are offered regularly throughout the academic year and/ or in the summer
- In-school PD programs are offered at times that are convenient to teachers (e.g., before or after school or substitute coverage is provided)
- Professional development opportunities are relevant to teachers' technology needs
- PD programs are offered by a variety of experts, including school personnel (e.g., Integration Specialists) and outside consultants
- PD programs are voluntarily attended by the majority of teachers
- One-on-one sessions are available to teachers.

School districts that had PD programs exhibiting 5 or 6 characteristics were rated as a 3; districts exhibiting 2 to 4 characteristics were rated as 2; and school districts exhibiting less than 2 characteristics were rated as 1.

2. **Leadership:** Strength of district leadership regarding technology.

Criteria:

- Teacher hiring practices that emphasize tech expertise
- Strong emphasis on linking technology and curriculum
- District leaders used technology themselves and encourage faculty and staff to embrace it
- Low turnover rate of technology personnel
- Technology funding from multiple sources including external grants
- Clear vision of how technology can change teaching and learning
- School district has and follows a long term technology plan
- Personnel in technology positions have strong technology and academic backgrounds
- School culture emphasizes site-based management.

School districts exhibiting 7 to 9 characteristics were rated as 3; districts exhibiting 3 to 6 characteristics were rated as 2; and districts exhibiting less than 3 characteristics were rated as 1.

3. **Resources:** Amount of computers, recent software, and other related equipment available in the district, power and data capabilities, and network access of computers and peripherals.

Criteria:

- Evidence of easily accessible and readily available equipment
- Evidence of reliable newer equipment and network
- Evidence of recent software being used
- Computers in every classroom (4-6)
- Laptops on carts
- Well equipped media center
- Wireless Internet access
- Availability of digital cameras and LCD projectors.

Districts exhibiting 6 to 8 characteristics were rated as 3; districts exhibiting 3 to 5 characteristics were rated as 3; and districts exhibiting less than 3 characteristics were rated as 1.

4. **Technology Plan:** District has a well-written technology plan and extent to which the plan is followed.

Criteria:

- Evidence that there is a long term plan (most districts use a 5-year plan) that addresses equipment purchases, maintenance and upgrades, curriculum integration, and personnel training
- Evidence that school personnel at all levels are aware of the plan's existence
- Evidence that the plan is followed and enforced.

Districts that met more than 2 criteria were rated as 3; districts that met 1 of the criteria were rated as 2; and districts that met no criteria were rated as 1.

5. **Integration Specialist:** Do schools have separate FTE positions for classrooms or school technology integration specialists.

Criteria:

- Evidence that each school has an Integration Specialist who is responsible for the integration of curriculum and technology
- Evidence that Integration Specialists work with teachers to develop curriculum units
- Evidence that Integration Specialists assist teachers in the implementation of integrated curriculum units
- Evidence that Integration Specialists participate in the formal and informal training of teachers
- Evidence that Integration Specialists act as liaisons between teachers and other technology support personnel.

Districts who met 4 or 5 criteria were rated as 3; districts that met 2 or 3 criteria were rated as 2, and districts that met less than 2 criteria were rated as 1.

6. **Teacher Support:** Level of technology support for teachers separate from professional development, e.g., just-in-time support, building level support.

Criteria:

- One Integration Specialist in each of the district's schools
- Adequate number of computer technicians to support district's needs, including both desktop computer and network problems
- Evidence of a help desk (or similar support system) to assist teachers with equipment and software issues
- Evidence of prompt response to teachers' queries.

Districts that met 3 or 4 criteria were rated as 3; districts that met 1 or 2 criteria were rated as 2, and districts that met none were rated as 1.

7. **External Programs:** The extent to which the district participates in technology education programs and projects outside the district, including grant funded projects and university funded projects such as Project MEET, Gen WHY, PT3, etc.

Criterion:

- Evidence that the district participates in external technology programs during the school year.

Districts that had 2 or more externally funded projects were rated as 3; districts that had 1 externally funded project were rated as 2, and districts that had no externally funded projects were rated as 1.

8. **Funding Level:** District operational budget funding level for technology.

Criteria:

- a) Evidence that there is a budget line item for instructional technology
- b) Evidence that the budget reflects total cost of ownership (i.e., allowances for maintenance and upgrade)
- c) Evidence that technology funds are not "borrowed" from other line items (e.g., materials and supplies, equipment)
- d) Evidence that the district encourages grant writing for additional tech funding.

Districts that met criteria a and b OR any 3 criteria were rated as 3. Districts that met criteria c and d OR criterion a OR criterion b were rated as 2. Otherwise, districts were rated as 1.

9. **Community:** The extent to which the community supports technology.

Criteria:

- Evidence that the School Committee supports funding for hardware (i.e., equipment and infrastructure)
- Evidence that the School Committee supports funding for support personnel
- Evidence that the School Committee prioritizes technology in times of fiscal constraint
- Evidence that community members support technology through donations of equipment or money
- Evidence that community members serve as technology volunteers in schools.

Districts that met 4 or 5 criteria were rated as 3; districts that met 2 or 3 criteria were rated as 2; districts that met less than 2 criteria were rated as 1.

10. **Collaboration:** The extent to which teachers collaborate on any educational objective.

Criteria:

- Evidence that teachers support each other in educational projects (e.g., peers helping peers)
- Evidence that teachers collaborate to develop and share materials
- Evidence that teachers collaborate to develop technology integrated curriculum units
- Evidence of team teaching.

Districts that met 3 or more criteria were rated as 3; districts that met 1 or 2 criteria were rated as 2, and districts that met none were rated as 1.

11. **Tech Supports Goals:** The extent to which technology supports non-technology short-term district goals.

Criterion:

- District lists short-term educational goals that relate to or are supported by technology.

Districts that listed 3 or more goals were rated as 3; districts that listed 1 or 2 goals were rated as 2, and districts that listed none were rated as 1.

12. **Technology Standards:** Whether or not the district has technology standards or competencies, and the extent to which teachers and students are accountable for those standards.

