Review Copy

INTEGRATED STUDIES OF EDUCATIONAL TECHNOLOGY (ISET)

Implementing the
Technology Literacy Challenge Fund
Educational Technology State Grants Program

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Executive Summary

Introduction

The Technology Literacy Challenge Fund (TLCF) was the first federal grants program to assist states in bringing educational technology into the nation's elementary and secondary classrooms. Between fiscal years (FY) 1997 and 2001, the program provided $1.93 billion to states and territories, which then awarded funds to school districts within their state (including consortia of districts). In FY 2000 (the most current year for which TLCF funding data are available), 3,191 districts received TLCF funding, representing 21 percent of the nation's nearly 15,000 school districts.

A key feature of the TLCF program was the flexibility that it gave states in awarding funds to subgrant recipients. Subgrantees could use funds to purchase modern computers, to improve their connectivity to the Internet, to support the professional development of teachers in educational technology, and to promote the integration of technology into the classroom. States were directed to focus their awards on school districts that had a high level of economic need or a level of need to develop educational technology.

This report describes the implementation of the TLCF program from 1997 through 2001 from the perspective of state technology coordinators, district technology coordinators, school principals, and classroom teachers. It uses data from the Integrated Studies of Educational Technology (ISET) surveys funded by the U.S. Department of Education to obtain nationally representative information on educational technology as of the 1999–2000 school year.[1] These surveys provide a comprehensive picture of the availability and use of educational technology at a point in time, including the potential need for different types of assistance among the nation's school districts, such as professional development.

The report also uses data from the State Performance Reports (SPR), an annual reporting system to the federal TLCF program office in which states described their

[1]ISET data were collected from November 2000 to June 2001. Respondents were asked to focus on availability of technology for the 1999–2000 school year, including the summer of 2000.

program operations, including their priorities in awarding funds and their distribution of funds across school districts. The SPR data were available each year for 1997 through 2000 and give a great deal of information on how states targeted their funds across various types of districts.

The TLCF program operated at a time when educational technology was rapidly becoming available, accompanied by a growing concern of how to effectively integrate technology into the curriculum. States and school districts provided many different forms of leadership during this time, including the provision of statewide networks, regional technical assistance centers, and purchasing consortia. States and districts also played an important role in setting the policy environment for educational technology, in that they developed technology plans that specified priorities and goals, and they also set standards for students and teachers on technology-related uses and proficiencies.

In 2002, the TLCF program was replaced by the Educational Technology States Grants Program ("Ed Tech Program"), part of the No Child Left Behind Act. The Ed Tech Program has many of the same features as the TLCF, including flexibility for states to structure their grant competitions. One significant difference in the new program is that half of the available funds are to be distributed by states to districts on a formula basis, in which districts will receive funding based on their relative share of each state's economically disadvantaged students. The remainder is to be awarded by states through competitions as under the TLCF program.

Key Findings

Key provisions of the TLCF, including those that were reauthorized in the Educational Technology States Grants Program, appear to have been implemented as intended and to have worked effectively.

- Most states took advantage of the flexibility in the program for designing state TLCF subgrant competitions and tailored competitions to reflect state priorities.
- Sixty-one percent of districts responding to the ISET Survey of District Technology Coordinators reported having applied for TLCF funding from 1997 through 2001.
- No one priority dominated states' grant making, and many states made awards reflecting multiple priorities.

- States varied greatly in the share of districts in their state to which they made awards. Some states gave few, but large awards (e.g., Texas), and other states gave many, but small awards (e.g., Kentucky).
- State targeting to high-poverty districts, as well as to small and rural districts, in state-designed subgrant competitions appears to have been effective.
- States offered a wide array of technical assistance (e.g., briefings, feedback on technology plans, Web-based materials) to TLCF applicants, the majority of which the districts found useful.
- Over half the districts that did not apply for TLCF funds indicated that they were unaware of the program (56 percent), suggesting a need for broader state outreach.

The TLCF program emphasized making educational technology accessible and promoted its use. This study found that educational technology was available and being introduced in classrooms and schools across the nation. Quality of access to technology varied and was often limited. The frequency and quality of technology use also varied.

- Most teachers (81 percent) had two or more computers in the classroom or 25 or more computers in a laboratory setting. Significant differences existed in level, type, and quality of access to computers across different types of districts. Teachers in rural districts and in small districts had more limited access to computers than did teachers in other districts. Computers in districts that received TLCF funding were more likely to be older, not equipped with needed accessories (e.g., printer, projectors, external drives), and not connected to the Internet.
- Nearly three out of four schools (73 percent) had 76 to 100 percent of their instructional classrooms connected to the Internet, but the level of connectivity also varied by district type. Schools in urban districts, in large districts, in high-poverty, and in high-poverty TLCF districts had fewer classrooms connected to the Internet, compared with schools in other districts.
- Fifty-five percent of teachers reported doing at least one computer-related activity with students frequently (approximately once per week or more), and 8 percent reported not using technology with students. Some differences in use were found across district types. Although teachers in high-poverty districts reported using technology more frequently than did teachers in other districts, uses of technology tended to be more basic (e.g, word processing) than advanced (e.g., problem solving and data analysis).
- Most teachers reported that there were barriers to the use of educational technology that included limited availability of useful software and Web sites, as well as some limits in student technology skills and access to technology outside of school. These barriers were greatest for teachers in large districts, in rural districts, and in districts that received TLCF funds.

Districts and schools were active in making professional development and technical support available to teachers, yet teachers reported needing additional assistance.

- Though most teachers participated in professional development activities related to educational technology, teachers reported that they needed training in a variety of areas. When asked about their need for professional development in various educational technology topics, 78 to 89 percent of teachers reported that they needed additional training (e.g., in how to use technology to help students improve basic academic skills; in creating lesson plans that incorporate technology and the Internet).
- The majority of schools (80 percent) have a technology coordinator. Although teachers generally reported that their needs for technical support were fairly well or well met in terms of installing, maintaining, and repairing equipment, teachers reported needing more assistance in integrating technology into the curriculum.

States, districts, and schools were active in supporting the implementation of educational technology through policy and other initiatives.

- All states developed plans for educational technology, and the existence of plans at the district and school levels was nearly universal. However, there appeared to be room for improvement in developing and using performance indicators to track progress within formal evaluations of initiatives related to educational technology.
- State initiatives to support technology (e.g., statewide networks, purchasing consortia, distance learning) were widespread, and some were associated with increased access to technology at the local level. State efforts that helped decrease the direct cost of hardware and connectivity (such as purchasing consortia) were most closely linked to access at the local levels.
- Student and teacher standards for educational technology also were common, but inconsistent relationships were observed between the existence of standards and the availability of technology.

Summary

The primary conclusion of this report is that the TLCF program was implemented effectively. States were able to identify districts with the greatest levels of need and were successful in targeting program funds to these districts, as suggested in the ISET surveys by the lesser access, greater barriers, and higher level of needs reported by those in high-poverty TLCF districts.

Although access to educational technology, technology-related professional development, and use of technology increased throughout the nation during this period, it is difficult to isolate the specific effects of the TLCF program in these areas. The program operated at a time when most states and school districts were actively working to bring educational technology into their classrooms and to incorporate this technology into the curriculum. For most districts and schools, the program likely provided only a relatively small share of total funding associated with educational technology. In addition, given the overall flexibility that states had in setting priorities, states and districts funded a broad range of activities, making it difficult to isolate any one measure that could define the extent to which the program had measurable effects.

This study of the implementation of the TLCF suggests that the basic program structure, in which states are given block grants that are then distributed on a competitive basis to districts, is effective in targeting funds to high-need districts. The flexibility built into the TLCF program appears to have allowed states to target TLCF funds through a variety of state-specific approaches, as demonstrated in the wide diversity across states in the number and focus of subgrant competitions, as well as the size of individual subgrants.

Chapter 1. Introduction

This report examines various aspects of the availability and use of educational technology in the nation's elementary and secondary schools as of the 1999–2000 school year. In particular, it examines the implementation of the Technology Literacy Challenge Fund (TLCF), the first federal educational technology grants program that supported states in their efforts to bring technology into the classroom. Funded from 1997 to 2001, the program intended to complement the ongoing efforts of states to acquire hardware and Internet connections, to provide professional development and technical support, and to assist in the integration of technology into the curriculum. Although no longer funded, many elements of the TLCF have been incorporated into the Educational Technology State Grants Program in the 2002 No Child Left Behind Act.

The TLCF program gave individual states a great deal of flexibility in how they operated their grants programs in terms of the activities they funded and the manner in which they awarded funds across school districts[r1]. States were allocated funds on the basis of a formula [r2]related to the number of students in poverty (subject to a funding floor). Districts and consortia within states then applied for funding under a competitive subgrants program that required prospective subgrantees to respond to priorities specified by their state. States were required, however, to target their awards to districts that were identified as high poverty or otherwise in need of technology.