Criteria:

- Evidence that district has written standards or competencies for students
- Evidence that administrators and teachers know of the standards' existence
- Evidence that teachers and students are held accountable for the standards.

Districts that met 2 or 3 criteria were rated as 3; districts that met 1 criteria were rated as 2; districts that met none were rated as 1.

13. **Vision:** The extent to which the district has a clear technology vision.

Criteria:

- a) Evidence that district leaders look for alternative or creative solutions to support and forward technology (e.g., adopt wireless technologies to circumvent high wiring costs; purchase laptops on carts rather than building expensive labs, etc.)
- b) Evidence that district leaders are aware of leading trends and research in educational technology
- c) Evidence that district leaders are actively attempting to implement technology programs in their schools that are supported by research
- d) Emphasis on curriculum integration
- e) Evidence that tech is used to enable communication on a local (i.e., school/community) and global scale.

Districts that met any 2 criteria from a to c AND criterion d were rated as 3. Districts that met 1 criterion from criteria a to c AND any other criterion were rated as 2. Otherwise, districts were rated as 1.

14. **Obstacles:** The extent to which obstacles mentioned by interviewees reflected a range of complicated issues besides “time and money”.

Criterion:

- Evidence that district personnel refer to 3 or more technology related obstacles that covered broader issues besides time and money (e.g., culture, equity).

Districts that met the criterion were rated as 3 while districts that did not meet the criterion were rated as 1.

## Appendix D: Measurement Scales

The following scales for the teacher, student, and district data have been created through the use of principal components analysis. This technique provides evidence that the scales are indeed measuring a single attribute. The percent of variance explained refers to amount of variance that the scale accounts for in the responses of all the items that make up the scale. The factor loadings represent the correlation between the original item and the scale. Higher factor loadings represent a stronger relationship between the item and the scale. These scales were created using data provided by teachers who met our selection criteria (see Appendix E) .

### Teacher Scales

#### Scale 1 – Student Use of Technology as Reported by Teacher Scales

TEAQ11b	v11bwco	During classtime, how often did students work individually on school work using computers this year?	Teacher-directed student use of technology during classtime scale  Variance Explained: 56% Smallest component: 0.664 Reliability = 0.84
TEAQ11d	v11dgr	During classtime, how often did students work in groups on school work using computers this year?	
TEAQ11f	v11fres.	During classtime, how often did students perform research or find information using the internet or CD-ROM this year?	
TEAQ11g	v11gdev.	During classtime, how often did students use a computer or portable writing device for writing this year?	
TEAQ11h	v11hsolv	During classtime, how often did students use a computer to solve problems this year?	
TEAQ11m	v11minfo	During classtime, how often did students present information to the class using a computer this year?	

TEAQ11p	v11pema	During classtime, how often did students use email to consult “experts” this year?	Student use of specific technology applications scale  Variance Explained: 47% Smallest component: 0.588 Reliability = 0.60
TEAQ11q	v11qema	During classtime, how often did students use computers to communicate with students in other schools this year?	
TEAQ11n	v11nana	During classtime, how often did students use a spreadsheet/database to record, explore or analyze data this year?	
TEAQ11o	v11opro	During classtime, how often did students use probes (e.g. thermometers, etc.) attached to a computer this year?	

TEAQ11a	v11awo	During classtime, how often did students work individually on school work without using computers this year?	Student activities without computers scale  Variance Explained: 48% Smallest component: 0.595 Reliability = 0.60
TEAQ11c	v11cgr	During classtime, how often did students work in groups on school work without using computers this year?	
TEAQ11e	v11eres.	During classtime, how often did students perform research or find information without using a computer this year?	
TEAQ11i	v11info	During classtime, how often did students present information to the class without using a computer this year?	

TEAQ11j	v11jedg	During classtime, how often did students use a computer to play educational games this year?	Students’ non-academic computer use scale  Variance Explained: 87% Smallest component: 0.931 Reliability = 0.85
TEAQ11k	v11kfun	During classtime, how often did students use a computer to play games for fun this year?	

## Scale 2 – Teacher Use of Technology Scales

TEAQ12e	v12ehand	How often did you make handouts for students using a computer?	Teacher use of technology for preparation scale  Variance Explained: 73% Smallest component: 0.765 Reliability = 0.80
TEAQ12f	v12ftest	How often did you create a test, quiz or assignment using a computer?	
TEAQ12g	v12grese	How often did you perform research and lesson planning using the internet?	

TEAQ12h	v12hemai	How often did <u>you</u> email teachers in your school?	Teachers' professional use of email scale  Variance Explained: 78% Smallest component: 0.819 Reliability = 0.86
TEAQ12i	v12iemai	How often did <u>you</u> email communication with school and district administration?	
TEAQ12j	v12jemai	How often did <u>you</u> email students' parents?	

TEAQ12c	v12ciep	How often did <u>you</u> prepare or maintain Individualized Education Plans using a computer?	Use of computers for individual student needs scale  Variance Explained: 65% Smallest component: 0.809 Reliability = 0.41
TEAQ12d	v12dindi	How often did <u>you</u> adapt an activity to students' individual needs using a computer?	

TEAQ13a	v13arepo	How often do you ask students to produce reports and term paper using technology?	Teachers direct students to use technology to create products scale  Variance Explained: 45% Smallest component: 0.616 Reliability = 0.73
TEAQ13b	v13bproj	How often do you ask students to produce multimedia projects using technology?	
TEAQ13c	v13cweb	How often do you ask students to produce web pages, web sites or other web-based publications using technology?	
TEAQ13d	v13dart	How often do you ask students to produce pictures or artwork using technology?	
TEAQ13f	v13fgrap	How often do you ask students to produce graphs or charts using technology?	
TEAQ13g	v13gvide	How often do you ask students to produce videos or movies using technology?	

### Scale 3 – Importance of Technology Scales

TEAQ21a	v21aaimp	How important is using technology to improve classroom instruction in your school/districts technology vision?	Perceived importance of technology for the school/district scale
TEAQ21b	v21abimp	How important is using technology to improve student performance in your school/districts technology vision?	
TEAQ21c	v21actea	How important is student proficiency in teaming and collaboration in your school/districts technology vision?	
TEAQ21d	v21addat	How important is student proficiency in data analysis in your school/districts technology vision?	
TEAQ21e	v21aetea	How important is increasing teacher proficiency in the use of technology in your school/districts technology vision?	
TEAQ21f	v21affut	How important is preparing students for future jobs in your school/districts technology vision?	
TEAQ21g	v21agtes	How important is improving student test scores in your school/districts technology vision?	
TEAQ21h	v21ahlea	How important is promoting active learning strategies in your school/districts technology vision?	
TEAQ21i	v21airef	How important is supporting instructional reform in your school/districts technology vision?	
TEAQ21j	v21ajpar	How important is satisfying parents' and community interests in your school/districts technology vision?	
TEAQ21k	v21akski	How important is improving student computer skills and abilities in your school/districts technology vision?	
TEAQ21l	v21alres	How important is improving student proficiency in research in your school/districts technology vision?	
TEAQ21m	v21amtea	How important is improving productivity and efficiency in your school/districts technology vision?	
TEAQ21n	v21anlev	How important is target level of technology (i.e., student/computer ratio) in your school/districts technology vision?	
			Variance Explained:62% Smallest component: 0.728 Reliability = 0.95

TEAQ21ai	v21baimp	How important is using technology to improve classroom instruction in shaping computer use in your classroom?	Technology for shaping classroom use scale
TEAQ21bi	v21bbimp	How important is using technology to improve student performance in shaping computer use in your own classroom?	
TEAQ21ci	v21bctea	How important is student proficiency in teaming and collaboration in shaping computer use in your own classroom?	
TEAQ21di	v21bddat	How important is student proficiency in data analysis in shaping computer use in your own classroom?	
TEAQ21ei	v21betea	How important is increasing teacher proficiency in the use of technology in shaping computer use in your own classroom?	
TEAQ21fi	v21bffut	How important is preparing students to take jobs in shaping computer use in your own classroom?	
TEAQ21gi	v21bgtes	How important is improving student test scores in shaping computer use in your own classroom?	
TEAQ21hi	v21bhlea	How important is promoting active learning strategies in shaping computer use in your own classroom?	
TEAQ21ii	v21biref	How important is supporting instructional reform in shaping computer use in your own classroom?	
TEAQ21ji	v21bjpar	How important is satisfying parents' and community interests in shaping computer use in your own classroom?	
TEAQ21ki	v21bkski	How important is improving student computer skills and abilities in shaping computer use in your own classroom?	
TEAQ21li	v21blres	How important is improving student proficiency in research in shaping computer use in your own classroom?	
TEAQ21mi	v21bmtea	How important is improving productivity and efficiency in shaping computer use in your own classroom?	
TEAQ21ni	v21bnlev	How important is target level of technology (i.e., student/computer ratio) in shaping computer use in your own classroom?	
			Variance Explained:60% Smallest component: 0.704 Reliability = 0.95

### Scale 4 – Professional Development Relating to Technology Scales

TEAQ29a	v29amana	Beneficial professional development: managing my computer desktop (opening programs, printing etc.)?	Need for professional development for basic skills scale  Variance Explained:60% Smallest component: 0.682 Reliability = 0.81
TEAQ29b	v29butil	Beneficial professional development: learning to utilize network services efficiently (e-mailed, saving to the server)?	
TEAQ29c	v29csour	Beneficial professional development: learning about research sources on the Internet?	
TEAQ29d	v29ddata	Beneficial professional development: learning how to manipulate data and constructing graphs?	
TEAQ29g	v29gappl	Beneficial professional development: learning specific applications/software (Microsoft Word, PowerPoint)?	
TEAQ29h	v29honi	Beneficial professional development: learning to use the Internet	

TEAQ29e	v29etech	Beneficial professional development: integrating technology with student writing?	Need for professional development on the integration of technology scale  Variance Explained:79% Smallest component: 0.887 Reliability = 0.73
TEAQ29f	v29ftech	Beneficial professional development: integrating technology into my classroom activities?	

### Scale 5 – Obstacles Relating to Technology Use Scales

TEAQ31k	v31klack	Are the lack of student's keyboarding skills an obstacle for you in making more effective use of technology?	Students obstruct technology use scale  Variance Explained:48% Smallest component: 0.501 Reliability = 0.76
TEAQ31l	v31ltoo	Does having too many students in your class act as an obstacle for you in making more effective use of technology?	
TEAQ31n	v31nnos	Are the lack of students' skills using a computer effectively an obstacle for you in making more effective use of technology?	
TEAQ31w	v31wtech	Does a wide variety of computer skills among the students in your classroom act as an obstacle for you in making more effective use of technology?	
TEAQ328a	v32a8man	Problems managing students when they use computers	
TEAQ31x	v31xacad	Does a wide variety of academic skills among the students in your classroom act as an obstacle for you in making more effective use of technology?	

TEAQ31p	v31plack	Does teachers' lack of input into technology decisions act as an obstacle for you in making more effective use of technology?	Leadership and teacher input obstructs technology use scale  Variance Explained:56% Smallest component: 0.681 Reliability = 0.79
TEAQ31q	v31qlack	Do difficulties connecting with the school technology specialist act as an obstacle for you in making more effective use of technology?	
TEAQ31s	v31slack	Does lack of leadership related to technology act as an obstacle for you in making more effective use of technology?	
TEAQ31t	v31tnoi	Does not knowing how the district wants you to use technology in the classroom act as an obstacle for you in making more effective use of technology?	
TEAQ31u	v31ulack	Does a lack of flexibility in deciding how to you use computers in your classroom act as an obstacle for you in making more effective use of technology?	

TEAQ31a	v31alack	Is the lack of computers in the classroom an obstacle for you in making more effective use of technology?	Access obstructs technology use scale  Variance Explained:69% Smallest component: 0.855 Reliability = 0.78
TEAQ31b	v31bdif	Is the difficulty in accessing computers in labs and/or library an obstacle for you in making more effective use of technology?	
TEAQ31c	v31cnot	Is not having enough computers for all of your students an obstacle for you in making more effective use of technology?	