The TLCF program operated during a time when access to computers, Internet access, and their use in instruction was growing. For example, in 1996 only 65 percent of public schools and 14 percent of instructional classrooms were connected to the Internet, whereas by fall 2000, 98 percent of public schools had access to the Internet and 77 percent of instructional classrooms were connected to the Internet.[2] Despite the high percentage of schools and classrooms with Internet access in fall 2000, schools with high poverty and minority enrollments were still less likely to have access to technology. For example, in fall 2000, only 60 percent of classrooms in high-poverty schools and 64 percent of classrooms in schools with high minority enrollments were connected to the

[2]National Center for Education Statistics. (2001). *Internet Access in U.S. Public Schools and Classrooms: 1994–2000* (Report No. 2001-071). Washington D.C.: National Center for Education Statistics.

Internet.[3] The TLCF program sought to reduce such disparities by focusing funding on high-poverty districts and those with high levels of need for technology.

The Integrated Studies of Educational Technology

In response to the increasing investments in and concerns about educational technology, as well as to better understand the federal role in supporting technology in schools, the U.S. Department of Education (ED) commissioned three major studies, together known as the Integrated Studies of Educational Technology (ISET):

- Implementing the Technology Literacy Challenge Fund Educational Technology State Grants Program
- Professional Development and Teachers' Use of Technology
- The Formative Evaluation of the E-Rate Program

The Implementing the Technology Literacy Challenge Fund Educational Technology State Grants Program seeks to answer the following questions:

- What was the status of state and district planning and leadership with respect to educational technology, and what was the role of TLCF in these areas? What types of activities did TLCF funds support?
- How did states and districts initiate and support the use and evaluation of educational technology?
- How was educational technology used and supported in schools and classrooms? How did the use of technology differ by local characteristics?

The three studies collected data on the implementation of educational technology through a survey of all states and nationally representative surveys of school districts, schools, and teachers that were fielded from November 2000 to June 2001. The survey instruments are as follows:[4]

- ***ISET Survey of State Technology Coordinators.*** The technology coordinators of all 50 states and the District of Columbia were asked to respond to this survey. Forty-five states and the District of Columbia completed the state survey, and partial data were gathered from two additional states.

[3]Ibid

[4]The description of methods in Appendix B of this report details information on the content of the surveys, study design, sampling strategy, response rates, and development of statistical weights. The state and district surveys (including summary responses to each question) are in Appendices C and D of this report. The school and teacher surveys are appended to the *ISET Formative Evaluation of the E-Rate* report and the *ISET Professional Development and Teachers' Use of Technology* report, respectively.

- ***ISET Survey of District Technology Coordinators.*** A stratified random sample of 1,061 districts was drawn,[5] and 763 districts responded to this survey, for a 72 percent response rate.
- ***ISET Survey of School Principals.*** A stratified random sample of 1,106 schools was drawn from the 1,061 districts sampled for the ISET study. A total of 849 school principals responded, for a 77 percent response rate.
- ***ISET Survey of Classroom Teachers.*** Teacher rosters were obtained from 582 of the 1,106 schools sampled for the ISET study, from which 1,750 teachers were selected and asked to respond to the classroom survey. A total of 1,273 teachers responded, for a 73 percent response rate.

These surveys provide a great deal of information on a wide range of issues related to educational technology for the various respondents. They present a representative picture of the availability and use of technology as of the 1999–2000 school year and include information that can be used to assess the need for various types of assistance. The surveys for districts, schools, and teachers have been linked with data on the characteristics of districts, specifically their size, locality (urban, rural, and suburban), poverty status, and with information on whether they ever received TLCF funding.

The addition of district characteristics to the survey data has allowed us to examine how funds were awarded across districts and to analyze the extent to which states targeted their funding to districts with the greatest need. We also have been able to compare districts across various attributes to examine how high-poverty districts that received TLCF funding (presumably those with greatest need) differed from other districts in attributes such as the availability of technology. In discussing differences across districts (and teachers within districts) in the report, we have noted only those

[5]The District of Columbia and Hawaii were removed and treated instead as states, and two districts were deleted because they were duplicates for an effective sample size of 1,057.

comparisons that are statistically different at the 0.05 [tgd3]level of significance in terms of conventional tests of differences.[6]

The TLCF study also used information from the annual State Performance Reports (SPR) to the TLCF program office, in which states and district awardees provided information on the administration of the program, their goals for technology, and their uses of TLCF funds. These reports were available for 1997 through 2000. There were 1,446, 3,265, 3,191, and 3,191 [tgd4]reports available for districts that responded to the SPR in 1997, 1998, 1999, and 2000, respectively. The SPR data provide useful information on how the program operated over time in terms of the population of subgrantees each year. However, because this population changed from year to year, comparisons of subgrantees across years generally cannot be made, because they do not necessarily represent the same subgrantees.

The SPR reports include a mix of narrative information on program goals and descriptions of subgrants within each state, along with tabular information related to the number of subgrants, characteristics of subgrantees, and uses of funds. In addition to the surveys and the SPR reports, we examined state technology plans to document the types of educational technology goals set by the state.

The TLCF Program

Congress appropriated $200 million in Fiscal Year (FY) 1997 for the TLCF and subsequently appropriated $425 million in FY1998, in FY1999, and in FY2000, and $450 million in FY2001. These funds were allocated to individual states in proportion to their overall share of students in poverty as measured under Part A of Title I of the Elementary and Secondary Act, subject to the requirement that no state receive less than one-half of 1 percent of the amount appropriated. Thus all states received funding from the first year of

[6]We applied multivariate methods (i.e., linear regression analyses, logistic regression analyses) to make comparisons in outcome variables across district characteristics. These methods allowed us to account for the possibility that characteristics such as district size and locale are related and to identify unique differences that exist across districts with various characteristics by accounting for the correlation of these characteristics. The identification of statistically significant differences through the use of multivariate analyses was virtually identical to those determined through simple pair- and group-wise comparisons that did not account for the possible correlation of district factors. This suggests that although correlations existed across district factors, there was enough unique variation across districts that statistically significant differences can be observed, even when the correlation among these factors was controlled for. In conducting tests of significance, we accounted for the clustering of observations to account for the fact that the ISET data were obtained under a complex survey design.

the program. States were allowed to retain up to 5 percent of their grants for program administration, with the rest to be distributed within each state under a competitive grants program.

The TLCF program had four overarching goals that guided the administration of the program and the award of subgrants:

- All teachers will have the training and support they need to help all students learn through computers and through the Internet.
- All teachers and students will have modern computers in their classrooms.
- Every classroom will be connected to the Internet.
- Effective and engaging software and online resources will be an integral part of every school curriculum.

Beginning in 1998, the Department of Education encouraged districts to spend at least 30 percent of TLCF funds on technology-related professional development for teachers. The Educational Technology State Grants Program in the 2002 No Child Left Behind Act requires district recipients of these funds to spend a minimum of 25 percent on professional development for teachers.

In receiving TLCF program funds from the federal government, states could specify their own priorities in the types of activities they would support and the strategy they would use in distributing funds. Individual states were required to submit their state technology plans (often developed prior to the TLCF program) and to report on the progress in meeting the goals they specified in their plan.

As part of the grants process, individual school districts and consortia of districts submitted grant applications to their state educational technology coordinators. These applications covered a wide range of possible activities, such as acquiring hardware, software, and connections; obtaining professional development; providing technical support; enhancing the integration of technology into the curriculum; and generally applying technology to support school reform efforts.

Under the federal legislation, states were required to provide assistance in grant writing to potential grantees. The majority of states made available a wide array of technical assistance that ranged from personalized forms, such as statewide conferences

or regional briefings, training sessions for grant writing, and training and feedback on district technology plans, to information-resource assistance, such as e-mail distribution lists and examples of successful proposals and other Web-based materials.

Under the TLCF legislation, both states and districts were required to describe how they would evaluate their performance and measure their progress in meeting their goals. Because of each state's unique context, the legislation deliberately built in flexibility and allowed each state to determine the best means of tracking progress toward its goals.

As a whole, the data collected through the TLCF implementation study suggest that the program was implemented effectively and that funds were targeted to the highest need districts, as mandated by the legislation. Indeed, the Educational Technology State Grants Program of the No Child Left Behind Act preserves much of the TLCF program structure. The federal government will distribute block grants to states, which will then distribute subgrants to districts in two ways. Half of each state's block grant will be distributed on a competitive basis to high-need districts, as was done in the TLCF (state flexibility in determining competition structures and evaluating progress has been preserved). The remaining half of each state's block grant will be distributed across districts on a formula basis, according to districts' Title I standing (i.e., relative percentages of high-poverty children enrolled within each district).

Purpose of the TLCF Implementation Study

The purpose of this report is twofold. The first is to describe the implementation of the TLCF program at the state and local levels in terms of the type of activities that were supported in relation to the major goals of the enabling legislation. The second is to describe the environment in which the program was administered and to describe the needs that it sought to address.

The nationally representative survey data collected as part of the Integrated Studies of Educational Technology (ISET) provide a great deal of information on student access to computers and the Internet, professional development, technical support, uses of technology, and barriers to the use of technology. The state and district survey instruments with item-level summary statistics are included in the appendices. The ISET

school survey, along with summary statistics, is available in the ISET Formative Evaluation of the E-Rate report. The ISET teacher survey with summary statistics may be found in the *ISET Professional Development and Teachers' Use of Technology* report.

States and districts have taken an active role—independent of the TLCF program—in supporting educational technology. This report presents information on state policies related to educational technology, providing information about the policy environments in which the TLCF program operated. This study is primarily descriptive in terms of reporting the policy environments and how TLCF program funds were used to support state and district activities.

A key part of the evaluation of the program is an examination of how states used TLCF funds to meet the various needs at the district and school levels. The ISET surveys provide information on the characteristics of respondents that help us understand how these needs may have varied across respondents, including those that received TLCF funds and those that did not. These data allow us to examine the extent to which TLCF grantees were indeed those with greatest need for technology, which allows us to describe the degree to which funds were used as intended.

The study is limited, however, in its ability to measure the effect of the TLCF program on key outcomes, including the availability of educational technology and its impact on student achievement (which requires a much more elaborate design than this program implementation study). TLCF funds could be used in many different ways. Indeed, many states encouraged subgrantees to coordinate TLCF funds with other funding sources to help leverage additional resources. As a result, it is difficult to measure the specific impact of the program on outcomes, especially given that the program operated at a time when multiple sources of funding for educational technology were becoming more widely available. Accordingly, this report discusses technology in classrooms and in different types of districts (e.g., TLCF subgrantees versus non-TLCF subgrantees), but cannot make definitive claims about the impact of the TLCF program.

Organization of the Report

This report is organized as follows:

- *Executive Summary*

- *Chapter 1: Introduction*
- *Chapter 2: Implementation of the TLCF Program*. This chapter describes the implementation of the TLCF program and addresses the effectiveness of state targeting to high-poverty and high-technology-need districts, the structure of subgrant competitions, and the technical assistance offered to districts by states. We also document the characteristics of district applicants and their uses of TLCF funds.
- *Chapter 3: Leadership in Enhancing Technology*. This chapter discusses state and district policy and infrastructure environments to examine how leadership is related to the prevalence and use of educational technology.
- *Chapter 4: Access to Educational Technology*. This chapter reviews the status of access to modern computers and to the Internet and discusses how policy and infrastructure environments are related to access to technology in the nation's schools.
- *Chapter 5: Professional Development*. This chapter reviews the status of professional development for teachers in educational technology and discusses how policy and infrastructure environments are related to professional development for the nation's teachers.
- *Chapter 6: Technical Support*. This chapter reviews the status of technical support and discusses how policy and infrastructure environments are related to technical support in the nation's schools.
- *Chapter 7: Use of Technology in the Classroom*. This chapter reviews the status of how teachers use technology in the classroom and discusses how policy and infrastructure environments are related to technology use in the nation's schools.
- *Chapter 8: Conclusions*
- *Appendices*
    - *Appendix A* lists TLCF allocations for 1997–2001, by state.
    - *Appendix B* documents the technical aspects of the TLCF implementation study (e.g., study design, sampling strategy, response rates, and development of statistical weights).
    - *Appendix C* provides the ISET state survey, annotated with summary percentages for each survey item.
    - *Appendix D* provides the ISET district survey, annotated with summary percentages for each survey item.

Chapter 2. Implementation of the TLCF Program

First funded in 1997, the TLCF was the first federal program designed to provide assistance to states and districts nationwide to support the integration of technology into school curricula in order to improve teaching and learning and enable all students to become technologically literate. The program awarded grants to states on a formula basis determined by their relative economic need.[7] States had a great deal of flexibility in selecting subgrantees and subgranting funds. This chapter describes various elements of how states implemented the program, including the assistance they provided to potential subgrantees, the priorities they set in awarding funds, and their distribution of funds across subgrantees.[8]

An analysis of the data from the Integrated Studies of Educational Technology (ISET) surveys of state and of district technology coordinators and from the State Performance Reports (SPR) shows that states exercised wide discretion in their implementation of the TLCF program. Although states were given substantial flexibility in how they awarded funds, they were required to target funding toward districts that the state defined as having either a high level of poverty or a high level of need for educational technology. Our analysis indicates that states successfully targeted funds to meet this mandate, which is also a requirement under the Educational Technology State Grants Program in the 2002 No Child Left Behind Act.

The TLCF Application Process

The TLCF was a competitive grants program that targeted high-poverty districts and those with high needs for technology. Districts could apply individually or as part of a consortium with other districts or entities within a state.[9] The ISET Survey of District Technology Coordinators indicated that about 61 percent of districts applied for TLCF funds at any time during the period from fall 1997 through spring 2001. Of these, 71 percent applied as individual districts; the remainder applied as part of a consortium (i.e.,

[7]These funds were allocated to states in proportion to their overall share of students in poverty as measured under Part A of Title I of the Elementary and Secondary Act, subject to the requirement that no state receive less than one-half of 1 percent of the amount appropriated.
[8]See Appendix A for a state-by-state listing of TLCF grant allocations for 1997–2001.
[9]Districts can now apply with other parties as part of the No Child Left Behind Act.

partnered with other districts or with libraries or businesses). The strongest determinant of whether a school district ever applied for TLCF funding was, consistent with the purpose of the legislation, the poverty status of the district. Seventy-seven percent of high-poverty districts applied for TLCF funds, compared with 54 percent of other districts (which may have sought TLCF funds as high-technology-need applicants).

Although many school districts applied for TLCF funding, there appeared to be a number of barriers to applying for a subgrant. The most common reason for not applying, as reported by district technology coordinators, was that staff lacked time to write a proposal (61 percent of districts), followed by a lack of awareness of this source of funding (56 percent of districts). Small districts were significantly more likely than large districts to report that district personnel lacked time to write a proposal (76 percent versus 26 percent). Other district characteristics were not significantly related to a lack of awareness of the TLCF program as a barrier to application.

State Technical Assistance Provided to Applicants

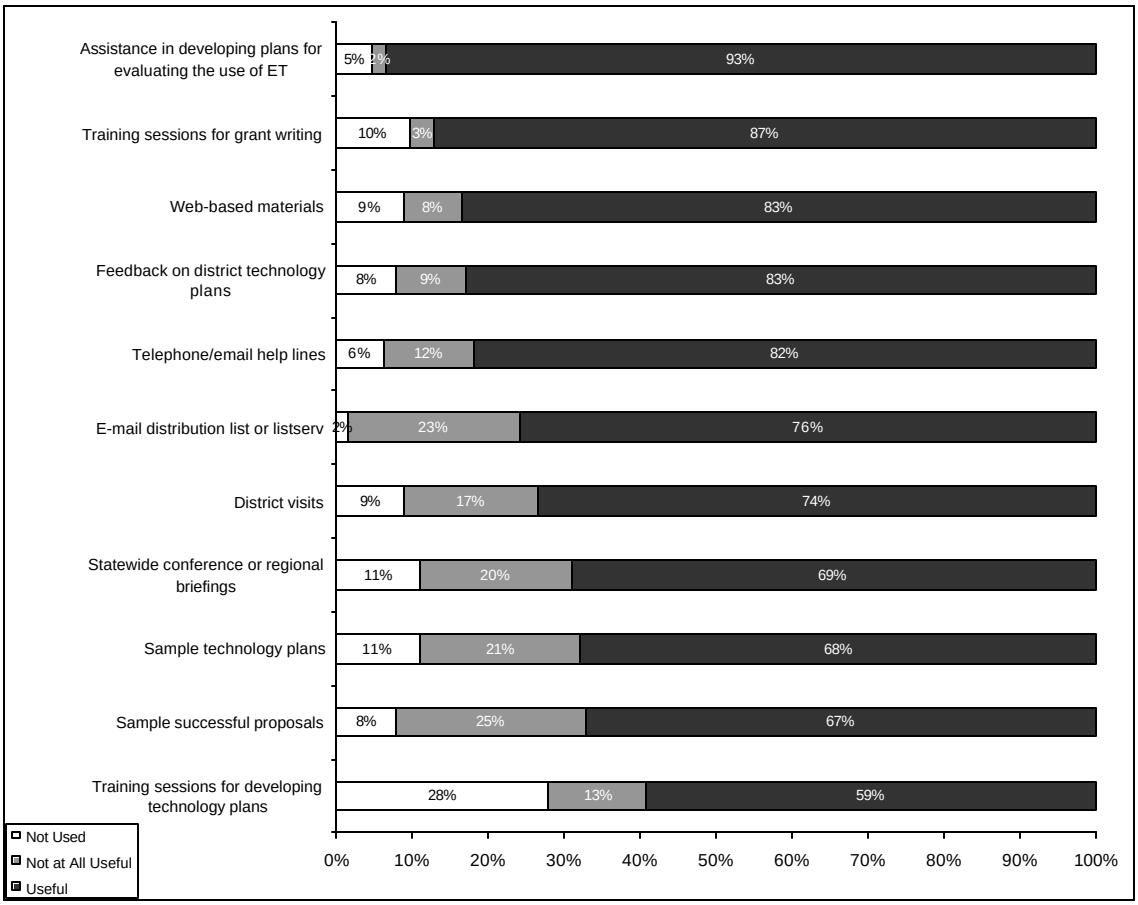
One obligation of state technology offices was to provide technical assistance to districts applying for subgrants. Exhibit II-1 summarizes the array of technical assistance that states offered to TLCF applicants. There was relatively little change in the mix of types of assistance offered over the four years of the program (1997–2000), though it should be noted that more states began to provide Web-based and e-mail based assistance in the later years.