TEAQ31h	v31hdon	Are unpredictable computers an obstacle for you in making more effective use of technology?	Quality of available technology obstructs use scale  Variance Explained:54% Smallest component: 0.710 Reliability = 0.72
TEAQ31i	v31iold	Are outdated computers/software an obstacle for you in making more effective use of technology?	
TEAQ31j	v31jfast	Is increased speed and improved technology an obstacle for you in making more effective use of technology?	
TEAQ31r	v31rtoo	Does a slow internet act as an obstacle for you in making more effective use of technology?	

TEAQ31d	v31dnop	Is the unavailability of software that your professional development has trained you to use an obstacle for you in making more effective use of technology?	Poor professional development obstructs use scale  Variance Explained:57% Smallest component: 0.775 Reliability = 0.62
TEAQ31e	v31enot	Is the lack of practice with software that your professional development has trained you to use an obstacle for you in making more effective use of technology?	
TEAQ31g	v31gnos	Is insufficient or inadequate support on how to use technology in the classroom an obstacle for you in making more effective use of technology?	

### Scale 6 – Problems Relating to Technology Scales

TEAQ32a	v32a1com	Do you have problems getting the computer to work?	Problems getting technology to work scale  Variance Explained:61% Smallest component: 0.774 Reliability = 0.87
TEAQ32b	v32a2sof	Do you have problems getting the software to work?	
TEAQ32c	v32a3pri	Do you have problems getting the printer to work?	
TEAQ32d	v32a4acc	Do you have problems accessing network folders/files?	
TEAQ32e	v32a5int	Do you have problems connecting to the internet?	
TEAQ32f	v32a6ema	Do you have problems emailing?	

TEAQ32g	v32a7inc	Do you have problems incorporating technology into lessons?	Problems incorporating technology obstructs use scale  Variance Explained:64% Smallest component: 0.799 Reliability = 0.41
TEAQ31v	v31vrel	Not sure that technology is relevant	

### Scale 7 – Teachers’ Perception of District Success Relating to Technology Scale

TEAQ36a	v36aprof	Rate the degree of success your district has had implementing technical professional development.	District success implementing technology program scale  Variance Explained:59% Smallest component: 0.780 Reliability = 0.86
TEAQ36b	v36binte	Rate the degree of success your district has had integrating technology into the curriculum.	
TEAQ36c	v36ctech	Rate the degree of success your district has had implementing technical support.	
TEAQ36d	v36dhard	Rate the degree of success your district has had implementing access to hardware.	
TEAQ36e	v36esoft	Rate the degree of success your district has had implementing access to software.	
TEAQ36f	v36fnetw	Rate the degree of success your district has had implementing network services.	

### Scale 8 – Importance of Computers for Teaching Scale

TEAQ37a	v37athis	How important have computers been in your teaching this year?	Importance of computers for teaching scale  Variance Explained:73% Smallest component: 0.843 Reliability = 0.81
TEAQ37b	v37b3ye	How important have computers been in your teaching three years ago?	
TEAQ37c	v37c5ye	How important have computers been in your teaching five years ago?	

### Scale 9 – Teacher Confidence Using Computers Scale

TEAQ38a	v38athis	How confident have you been when using computers this year?	Teacher confidence using computers scale  Variance Explained:77% Smallest component: 0.868 Reliability = 0.85
TEAQ38b	v38b3ye	How confident were you when you used computers three years ago?	
TEAQ38c	v38c5ye	How confident were you when you used computers five years ago?	

### Scale 10 – Pressure Scales

TEAQ39a	v39agrou	How much pressure do you feel to have students work in groups?	Instructional pressures around technology scale  Variance Explained: 53% Smallest component: 0.669 Reliability = 0.82
TEAQ39c	v39ccove	How much pressure do you feel to cover a large quantity of curriculum content?	
TEAQ39g	v39gproj	How much pressure do you feel to have students to projects?	
TEAQ39f	v39fperf	How much pressure do you feel to do performance-based assessments?	
TEAQ39i	v39istd.	How much pressure do you feel to prepare students to take standardized tests?	
TEAQ39j	v39jhigh	How much pressure do you feel to do higher order thinking and “problem solving”?	

TEAQ39b	v39buse	How much pressure do you feel to have students use computers?	Pressure to use technology scale  Variance Explained:70% Smallest component: 0.811 Reliability = 0.78
TEAQ39e	v39euse	How much pressure do you feel to have students use the Internet?	
TEAQ39h	v39hsame	How much pressure do you feel to use technology in the same way as other teachers in your grade?	

### Scale 11 – Support for Change Scales

TEAQ44c	v44crese	Research and best practices are shared and discussed in my school/district.	Community support for change scale  Variance Explained:56% Smallest component: 0.727 Reliability = 0.80
TEAQ44d	v44dnew	New ideas presented at in-services are discussed afterwards by teachers in this school.	
TEAQ44e	v44eshar	Most teachers here share my beliefs about what the central goals of the schools should be.	
TEAQ44f	v44fcont	Teachers in the school are continually learning and seeking new ideas.	
TEAQ44g	v44gshar	It is common for us to share samples of students' work.	

TEAQ44h	v44hpres	If the teacher is not doing a good job, they are pressed by school leaders or colleagues to improve.	Support for growth scale  Variance Explained: 54% Smallest component: 0.692 Reliability = 0.57
TEAQ44i	v44istaf	Staff development activities are followed by support to help teachers implement new practices.	
TEAQ44p	v44pment	Formal teacher mentoring actively occurs in my school	

TEAQ44b	v44bvalu	My principal's values and philosophy of education are similar to my own.	Teacher relationship with principal scale  Variance Explained: 78% Smallest component: 0.886 Reliability = 0.73
TEAQ44k	v44kwith	I have a good working relationship with my principal.	

TEAQ44m	v44minpu	Teachers have a lot of input regarding innovations, projects, and changing practices.	Perceived support for innovation scale  Variance Explained:57% Smallest component: 0.571 Reliability = 0.59
TEAQ44j	v44jhind	There are hindrances to implementing new ideas at my school	
TEAQ44o	v44oexpe	My school encourages experimentation.	