Exhibit II-1. TLCF-related technical assistance provided by states, 1997–2000

Type of technical assistance	Number of states that provided this form of technical assistance			
	1997	1998	1999	2000
Personalized forms of assistance				
Statewide conference or regional briefings to discuss competition requirements	38	40	39	40
Training sessions for grant writing	31	33	33	32
Training sessions for developing technology plans	33	32	30	31
Feedback on district technology plans	37	37	39	35
Assistance in developing plans for evaluating the use of educational technology	33	33	35	28
District visits	35	38	38	36
Information-resource forms of assistance				
Telephone or e-mail help lines	39	39	42	38
Web-based materials	32	36	38	39
E-mail distribution list or listserv	31	34	38	39
Sample technology plans	29	31	34	33
Sample successful proposals (whole or pieces of proposals)	28	35	35	29

Respondents to the ISET Survey of District Technology Coordinators were asked to report on their TLCF application experiences. Districts commonly reported using multiple sources of technical assistance provided by their states. In general, the districts found that the information resources (e.g., Web-based materials, help lines) were quite useful. Other in-person forms of assistance, such as training sessions for developing technology plans and briefings, were rated as less useful to applicants, as shown in Exhibit II-2.

Exhibit II-2. District ratings of TLCF-related technical assistance provided by states



State Priorities in Awarding District Subgrants

States had great flexibility in awarding subgrants under the TLCF program, including opportunities to specify the priorities that they wished to fund with their available TLCF monies. The SPR asked states to identify their priority areas, though not

all states placed specific restrictions on their use of funds. Examples of the priority areas follow:

- ***Computer access:*** access to modern computers
- ***Connectivity:*** access to networks and the Internet
- ***Professional development:*** training for teachers in the use of educational technology in the classroom
- ***Technical support:*** provision of technical support (troubleshooting, maintaining, or installing equipment; assistance in developing lesson plans that use educational technology) to teachers
- ***Content resources:*** the integration of effective and engaging software and online resources into the classroom curriculum

Exhibit II-3 summarizes the priorities that states placed in awarding funds across these different priority areas across different years. From 1998–2000, there was a reduction in state restrictions of subgrant competitions in each of these five areas. It appears that restrictions on TLCF competitions tended to be placed by states at the onset of the program, when needs in particular areas may have been more urgent. Perhaps as technology became more widespread, states saw less of a need for such restrictions and began allowing TLCF applicants to submit applications for a wider range of uses.

Exhibit II-3. Number of states restricting TLCF subgrant competitions to priority area uses, 1997–2000[tgd5]

Priority area	1997	1998	1999	2000
Computer access	15	23	10	4
Connectivity	20	22	10	2
Professional development	29	29	13	6
Technical support	12	7	—	—
Content resources	18	23	8	3
Other	—	—	4	5

Awards to Districts

There was wide variation in how states distributed TLCF funds. Under the TLCF legislation, states had a great deal of discretion in how widely they distributed grant monies in terms of the number and sizes of awards that they made. Whereas some states chose to distribute grant funds so that most districts in their state received some grant funding, other states chose to concentrate their subgrants on a small number of districts,

including consortia comprising districts and other partners such as libraries and commercial businesses. In this section, we examine the relative concentration of awards among districts within individual states.

Overall, the TLCF program provided funding to about 12 percent of the nation's school districts in 1997 (1,756 of 14,805[tgd6]), a number that increased to 21 percent in 2000 (3,191 of 14,891) as funding more than doubled.[10] According to the SPR, in 1997, a total of 1,476 TLCF subgrant awards were made (affecting 1,756 districts when consortia are included). This number increased to 3,303 in 1998 (affecting 4,077 districts), 3,191 in 1999 (affecting 4,484 districts), and 3,191 in 2000 (affecting 4,247 districts).

Exhibit II-4 provides information on state awards for the years 1997 through 2000 in terms of the number of awards made relative to the number of districts and also on the average size of the award per subgrantee. The exhibit shows no one clearly dominant pattern of how states distributed their awards, though it appears that states generally adopted a similar strategy across years. That is, states that granted many awards in one year tended to make many awards the next year. One finding of note is that as total program funding more than doubled from $200 million in 1997 to $425 million in 1998, the average size of subgrants increased by about only 9 percent, indicating that states awarded funds to more districts instead of making large increases to the average award size.

The 1998 subgrants were of similar magnitude to what they were in 1997, reflecting the fact that states made more awards instead of sharply increasing the average amount of each award. An exception, of course, was in states that made awards to most of their districts; these states tended to increase the average amount of the award to more closely match the overall funding increase. For 1999 and 2000, it is difficult to detect a pattern in awards, because some states chose to expand the number of awards, whereas others reduced this number. Although most states changed the number of subgrants they awarded from 1998 to 2000, states generally kept the per-pupil subgrant sizes similar within their state during a period of steady funding.

[10]According to the National Center for Education Statistics (NCES), there were 14,805 districts in the nation as of the 1997–1998 school year and 14,891 districts in the 1998–1999 school year. Source: *Digest of Educational Statistics, 2000*.

Exhibit II-4 shows a great deal of variation in the average size of subgrant awards that states made. These differences in part reflect the variation in the total number of districts in states and the extent to which states chose to make awards to a large share of their districts, rather than either focus on a few individual districts or make relatively large awards to consortia that included multiple districts.[11] For example, Texas awarded its TLCF funds through large regional consortia, rather than to individual districts[r7].

Exhibit II-4. Distribution of TLCF subgrants by state, 1997–2000[12]

State	Total districts in the state	Award year	Number of subgrant awards	Number of districts impacted	Total amount awarded by state	Average subgrant size	Average subgrant per pupil
Alabama	132	1997	100	100	$3,536,029	$34,092	$6.04
		1998	127	127	$6,767,676	$52,849	$15.11
		1999	127	129	$6,528,632	$51,573	$13.94
		2000	106	106	$6,423,325	$60,597	$11.98
Alaska	56	1997	8	15	$1,000,000	$118,750	$47.62
		1998	10	21	$2,125,000	$207,455	$55.87
		1999	6	13	$2,017,671	$168,139	$88.91
		2000	5	6	$1,972,017	$394,403	$248.51
Arizona	359	1997	63	72	$2,772,006	$52,367	$36.68
		1998	168	178	$6,403,705	$51,626	$56.50
		1999	122	125	$6,040,884	$49,515	$142.50
		2000	106	110	$6,032,222	$56,908	$152.03
Arkansas	311	1997	—	—	$2,113,832	—	—
		1998	69	69	$4,050,741	$51,574	$81.39
		1999	27	27	$3,960,668	$146,691	$109.74
		2000	42	42	$4,000,027	$95,239	$92.55

[11] In some states, a district is almost synonymous with a school (i.e., one-school districts); other states have consolidated districts; other states have districts that consist of only elementary schools, and so on. Also, many states have intermediary agencies between the state education agency and the local education agency.

[12] Because the District of Columbia and Hawaii are single-district states, N/A (not applicable) has been entered into the "number of subgrant awards" and "number of districts impacted" columns. A long dash indicates that data were either missing or incomplete and therefore not included in this table. The number of districts impacted includes the individual member districts of a consortium (if reported).

Exhibit II-4. Distribution of TLCF subgrants by state, 1997–2000 (Continued)

State	Total districts in the state	Award year	Number of subgrant awards	Number of districts impacted	Total amount awarded by state	Average subgrant size	Average subgrant per pupil
California	1066	1997	25	25	$20,568,622	$781,608	$166.86
		1998	139	232	$46,549,397	$318,043	$48.72
		1999	139	240	$44,376,072	$319,252	$49.10
		2000	154	254	$46,616,879	$302,707	$44.30
Colorado	194	1997	20	20	$1,872,235	$74,250	$167.71
		1998	54	51	$3,922,640	$57,960	$62.92
		1999	33	89	$3,697,828	$112,055	$114.33
		2000	109	165	$3,462,279	$31,764	$73.05
Connecticut	192	1997	50	50	$1,481,944	$9,529	$4.57
		1998	93	74	$3,803,227	$15,524	$10.47
		1999	52	67	$3,606,173	$69,612	$168.88
		2000	6	6	$3,294,920	$549,153	$3,724.87
Delaware	25	1997	4	4	$1,000,000	$237,500	$41.91
		1998	10	10	$2,125,000	$201,875	$43.98
		1999	10	10	$2,018,750	$201,875	$41.88
		2000	10	10	$2,018,750	$201,875	$41.88
District of Columbia	1	1997	N/A	N/A	$1,000,000	$1,000,000	N/A
		1998	N/A	N/A	$2,125,000	$2,125,000	N/A
		1999	N/A	N/A	$2,018,798	$2,018,798	N/A
		2000	N/A	N/A	$2,022,071	$2,022,071	N/A
Florida	74	1997	—	—	$7,901,240	—	—
		1998	69	52	$18,631,872	$264,760	$39.72
		1999	47	48	$18,014,439	$383,286	$65.43
		2000	34	34	$18,797,978	$552,882	$42.49
Georgia	183	1997	20	24	$4,792,173	$227,628	$72.74
		1998	161	110	$10,891,218	$63,088	$20.83
		1999	67	82	$10,224,692	$152,607	$55.97
		2000	75	83	$10,358,636	$138,115	$51.48
Hawaii	1	1997	N/A	N/A	$1,000,000	$970,000	N/A
		1998	N/A	N/A	$2,125,000	$2,125,000	N/A
		1999	N/A	N/A	$2,055,000	$2,055,000	N/A
		2000	N/A	N/A	$2,125,000	$2,125,000	N/A
Idaho	113	1997	30	37	$1,000,000	$29,688	$40.72
		1998	54	54	$2,125,000	$37,384	$61.49
		1999	29	30	$2,018,750	$69,612	$89.39
		2000	29	29	$2,018,750	$69,612	$82.87
Illinois	1057	1997	52	51	$9,100,428	$167,231	$75.79
		1998	112	167	$17,992,404	$140,565	$56.21
		1999	99	99	$17,418,118	$175,941	$68.54
		2000	92	92	$16,642,328	$180,895	$73.09

Exhibit II-4. Distribution of TLCF subgrants by state, 1997–2000 (Continued)

State	Total districts in the state	Award year	Number of subgrant awards	Number of districts impacted	Total amount awarded by state	Average subgrant size	Average subgrant per pupil
Indiana	328	1997	16	16	$3,085,379	$192,194	$105.09
		1998	30	30	$6,162,855	$196,083	$84.09
		1999	63	63	$6,156,670	$97,725	$40.19
		2000	22	22	$6,011,161	$273,235	$150.00
Iowa	415	1997	23	23	$1,449,079	$59,870	$90.83
		1998	34	35	$2,695,752	$77,578	$66.00
		1999	67	68	$2,746,192	$40,988	$37.37
		2000	93	93	$2,787,969	$29,978	$33.53
Kansas	311	1997	16	16	$1,487,041	$73,341	$34.12
		1998	146	134	$3,037,380	$17,182	$16.39
		1999	67	67	$2,883,537	$42,566	$50.90
		2000	49	49	$2,594,038	$52,940	$47.16
Kentucky	260	1997	177	177	$3,525,385	$20,366	$5.88
		1998	176	176	$6,949,329	$38,464	$10.96
		1999	176	172	$6,550,918	$37,221	$10.64
		2000	176	176	$6,230,702	$35,402	$10.05
Louisiana	73	1997	67	67	$5,348,827	$76,639	$34.43
		1998	80	68	$10,272,812	$116,540	$28.31
		1999	92	178	$10,062,678	$109,377	$7.25
		2000	98	191	$9,790,821	$99,906	$8.20
Maine	343	1997	24	24	$1,000,000	$39,712	$69.98
		1998	74	74	$2,125,000	$27,254	$43.60
		1999	69	69	$2,018,750	$29,257	$37.23
		2000	89	89	$1,754,186	$19,710	$66.65
Maryland	24	1997	17	17	$2,447,779	$136,788	$13.30
		1998	22	22	$5,528,434	$238,728	$18.95
		1999	22	22	$5,211,880	$236,904	$18.22
		2000	22	22	$5,118,851	$232,675	$15.41
Massachusetts	467	1997	120	120	$3,424,955	$28,060	$14.57
		1998	117	87	$8,115,371	$65,787	$33.60
		1999	118	118	$7,399,712	$65,529	$36.59
		2000	137	137	$7,381,341	$53,878	$23.79
Michigan	745	1997	33	33	$8,621,429	$221,943	$94.47
		1998	79	74	$18,215,451	$161,487	$118.83
		1999	96	96	$17,166,037	$178,813	$191.10
		2000	145	145	$16,818,287	$115,988	$105.32
Minnesota	366	1997	—	—	$2,321,232	—	—
		1998	23	23	$4,888,611	$184,732	$234.54
		1999	22	22	$4,422,610	$105,966	$216.08
		2000	38	38	$4,371,109	$115,029	$164.94

Exhibit II-4. Distribution of TLCF subgrants by state, 1997–2000 (Continued)

State	Total districts in the state	Award year	Number of subgrant awards	Number of districts impacted	Total amount awarded by state	Average subgrant size	Average subgrant per pupil
Mississippi	164	1997	21	21	$3,511,568	$158,857	$59.53
		1998	42	42	$6,696,008	$151,450	$85.26
		1999	63	64	$6,675,877	$105,966	$54.17
		2000	62	62	$6,295,950	$101,548	$51.77
Missouri	523	1997	—	—	$3,246,535	—	—
		1998	—	—	$7,002,554	—	—
		1999	105	117	$6,536,107	$62,249	$103.24
		2000	124	139	$5,879,138	$47,412	$76.85
Montana	556	1997	16	32	$1,000,000	$59,210	$387.85
		1998	35	52	$2,125,000	$59,127	$239.43
		1999	28	28	$2,018,750	$72,098	$349.37
		2000	28	28	$2,018,750	$72,098	$349.37
Nebraska	777	1997	18	18	$1,000,000	$52,778	$137.35
		1998	27	32	$2,125,000	$69,630	$159.61
		1999	38	38	$2,018,750	$53,125	$113.59
		2000	34	34	$2,018,750	$59,375	$95.94
Nevada	18	1997	6	10	$1,000,000	$159,167	$17.84
		1998	11	15	$2,125,000	$186,394	$49.37
		1999	11	11	$1,934,000	$186,622	$38.21
		2000	6	17	$2,020,316	$336,719	$8.67
New Hampshire	249	1997	19	20	$1,000,000	$50,000	$47.63
		1998	30	34	$2,125,000	$67,292	$47.00
		1999	26	38	$2,015,215	$77,508	$93.16
		2000	95	95	$2,047,406	$21,552	$25.69
New Jersey	621	1997	41	47	$3,954,548	$93,285	$85.54
		1998	86	102	$8,969,777	$97,008	$90.22
		1999	65	75	$8,468,201	$130,280	$172.45
		2000	21	21	$6,273,289	$298,728	$375.58
New Mexico	89	1997	30	36	$1,671,215	$51,587	$54.86
		1998	43	54	$3,516,603	$77,659	$94.82
		1999	47	60	$3,308,378	$70,391	$133.12
		2000	47	77	$3,306,464	$70,350	$83.21
New York	694	1997	—	—	$17,313,404	—	—
		1998	29	29	$37,787,905	$1,717,508	$95.21
		1999	29	29	$36,093,190	$1,568,900	$750.95
		2000	28	28	$36,917,025	$1,318,465	$761.15
North Carolina	157	1997	44	48	$3,693,671	$79,860	$18.24
		1998	72	84	$7,698,246	$100,298	$21.18
		1999	84	90	$7,319,127	$87,132	$20.36
		2000	104	108	$7,384,898	$71,009	$19.37

Exhibit II-4. Distribution of TLCF subgrants by state, 1997–2000 (Continued)