### Scale 12 – Attitudes Toward Technology Scale

TEAQ40n	v40nweak	Computers have weakened students' research skills.	Computers harm students learning scale  Variance Explained: 55% Smallest component: 0.620 Reliability = 0.72
TEAQ40o	v40oavoi	Many students use computers to avoid doing more important schoolwork.	
TEAQ40j	v40jwrit	Students' writing quality is worse when they use word processors.	
TEAQ40k	v40klazy	Computers encourage students to be lazy.	

TEAQ40a	v40anom	Teachers know a lot more than students; they shouldn't let students muddle around when they can just explain the answers directly.	Teacher-directed instruction scale  Variance Explained: 60% Smallest component: 0.746 Reliability = 0.67
TEAQ40b	v40bquie	A quiet classroom is generally needed for effective learning.	
TEAQ40c	v40ctec	It is better when the teacher, not the students, decides what activities are done.	

TEAQ40i	v40ibett	Students create better looking products with computers than with other traditional media.	Computers help students scale  Variance Explained: 40% Smallest component: 0.546 Reliability = 0.61
TEAQ40l	v40linte	Students interact with each other more while working with computers.	
TEAQ40m	v40mgras	Computers help students grasp difficult curricular concepts.	
TEAQ40p	v40phard	Students work harder at their assignments when they use computers.	
TEAQ40q	v40qmore	Students are more willing to do second drafts when using a computer.	

TEAQ46a	V46a	The role of the teacher is to be facilitator vs. the instructor.	Teacher beliefs about student-centered instruction scale  Variance Explained: 42% Smallest component: 0.580 Reliability = 0.63
TEAQ46d	V46d	Students' interests/effort in academic work is more important than learning information.	
TEAQ46e	V46e	It is good to have different activities going on in the classroom vs. a whole class assignment.	
TEAQ40d	v40dstud	Students will take more initiative to learn when they feel free to move around the classroom during class.	
TEAQ40e	v40estud	Students should help establish criteria on which they will be assessed.	

TEAQ40r	v40rkeep	Technology support in my school exists primarily to keep the computers running.	Technology support focuses on integration scale  Variance Explained: 73% Smallest component: 0.855 Reliability = 0.64
TEAQ40s	v40sinte	Technology support exists primarily to help teachers integrate computers with teaching.	

## STUDENT SCALES

These scales are created using the combined files from the lower and upper grade students.

### Scale 1 – Student Use of Technology Scales

Grade 5 Variable Name	Grade 8 Variable Name	Combined File Variable Name	Description	
q10draft	v17bdra	v27	How often use a computer to write first drafts?	Student reported use of computers for writing and research scale  Variance Explained: 58% Smallest component: 0.670 Reliability = 0.82
q10edit	v17cedi	v28	How often use a computer to edit your papers?	
q10inter	v17efin	v30	How often use a computer to find info on the net?	
q24schoo	v30dsea	v66	How often use your home PC to search the net for school?	
q24write	v30gwri	v69	How often use your home PC to write papers?	

Grade 5 Variable Name	Grade 8 Variable Name	Combined File Variable Name	Description	
q24prog	v30hpro	v70	How often use your home PC for programming?	Student reported high-end home use of technology scale  Variance Explained: 69% Smallest component: 0.814 Reliability = 0.78
q24web	v30iweb	v71	How often use your home PC to create web sites?	
q24photo	v30jpho	v72	How often use your home PC for digital photos or movies?	

Grade 5 Variable Name	Grade 8 Variable Name	Combined File Variable Name	Description	
q24game	v30agam	v63	How often use your home PC to play games?	Student reported recreational home use scale  Variance Explained: 56% Smallest component: 0.440 Reliability = 0.80
q24chat	v30bcha	v64	How often use your home PC to chat or instant messaging?	
q24email	v30cema	v65	How often use your home PC to email?	
q24fun	v30efun	v67	How often use your home PC search the net for fun?	
q24music	v30fmus	v68	How often use your home PC to mp3 or music?	

### Scale 2 – Student Belief Scale

Grade 5 Variable Name	Grade 8 Variable Name	Combined File Variable Name	Description	
q17finis	v22afin	v48	When you are using a computer do you create a better product?	Students report that computers help their work scale  Variance Explained: 54% Smallest component: 0.593 Reliability = 0.71
q17write	v22bwri	v49	When you are using a computer do you write better?	
q17bette	v22eund	v52	When you are using a computer, do you better understand?	
q17harde	v22fwor	v53	When you are using a computer, do you work harder?	

### Scale 3 – Student Self-Reported Skills Scales

Grade 5 Variable Name	Grade 8 Variable Name	Combined File Variable Name	Description	
q11email	v18aema	v34	How well able to use a computer to send and receive email?	Student report of how well they use for research and writing scale  Variance Explained: 54% Smallest component: 0.669 Reliability = 0.72
q11draft	v18bdra	v35	How well able to use a computer to write first drafts?	
q11edit	v18cedi	v36	How well able to use a computer to edit your papers?	
q11inter	v18efin	v38	How well able to use a computer to find info on the net?	

Grade 5 Variable Name	Grade 8 Variable Name	Combined File Variable Name	Description	
q11serve	v18dser	v37	How well able to use a computer to open files on a server-network?	Student report of how well they use for high end use scale  Variance Explained: 61% Smallest component: 0.724 Reliability = 0.68
q11ppt	v18fppt	v39	How well able to use a computer to create a Hyperstudio or PowerPoint presentation?	
q11dbt	v18hspre	v41	How well able to use a computer to work with spreadsheet or database?	

### Scale 4 – Students General Comfort Level With Technology

Grade 5 Variable Name	Grade 8 Variable Name	Combined File Variable Name	Description	
q15perso	v19pers	v45	Statement about personal use of computer	Student reported general comfort level with technology scale  Variance Explained: 61% Smallest component: 0.623 Reliability = 0.67
q17confu	v22hcon	v55	When you are using a computer, do you get more confused?	
q17frust	v22ifru	v56	When you are using a computer, do you get frustrated more easily?	

### Scale 5 – Technology in the Home Scales

Grade 5 Variable Name	Grade 8 Variable Name	Combined File Variable Name	Description	
q18#comp	v24num	v57	How many computers do you have at home?	Student reported amount of technology in the home scale  Variance Explained: 59% Smallest component: 0.702 Reliability = 0.63
q19conne	v26inte	v58	What type of internet connection do you have at home?	
q23howlo	v25how	v62	How long have you had a computer at home?	

Grade 5 Variable Name	Grade 8 Variable Name	Combined File Variable Name	Description	
q20#shar	v27sha	v59	How many people share your home computer?	Student reported ease of access at home scale  Variance Explained: 58% Smallest component: 0.752 Reliability = 0.62
q21usem	v28use	v60	Who uses your home computer the most?	
q22diifi	v29diff	v61	At home, how difficult is it to get on your computer?	

## DISTRICT SCALES

### Scale 1 – Policy Scales

v95	Which of the following policies are implemented in your district: Students are not allowed to play games on the school computers	Number of restrictive policies relating to technology use scale
v97	Which of the following policies are implemented in your district: Students are not allowed to send email from school computers	
v98	Which of the following policies are implemented in your district: Students are not allowed to receive email from school computers	
v103	Which of the following policies are implemented in your district: Students are not allowed to bring their own computers or Palms from home	
v104	Which of the following policies are implemented in your district: Students are not allowed access to the server	
v105	Which of the following policies are implemented in your district: Students are not allowed access to the server from home	Scale created through summing items Reliability = 0.49

### Scale 2 – Personal Use

v116	How many emails do you receive in a given day?	Personal use scale
v117R	How often do you, as a district leader, regularly email the following people? :Teachers	
v118R	How often do you, as a district leader, regularly email the following people? : Administrative Staff	
v121R	How often do you, as a district leader, regularly email the following people? : Principals in your schools	
v124	How many years ago, if at all, did you first use computers in the following ways? : Communication with school staff via email	
v125	How many years ago, if at all, did you first use computers in the following ways? : For your own work; writing documents, administrative software	
v126	How many years ago, if at all, did you first use computers in the following ways? : For your personal activities; personal e-mail,	Variance Explained: 51% Smallest component: 0.548 Reliability = 0.81

v119R	How often do you, as a district leader, regularly email the following people? : Students	Communicating beyond school scale
v120R	How often do you, as a district leader, regularly email the following people? : Parents	
v127	How many years ago, if at all, did you first use computers in the following ways? : Presentations to school or outside community	
		Variance Explained: 59% Smallest component: 0.646 Reliability = 0.63

v122	How many hours a week do you spend on the internet: Professionally	Internet use scale
v123	How many hours a week do you spend on the internet: Personally	
		Variance Explained: 73% Smallest component: 0.855 Reliability = 0.62

### Scale 3 – Belief Scales

v2	Students interact with each other more while working with computers	Technology helps students
v3	Computers help students grasp difficult curricular concepts	
v6	Students work harder at their assignments when they use computers	Variance Explained: 58% Smallest component: 0.707 Reliability = 0.64

v5	Many students use computers to avoid doing more important work	Technology harms students
v8	Students are too careless to use technology without close supervision	
v4	Computers have weakened students' research skills	
V10	Students access to web encourages plagiarism	Variance Explained: 47% Smallest component: 0.579 Reliability = 0.74

V13	How valuable are each of the following instructional uses of computers? Developing basic mathematics skills	Value of technology for developing basic skills scale
V14	How valuable are each of the following instructional uses of computers? Developing basic reading skills	
V15	How valuable are each of the following instructional uses of computers? Preparing students for standardized tests	
V16	How valuable are each of the following instructional uses of computers? Drafting text	
V21	How valuable for accessing resources via the internet or CD-ROM	Variance Explained: 57% Smallest component: 0.718 Reliability = 0.68

V20	How valuable are each of the following instructional uses of computers? Student presentations	Value for developing advanced more advanced skills scale
V22	How valuable are each of the following instructional uses of computers? Exploring mathematical relationships	
V23	How valuable are each of the following instructional uses of computers? Graphing and manipulating data	
V24	How valuable are each of the following instructional uses of computers? Producing projects	
V25	How valuable are each of the following instructional uses of computers? Creating web sites	Variance Explained: 53% Smallest component: 0.571 Reliability = 0.75

### Scale 4 – Funding scales

v43	Over the last three years, what percentage of technology related expenditures came from: Bond/Debt issuance	General funding for technology scale
v44	Over the last three years, what percentage of technology related expenditures came from: Annual School Budget	Variance Explained: 55%
		Smallest component: 0.739
		Reliability = 0.17

v41	Has your district obtained special grants during the last three years to support experimental programs at the school either directly or through your district?	Variety of external funding for technology scale
v45	Over the last three years, what percentage of technology-related expenditures came from: Parent/Community Fundraising	
v46	Over the last three years, what percentage of technology-related expenditures came from: External Grants	
v47	Over the last three years, what percentage of technology-related expenditures came from: Federal Grants including e-Rate	Variance Explained: 57%
		Smallest component: 0.593
		Reliability = 0.74

v49	Does your district budget have a line item for: Hardware	Line item funding for technology scale
v50	Does your district budget have a line item for: Software	
v51	Does your district budget have a line item for: Technology Support Staff	
v52	Does your district budget have a line item for: Technology Curriculum Integration Staff	
v53	Does your district budget have a line item for: Technology-related Professional Development	
v54	Does your district budget have a line item for: Upgrades and replacement	Variance Explained: 83%
		Smallest component: 0.777
		Reliability = 0.96