State	Total districts in the state	Award year	Number of subgrant awards	Number of districts impacted	Total amount awarded by state	Average subgrant size	Average subgrant per pupil
North Dakota	286	1997	31	59	$1,000,000	$30,589	$112.14
		1998	125	125	$2,125,000	$16,290	$58.56
		1999	70	70	$2,044,605	$29,209	$54.06
		2000	134	134	$2,018,750	$15,065	$63.92
Ohio	784	1997	54	54	$8,504,025	$150,000	$72.11
		1998	88	88	$16,650,418	$180,156	$83.08
		1999	148	148	$15,601,842	$105,418	$53.95
		2000	161	161	$14,960,525	$92,923	$35.74
Oklahoma	550	1997	28	28	$2,357,624	$84,642	$277.63
		1998	42	42	$4,787,553	$112,257	$245.19
		1999	52	53	$4,578,595	$88,050	$234.04
		2000	63	63	$4,758,595	$75,533	$196.38
Oregon	260	1997	10	11	$1,894,570	$157,914	$74.01
		1998	86	107	$3,785,276	$48,424	$53.18
		1999	56	59	$3,580,464	$244,292	$238.77
		2000	29	29	$3,442,588	$118,710	$60.45
Pennsylvania	620	1997	52	52	$8,617,078	$147,986	$52.32
		1998	123	197	$18,328,348	$140,926	$61.13
		1999	91	360	$17,026,305	$187,102	$75.77
		2000	49	157	$16,795,497	$342,765	$82.61
Rhode Island	37	1997	6	14	$1,000,000	$145,449	$9.58
		1998	12	28	$2,125,000	$168,193	$14.19
		1999	17	18	$1,971,281	$115,958	$23.51
		2000	18	18	$2,019,139	$112,174	$13.64
South Carolina	111	1997	25	25	$2,596,840	$98,680	$40.68
		1998	40	40	$5,107,330	$123,446	$52.40
		1999	40	40	$4,949,268	$123,732	$50.70
		2000	56	56	$4,405,791	$78,675	$28.46
South Dakota	177	1997	—	—	$1,000,000	—	—
		1998	159	159	$2,125,000	$12,999	$32.06
		1999	144	180	$2,018,750	$14,019	$26.23
		2000	98	180	$2,018,750	$20,599	$41.30
Tennessee	139	1997	—	—	$3,457,692	—	—
		1998	—	—	$7,184,544	—	—
		1999	140	140	$6,321,624	$125,901	$11.46
		2000	101	101	$8,248,200	$81,665	$16.66
Texas	1070	1997	19	181	$16,339,913	$816,994	$247.68
		1998	35	410	$35,344,118	$902,751	$155.50
		1999	31	430	$33,503,512	$1,080,758	$84.28
		2000	25	221	$33,411,906	$1,336,476	$187.34

Exhibit II-4. Distribution of TLCF subgrants by state, 1997–2000 (Continued)

State	Total districts in the state	Award year	Number of subgrant awards	Number of districts impacted	Total amount awarded by state	Average subgrant size	Average subgrant per pupil
Utah	47	1997	15	16	$1,000,000	$59,303	$27.17
		1998	20	38	$2,125,000	$54,772	$9.83
		1999	53	89	$2,018,750	$38,090	$7.57
		2000	63	63	$2,018,750	$32,044	$8.19
Vermont	349	1997	32	32	$1,000,000	$11,414	$34.32
		1998	83	87	$2,125,000	$14,238	$53.01
		1999	75	75	$2,041,402	$27,219	$262.30
		2000	73	79	$2,035,873	$27,889	$149.34
Virginia	169	1997	70	70	$2,851,387	$38,784	$14.13
		1998	106	106	$6,155,251	$55,118	$18.53
		1999	111	111	$5,853,825	$52,737	$18.30
		2000	110	110	$5,808,430	$52,804	$19.87
Washington	305	1997	8	8	$2,800,894	$309,621	$193.93
		1998	21	141	$6,112,694	$220,883	$61.65
		1999	6	75	$5,697,410	$949,568	$361.98
		2000	5	106	$5,471,418	$1,094,284	$12.33
West Virginia	57	1997	15	15	$1,975,565	$166,784	$55.67
		1998	23	23	$3,973,755	$169,946	$45.27
		1999	26	26	$3,860,027	$148,463	$51.92
		2000	32	32	$3,704,064	$115,752	$37.72
Wisconsin	444	1997	21	68	$3,473,991	$165,991	$63.98
		1998	60	147	$6,840,340	$104,085	$58.44
		1999	47	126	$6,568,779	$139,761	$54.31
		2000	49	144	$6,607,051	$134,838	$36.27
Wyoming	48	1997	—	—	$1,000,000	—	—
		1998	20	27	$2,125,000	$100,954	$84.81
		1999	22	82	$2,018,616	$91,755	$109.74
		2000	19	61	$1,856,315	$97,701	$124.49

Targeting of subgrants among districts

A key federal requirement in the allocation of awards was that states focus on making subgrants to high-poverty districts and to districts that had a high degree of need for educational technology. SPR data provide information useful for assessing the extent to which states focused on districts that were defined as high poverty (a designation that for most states was based on the share of students eligible for free or reduced-price school lunch[r8]).

We used two separate approaches to measure the extent to which TLCF funds were targeted to high-poverty districts. One approach compared the number of subgrants with the total number of districts considered to be high poverty under the three measures described below. The second addressed the share of total program funds awarded to high-poverty districts. This second measure helps account for the variation in the size of awards across districts.

The first definition of district poverty we considered was the one that individual states applied in making awards and was typically developed from information on the share of students in a district eligible for free or reduced-price lunch. Other measures of poverty that states used included Aid for Dependent Children (AFDC) deciles, Title I [tgd9]eligibility, Census poverty data, and state tax base data. The other definitions used in Exhibit II-5 were based on data developed by the U.S. Census to identify the economic status of individual districts in terms of the share of families in poverty as defined by family income and other factors. High-poverty districts were identified first as the top quartile of districts in terms of overall economic need and then in terms of the top two quartiles of districts as developed by the U.S. Bureau of the Census.

Exhibit II-5. Proportion of district TLCF subgrants awarded to high-poverty districts, 1997–2000

Year	State-defined poverty		Top poverty quartile		Top two poverty quartiles	
	Percent of funds	Percent of subgrants	Percent of funds	Percent of subgrants	Percent of funds	Percent of subgrants
1997	78%	71%	55%	48%	80%	81%
1998	73%	66%	42%	35%	62%	63%
1999	73%	64%	31%	27%	48%	51%
2000	70%	60%	32%	28%	49%	53%

Exhibit II-5 shows that state targeting to high-poverty districts seemed to be effective using state-defined measures of poverty, in that the majority of both subgrants and funds was awarded to high-poverty districts. It appears that targeting was most focused in the early years of the TLCF program, when a larger share of both subgrants and funds was awarded to higher poverty districts. By 2000, according to independent measures of poverty, targeting to high-poverty districts had decreased substantially.

The targeting of TLCF funds reflects both poverty status and the need for technology. States were given the flexibility to define high need for technology. According to the SPR reports, high technology need was generally determined by a review of technology access data (e.g., student-to-computer ratios or degree of Internet connectivity).

The analysis of SPR data indicates that factors such as district size and location (e.g., urban versus rural) also affected the targeting of funds. One priority of states appeared to be funding rural districts, at least during the first two years of the program. Rural districts enrolled 24 percent of students in the nation (a percentage based on the 1997–1998 Common Core of Data) and received 42 percent of TLCF funds in 1997 and 39 percent in 1998. Beginning in 1999, the share of funds going to rural districts roughly matched their share of student enrollments, with 22 percent of TLCF funds going to rural districts in 1999 and 21 percent in 2000. The converse trend was true for urban districts. Urban districts enrolled 35 percent of students in the nation and received 24 percent of TLCF funds in 1997 and 28 percent in 1998. Beginning in 1999, the share of funds going to urban districts roughly matched their share of student enrollments, with 38 percent of TLCF funds going to urban districts in 1999 and 37 percent in 2000.

Costs for implementing technology (e.g., connectivity and technical support) are likely often higher for rural schools. One interesting factor in the award of TLCF funds to rural districts is that the average award sizes per student were significantly higher than in other districts. The average per-pupil awards for rural districts were $27.29 in 1997, $30.26 in 1998, $26.51 in 1999, and $29.39 in 2000. These amounts compare with per-pupil awards of $6.71 in 1997 for urban districts, $10.06 in 1998, $7.95 in 1999, and $10.48 in 2000. The higher award amounts on a per-student basis may reflect a greater need for assistance and states' targeting to those districts, in addition to some diseconomies of scale that exist in using educational technology in smaller districts (e.g., the costs involved in setting up rural or small schools for technology are likely to be higher on a per-pupil basis).

States also appeared to focus their aid on smaller districts, many of which are rural, which again may reflect the districts' need for assistance. The size of school districts was strongly related to the amount of aid that districts received on a per-pupil

basis. This may again reflect differences in a need for technology, along with diseconomies that may arise in supplying educational technology among a smaller number of students. Small districts (fewer than 1,675 students) averaged $82.35 TLCF funding per pupil in 1997, $74.72 in 1998, $122.40 in 1999, and $121.12 in 2000. Mid-sized districts (1,675 to 5,262 students) averaged $26.16 TLCF funding per pupil in 1997, $29.65 in 1998, $29.88 in 1999, and $26.89 in 2000. In contrast, large districts (more than 5,262 students) averaged $7.24 of TLCF funding per pupil in 1997, $9.13 in 1998, $10.77 in 1999, and $11.32 in 2000.

The 100 largest school districts enrolled 22 percent of all public school students and represented 27 percent of students living in poverty.[13] In 1997, 46 of these 100 school districts received awards, representing 13 percent of TLCF funds awarded. In 1998, as program funding doubled, 72 of these districts received awards that made up 16 percent of the total TLCF funding. In 1999, 65 of the 100 largest districts received TLCF funding, representing 17 percent of the total pool of TLCF funds; these figures in 2000 were 70 districts and 18 percent of total TLCF funds.

Although the TLCF was primarily a program to fund districts to assist them in enhancing their use educational technology, it is interesting to note that some recipient districts targeted funds to specific types of schools instead of applying their funds across the entire district. The ISET Survey of District Technology Coordinators indicated that about 39 percent of TLCF subgrantees reported engaging in some targeting to schools. Seventy-two percent of these indicated that they targeted their funds to elementary schools, 66 percent targeted to junior high and middle schools, and 59 percent targeted to high schools. In addition, 71 percent of respondents indicated that they targeted TLCF funds toward high-technology-need schools within their district. High-poverty districts were significantly more likely to target to schools than other districts (57 percent versus 24 percent), most often to elementary schools within their district.[14]

[13]Size was defined by enrollment, as of the 1997–1998 school year. The list of 100 largest districts was taken from NCES report no. 1999-318, *Characteristics of the 100 largest elementary and secondary school districts in the United States: 1997-98*. Our analyses focused on the 100 largest districts in the United States. Although the Puerto Rico Department of Education was ranked third overall, territories were outside the scope of this report; therefore, Puerto Rico was not included on this list. The percent of students living in poverty was based on 1990 Census data.

[14]Please note that percents do not total to 100 because districts may have targeted TLCF funds to more than one type of school and therefore would be counted twice (e.g., elementary and high schools; high-technology-need elementary schools).

Partnerships to support the TLCF

Forming partnerships with other districts, agencies, businesses, or libraries was an important strategy that TLCF applicants used. For example, the greater buying power of a consortium of districts and other partners helps decrease the costs of purchasing hardware and software. The pooled resources of a consortium also can help its partners be better able to leverage additional funds or services. Partnerships play a key role in the Enhancing Educational Technology Program in the 2002 No Child Left Behind Act.

In 2000, the SPR system was modified to include greater details about partnerships. Exhibit II-6 presents the frequencies by which subgrantees involved partners in leveraging additional funds or services. State educational agencies, regional centers, institutions of higher education, and businesses were most frequently cited as TLCF partners.

Exhibit II-6. Partnerships reported by FY2000 TLCF subgrantees[15]

Partnership for:	Percent of subgrantees
Funds	
State educational agency	46%
Business and industry	9%
Foundation or other non-profit organization	8%
Intermediate agencies (e.g., regional services, training centers)	6%
Institution of higher education	5%
Other local public agency (e.g., library system)	3%
Other state agency (e.g., Department of Labor)	3%
Other federal sources	24%
Other	14%
Services	
State educational agency	45%
Institution of higher education	38%
Intermediate agencies (e.g., regional services, training centers)	36%
Business and industry	30%
Other local public agency (e.g., library system)	20%
Foundation or other non-profit organization	15%
Other state agency (e.g., Department of Labor)	7%
Other federal sources	11%
Other	13%

Primary uses of funds

As part of the SPR system, individual subgrantees were asked to estimate the percentage of TLCF funds they used for certain specified uses. Exhibit II-7 presents state-by-state information on the percentage of districts that reported using at least 25 percent

[15]There were 3,191 subgrants awarded in FY2000 (affecting 4,247 districts).

Exhibit II-7. Percent of 2000 subgrantees that reported using at least 25 percent of TLCF funds for specific purposes, by state[16] [tgd10]

State	Hardware	Connectivity	Professional development	Maintenance and technical support	Software and online resources
Alabama	75%	18%	15%	4%	7%
Alaska	0%	0%	100%	0%	0%
Arizona	26%	36%	24%	3%	7%
Arkansas	64%	0%	19%	0%	7%
California	69%	1%	60%	4%	5%
Colorado	5%	3%	7%	0%	2%
Connecticut	0%	0%	100%	0%	0%
Delaware	60%	0%	70%	20%	10%
Florida	74%	3%	29%	0%	32%
Georgia	60%	1%	69%	1%	16%
Hawaii	26%	17%	83%	4%	13%
Idaho	62%	0%	72%	0%	3%
Illinois	92%	0%	96%	0%	9%
Indiana	95%	0%	45%	5%	0%
Iowa	69%	1%	75%	0%	25%
Kansas	12%	0%	12%	0%	2%
Kentucky	57%	14%	43%	8%	15%
Louisiana	40%	3%	88%	0%	34%
Maine	72%	2%	33%	9%	8%
Maryland	50%	0%	82%	0%	5%
Massachusetts	0%	0%	96%	16%	0%
Michigan	66%	12%	52%	1%	9%
Minnesota	0%	0%	0%	0%	0%
Mississippi	40%	0%	16%	0%	8%
Missouri	89%	2%	35%	3%	19%
Montana	0%	0%	0%	0%	0%
Nebraska	68%	0%	29%	3%	6%
Nevada	0%	0%	0%	0%	0%
New Hampshire	37%	0%	63%	60%	0%
New Jersey	43%	5%	76%	5%	5%
New Mexico	36%	0%	23%	6%	6%
New York	25%	0%	89%	4%	7%
North Carolina	57%	5%	50%	11%	4%
North Dakota	55%	1%	8%	1%	4%
Ohio	94%	1%	24%	0%	0%
Oklahoma	24%	0%	5%	0%	10%
Oregon	69%	7%	79%	0%	24%
Pennsylvania	45%	4%	18%	2%	24%

[16]Data reported in this table are based on FY2000 fiscal agents. The "Nationwide" row represents the percentages based on total number of subgrantees, not averages of percentages within each column.

Exhibit II-7. Percent of 2000 subgrantees that reported using at least 25 percent of TLCF funds for specific purposes, by state[17] (Continued)[tgd11]

State	Hardware	Connectivity	Professional development	Maintenance and technical support	Software and online resources
Rhode Island	83%	6%	17%	0%	6%
South Carolina	64%	4%	13%	0%	9%
South Dakota	37%	0%	86%	9%	55%
Tennessee	76%	0%	68%	0%	70%
Texas	64%	0%	36%	4%	8%
Utah	57%	2%	35%	2%	5%
Vermont	70%	10%	64%	1%	11%
Virginia	47%	0%	94%	1%	12%
Washington	60%	0%	40%	0%	0%
West Virginia	94%	0%	9%	0%	28%
Wisconsin	12%	0%	90%	2%	4%
Wyoming	58%	37%	89%	0%	21%
Nationwide	***54%***	***5%***	***48%***	***5%***	***12%***

of their 2000 TLCF funds for hardware, connectivity, professional development, maintenance and technical support, and software and online resources.

As the exhibit indicates, there was wide variation in how FY2000 subgrantees directed their TLCF funds. The two areas in which FY2000 TLCF funds appear to have been most frequently directed were hardware and professional development. Although the percentages here refer to proportions of subgrantees that directed *at least 25 percent of their funds to particular uses*, a substantial bulk of subgrantees targeted TLCF funds to providing modern computers (nationally, 53.7 percent, ranging from zero to 95.5 percent, with a median value of 57.3 percent) and professional development (nationally, 47.9 percent, ranging from zero to 100 percent, with a median value of 44.3 percent).

State Reports of Challenges and Successes

As part of the ISET Survey of State Technology Coordinators, states were asked to comment on the challenges they faced and the successes they met and to share with the program office any insights or advice for improving the TLCF program. The most common challenges reported by the states were lack of time, constrained timelines,

[17]Data reported in this table are based on FY2000 fiscal agents. The "Nationwide" row represents the percentages based on total number of subgrantees, not averages of percentages within each column.

limited staff, and insufficient funding for the level of need. With regard to the successful aspects of TLCF implementation, states referred to specific technology programs within the state and frequently reported increases in the numbers of teachers obtaining professional development.