### Scale 5 – Equity scales

v68	Within your district, how equitable is student ACCESS to computers: Within elementary school classrooms	Equity of use and access for elementary school scale
v76	Within your district, how equitable is student USE of computers: Within elementary school classrooms	Variance Explained: 84%
		Smallest component: 0.919
		Reliability = 0.82

v71	Within your district, how equitable is student ACCESS to computers: Of different achievement levels	Equity of use and access for special populations scale
v72	Within your district, how equitable is student ACCESS to computers: Of different gender	
v73	Within your district, how equitable is student ACCESS to computers: Of different race	
v74	Within your district, how equitable is student ACCESS to computers: Of different SES	
v75	Within your district, how equitable is student ACCESS to computers: Of differing primary languages	
v79	Within your district, how equitable is student USE of computers: Of different achievement levels	
v80	Within your district, how equitable is student USE of computers: Of different gender	
v81	Within your district, how equitable is student USE of computers: Of different race	
v82	Within your district, how equitable is student USE of computers: Of different SES	
v83	Within your district, how equitable is student USE of computers: Of differing primary languages	Variance Explained: 68%
		Smallest component: 0.687
		Reliability = 0.94

v69	Within your district, how equitable is student ACCESS to computers: Within middle school classrooms	Equity of use and access for middle and high school students scale
v70	Within your district, how equitable is student ACCESS to computers: Within high school classrooms	
v77	Within your district, how equitable is student USE of computers: Within middle school classrooms	
v78	Within your district, how equitable is student USE of computers: Within high school classrooms	Variance Explained: 71%
		Smallest component: 0.800
		Reliability = 0.86

### Scale 6 – Leadership Scales

v106	To what extent do you, as a district leader, raise issues about technology with the following people (via conversation, formal presentation, school newsletter, etc)? : Parents	Leaders discuss technology scale  Variance Explained: 59% Smallest component: 0.728 Reliability = 0.86
v107	To what extent do you, as a district leader, raise issues about technology with the following people (via conversation, formal presentation, school newsletter, etc)? : School board	
v108	To what extent do you, as a district leader, raise issues about technology with the following people (via conversation, formal presentation, school newsletter, etc)? : With other district leaders	
v109	To what extent do you, as a district leader, raise issues about technology with the following people (via conversation, formal presentation, school newsletter, etc)? : Teachers	
v110	To what extent do you, as a district leader, raise issues about technology with the following people (via conversation, formal presentation, school newsletter, etc)? : Principals	
v111	To what extent do you, as a district leader, raise issues about technology with the following people (via conversation, formal presentation, school newsletter, etc)? : Your community	

v89	To what extent is technology considered when evaluating the principals and curriculum leaders in your district?	Evaluations consider technology scale
v90	To what extent is technology considered when evaluating the teachers in your district?	Variance Explained: 85% Smallest component: 0.920 Reliability = 0.82

### Scale 7 – Decision-Making Scales

v26	How much discretion do individual principals in your district have about: Purchasing software	Principal's technology discretion scale  Variance Explained: 59% Smallest component: 0.633 Reliability = 0.77
v27	How much discretion do individual principals in your district have about: Purchasing hardware	
v28	How much discretion do individual principals in your district have about: Allocation of technology in the schools	
v29	How much discretion do individual principals in your district have about: Professional development activities	

### Scale 8 – Maturity of Technology Program Scales

v34	In my district, technological resources are regularly updated and replaced	Strength of upgrading procedures scale  Variance Explained: 67% Smallest component: 0.731 Reliability = 0.75
v36	In my district, careful plans have been made for the replacement of obsolete technology on a regular basis	
v37	Processes for re-purposing older machines are in place, resulting in the maximum benefit for dollars invested	

### Scale 9 – Professional Development Scales

v134	Which type of professional development does your school tend to focus on?	Professional development focuses on integration scale
v135	Which type of professional development would be most useful to your staff?	Variance Explained: 58% Smallest component: 0.552 Reliability = 0.73

v137	Do you have access to workshops and seminars; run by outside source	Variety of technology professional development scale  Items summed to create scale
V138	Do you have access to workshops and seminars; run by district personnel	
V139	Do you have access to university or college course work	
V140	Do you have access to mentor/colleague	
V141	Do you attend conferences	
V142	Do you have access to district or school sponsored courses (over several weeks)	
V144	Do you have access to online or web-based professional development	
V145	Do you have access to one-on-one or group training with technology staff	
V146	Do you have access to release time for department or grade level planning related to technology	

## Appendix E

### SPSS Code Used to Classify Teachers by School Level and Subject Area

```

1 - Remove data from Somerville.
*Remove the one person in district id =19.
*4403 to 4402.

*2 - Remove teachers who report that they don't teach any grade.
COMPUTE flag=(v9ak =2 and v9b1 =2 and v9c2=2 and v9d3=2 and v9e4=2
    and v9f5=2 and v9g6=2 and v9h7=2 and v9i8 =2 and v9j9=2 and
    v9k10=2 and v9l11=2 and v9m12=2) .
EXECUTE.
*There are 117 teaches.
FILTER OFF.
USE ALL.
SELECT IF(flag=0).
EXECUTE .

*3 - Select only the teachers who teach "all", "English" or
    "math", "social studies" or "science".
USE ALL.
COMPUTE flag1=(v8ball=1 or v8cengl=1 or v8dmath=1 or v8essge=1 or
    v8gscien=1).
EXECUTE .
FILTER OFF.
USE ALL.
SELECT IF(flag1=1).
EXECUTE .

*4 - Keep the teachers who report being SPED teachers and respond
    less than 50% to v43a3 or v43bb3 or are missing both v43a3
    and v43bb3.
* These are the teachers that are most likely to be classroom
    teachers and who are reporting they are SPED because they
    have a small number of SPED students in their classrooms.
*v1.
COMPUTE flag3 = 0.
EXECUTE.
IF (v8fspe=1 and ((v43a3spe=1 or v43a3spe=2) or (v43b3lea=1 or
    v43b3lea=2) or (v43b3lea=9 and v43a3spe=9))) flag3 = 1.
EXECUTE .
IF (v8fspe =2) flag3 =1.
execute.

```

```

FILTER OFF.
USE ALL.
SELECT IF(flag3=1).
EXECUTE .

*5 - Remove teachers who report they teach out of their school
  classification.
*Step 1.
*Create school classification.
*Always lower level up to grade 5.
IF ((v9ak=1 or v9b1=1 or v9c2=1 or v9d3=1 or v9e4=1 or v9f5=1)
    and (notesfla='pk-k' or notesfla='1-5' or notesfla='6-
    8' or notesfla='2-4' or notesfla='2-5' or notesfla='2-
    6' or notesfla='3-5' or notesfla='4-8' or notesfla='k-
    2' or notesfla='k-4' or notesfla='k-5' or notesfla='k-6'
    or notesfla='k-8' or notesfla='pk-1' or notesfla='pk-2' or
    notesfla='pk-3' or notesfla='pk-5')) tlevel = 1 .
VARIABLE LABELS tlevel 'Level based on teacher'.
EXECUTE .
*Always middle level.
IF ((v9g6=1 or v9h7=1 or v9i8=1) and (notesfla='5-8' or
    notesfla='7-8' or notesfla='4-8' or notesfla='k-8' or
    notesfla='6-8')) tlevel = 2 .
VARIABLE LABELS tlevel 'Level based on teacher'.
EXECUTE .
*Always upper level.
IF ((v9j9=1 or v9k10=1 or v9l11=1 or v9m12=1) and (notesfla='7-12'
    or notesfla='9-11' or notesfla='9-12')) tlevel = 3 .
VARIABLE LABELS tlevel 'Level based on teacher'.
EXECUTE .
*Grade 6 exception 1.
IF ((v9g6=1) and (notesfla='2-6' or notesfla='k-6')) tlevel = 1 .
VARIABLE LABELS tlevel 'Level based on teacher' .
EXECUTE .
*Grade 6 exception 2.
IF ((v9g6=1) and (notesfla='4-8' or notesfla='k-8')) tlevel = 2 .
VARIABLE LABELS tlevel 'Level based on teacher'.
EXECUTE .
*Grade 7 and 8 exeception.
IF ((v9h7=1 or v9i8=1) and (notesfla='7-12')) tlevel = 2 .
VARIABLE LABELS tlevel 'Level based on teacher' .
EXECUTE .
*Step 2.
COMPUTE new1=0.
EXECUTE.
IF (tlevel=1 and (notesfla='9-12' or notesfla='7-12' or notesfla='9-
```

```

    11 ` or
    notesfla='7-8' or notesfla='6-8')) new1 = 1.
EXECUTE .
FILTER OFF.
USE ALL.
SELECT IF(new1=0).
EXECUTE .

COMPUTE new2=0.
EXECUTE.
IF (tlevel=2 and (notesfla='9-12' or notesfla='9-11' or notesfla='1-
5' or notesfla='2-4' or notesfla='2-5' or notesfla='2-
6' or notesfla='3-5' or notesfla='k-2' or notesfla='k-4'
or notesfla='k-5' or notesfla='k-6' or notesfla='pk-1' or
notesfla='pk-2' or notesfla='pk-3' or notesfla='pk-5')) new2 = 1
.
EXECUTE .
FILTER OFF.
USE ALL.
SELECT IF(new2=0).
EXECUTE .

COMPUTE new3=0.
EXECUTE.
IF (tlevel=3 and (notesfla='7-8' or notesfla='6-8' or notesfla='4-
8' or notesfla='5-8' or notesfla='1-5' or notesfla='2-
4' or notesfla='2-5' or notesfla='2-6' or notesfla='3-
5' or notesfla='k-2' or notesfla='k-4' or notesfla='k-5'
or notesfla='k-6' or notesfla='k-8' or notesfla='pk-1' or
notesfla='pk-2' or notesfla='pk-3' or notesfla='pk-5')) new3 = 1
.
EXECUTE .
FILTER OFF.
USE ALL.
SELECT IF(new3=0).
EXECUTE .

*6 - Remove all librarians.
FILTER OFF.
USE ALL.
SELECT IF(v8hlibra=2).
EXECUTE .
*2913 were left after all these steps.

```

\*If a teacher marks multiple grades that cross school levels they should be removed - for example if a teacher teaches

grades 4,5,6,7 they need to be removed because they can't be classified.

```
COMPUTE misclass=0.
```

```
EXECUTE.
```

```
IF (surveyid=6006 or surveyid=1780 or surveyid=2415 or  
surveyid=2533 or surveyid=2551 or surveyid=3055 or  
surveyid=3102 or surveyid=3897 or surveyid=5041 or  
surveyid=5263 or surveyid=5284 or surveyid=5674 or  
surveyid=5971 or surveyid=737 or surveyid=4548 or  
surveyid=6055 or surveyid=7433 or surveyid=7434 or  
surveyid=7816 ) misclass = 1 .
```

```
EXECUTE .
```

```
FILTER OFF.
```

```
USE ALL.
```

```
SELECT IF(misclass=0).
```

```
EXECUTE .
```

\*Final teacher number = 2894.



inTASC is a not-for-profit research group that works collaboratively with schools, educational agencies, and businesses to conduct research and development on a variety of issues related to technology and assessment. inTASC brings together researchers who have examined several aspects of technology and assessment in schools over the past decade to focus on new questions and issues that arise from the field. inTASC is unique in that it does not develop research studies and then seek schools to participate in research activities. Instead, schools, educational agencies, and businesses approach inTASC with their own ideas and/or questions that require systematic research to address. Research conducted by inTASC is developed, conducted, and often disseminated in collaboration with our educational and business partners.

inTASC believes that advances in educational technology and continuously emerging applications of those technologies coupled with growing demands to document impacts on teaching and learning requires a dual focus on instructional uses of technology and applications of technology to new forms of assessment. For this reason, inTASC collaborates on research that focuses on instructional uses of technology and on applications of computer-based technologies to the technology of testing and assessment. It is our hope that this dual focus will enable us to provide research-based information to schools and educational leaders about the impacts of educational technology, and to produce new forms of assessment that capitalize on the powers of computer-based technologies and that are more sensitive to the types of learning enabled by educational technologies.



Use, Support, and Effect of Instructional Technology Study

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