The flexibility of the TLCF program was borne out by the diversity of state responses regarding the barriers and successes. The relatively few restrictions placed by the TLCF program on how states were to distribute the funds to high-poverty and high-technology-need districts allowed states to tailor their competitions and the technical assistance provided to local needs. Some states reported more success and ease in implementation than others.

Many comments in states' advice to the program office have implications for the Educational Technology State Grants Program of the 2002 No Child Left Behind Act. They included requests to share effective strategies and approaches to administering the block grants (i.e., success stories).

Summary

States took advantage of the flexibility that the TLCF program offered and designed subgrant competitions that allowed them to distribute funds to meet a range of priorities. States appear to have targeted funds to where they were most needed, in that high-poverty districts were most likely to receive funding under the program. As intended by the program, states also provided a wide range of technical assistance that subgrantees and potential subgrantees generally found useful. It appears, however, that there were barriers to districts' application for TLCF funding, including a lack of awareness of the program by some districts, even after four years of operation.

In the next chapter, we address state and district efforts to provide leadership for enhancing educational technology (e.g., policies, standards, guidelines) to furnish a context regarding the policy and infrastructure environments in which the TLCF operated. Subsequent chapters address key issues of particular interest to the TLCF program: access to technology, professional development, technical support, and integration of technology into the curriculum.

Chapter 3. Leadership in Enhancing Technology

States and school districts filled important roles in the Technology Literacy Challenge Fund (TLCF) program. One role was to provide leadership in defining the goals of the TLCF program at various levels; another was to collect information for monitoring progress in meeting those goals. States and districts also provided leadership by establishing standards that defined expected training in technology for teachers and the integration of technology into curricula for students. To expand and improve the availability and use of technology, states supported distance learning and also provided statewide networks and purchasing consortia for obtaining and using educational technology.

This chapter describes the leadership activities of states and districts in providing technology and enhancing its use. The TLCF program operated in a time when states and districts were very actively working to bring technology into the classroom. As such, many of the activities funded by the TLCF program were coordinated with existing state and district initiatives. The policy environment in which the TLCF program operated likely influenced both how grant funds were used and how successfully states, districts, and schools were able to actually use TLCF funds to improve the availability and use of technology.

Technology Plans and Goals

We begin the discussion of leadership by discussing state technology plans. As noted below, most states had developed their technology plans before the implementation of the TLCF program. The TLCF program required a state to have an approved state technology plan in place, and many states adapted existing plans to meet this eligibility requirement. State plans were analyzed and state goals for educational technology (as reported in the annual state performance reports) were examined for degree of alignment with the national technology goals.

The TLCF program also required districts to have technology plans in order to be eligible to apply for funds. One leadership strategy that many states used was to require the districts themselves to create technology plans. The ISET surveys collected

information on the incidence of technology plans at the district and school levels. These data are presented below, along with the types of technology-related goals that districts and schools reported.

State technology plans

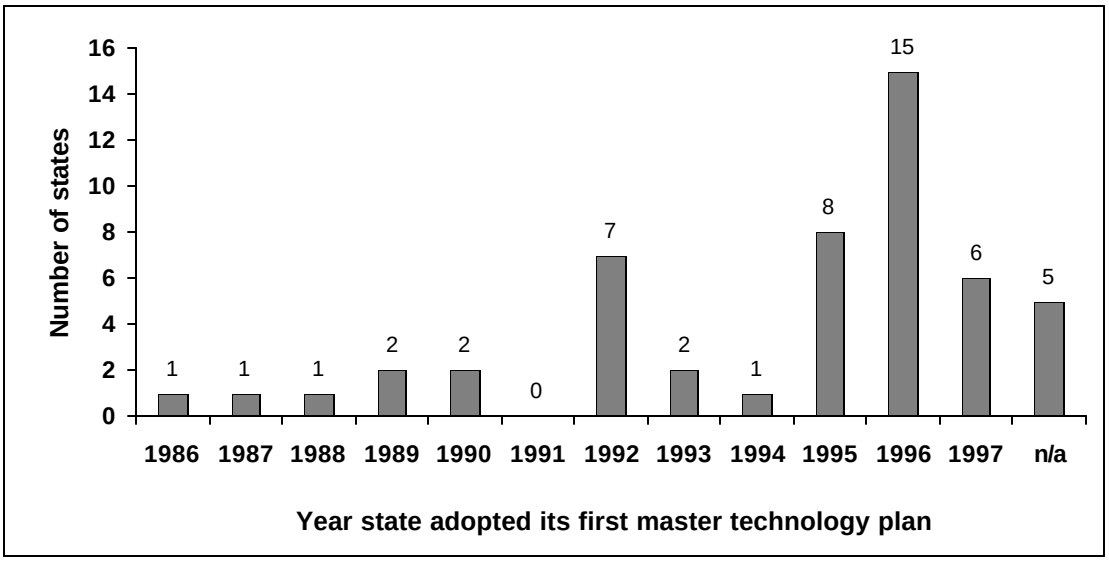
The TLCF legislation required that each state prepare a statewide technology plan that described the state's long-term goals and strategies for financing technology education. These types of plans are similarly required of states in the Enhancing Education Through Technology Program authorized in the No Child Left Behind Act of 2002.

To understand the status of educational technology planning of individual states, we reviewed the most recent technology plans (i.e., 2000–2001 school year). A total of 43 plans were available for review (42 states plus the District of Columbia). The majority of states had first developed plans for educational technology in the mid to late 1990s, in part to respond to federal legislation that required states to develop technology plans to participate in the TLCF program.[18] Although the TLCF program undoubtedly prompted many states to write technology plans, some had developed such plans as early as 1986 and adapted them for TLCF eligibility. Exhibit III-1 shows the number of states that had adopted master technology plans by 1997, the first year of the TLCF program.

The overall quality of state technology plans was reviewed. The 43 current technology plans that were obtained for this study were analyzed according to a technology plan rubric that included 16 dimensions: stakeholder input; needs assessment; mission and/or vision; goals and objectives; timelines and assignment of responsibilities; budget; funding sources; integration with reform efforts; curriculum integration; evaluation; equipment and software standards; staff development; location and equipment availability; E-Rate; facilities (electricity, security, etc.); and maintenance and support.[19]

[18]In 1994, Congress made at least $75,000 available per state to assist in writing plans for the implementation of educational technology (P.L. 103-446, Section 317).
[19]Adapted from: Sibley, P.H.R., & Kimball, C. (1997). *Technology plan analysis rubric* [online]. Available: http://www.edmin.com/tp/mmr.html.

Exhibit III-1. Years states adopted their first master technology plan[20]



Although this rubric is not necessarily aligned with legislative requirements for state plans, it was selected because it represents a reasonable set of measures on which to consider a state plan. Plans were coded for comprehensiveness, with 1 to 4 points available for each dimension, and an overall range of 16 to 64 points possible. State plans exhibited from 22 to 45 points on this rubric. In general, while most plans addressed certain issues well (e.g., the mission/vision dimension), most did not cover evaluation very well. Budgets were often placed in separate documents and appendices that were not typically included with the plans themselves. Although many states exhibited 3 or 4 points in various dimensions, no state exhibited 2 or more points in all 16 dimensions.

State goals

As part of their participation in the TLCF program, states were required to submit to the federal program office annual State Performance Reports that provided information on their educational technology goals and activities. We reviewed the reports submitted at the onset of the program (1997 and 1998) to characterize the goals of states and to measure the degree to which they were aligned with federal program goals.[tgd12]

[20]Milken Family Foundation (2000). *Learning technology policy counts*. Available online at http://www.mff.org/pubs/ME292.pdf.

Although the specific content of state goals varied, in 1998, all states had at least one goal related to one of the four major national program goals. Of the 50 states and the District of Columbia, 49 had goals related to professional development and technical support, 47 had goals related to access to modern computers, 51 had goals related to improving Internet connectivity; and 48 had goals related to software and online resources. Although specific goals varied greatly, states reported the following goals:

- ***Professional development and technical support*:** State goals included establishing training centers, identifying priorities for professional development activities, and setting benchmarks for the percentages of teachers who would receive professional development in educational technology.
- ***Access to computers*:** State goals often specified a target student-to-computer ratio and noted the importance of modern, multimedia-capable workstations for individualizing instruction and for providing dynamic educational opportunities.
- ***Internet connectivity*:** State goals all acknowledged the need for building-level and classroom-level Internet connectivity, as well as the importance of building communities of learners and of access to information resources.
- ***Software and online resources*:** State activities related to this goal included establishing online curriculum resources, print and online reviews of effective software, and access to online research tools. Some states also established goals identifying the percentages of students that would use the Internet to do educational research (e.g., Missouri).

As part of the SPR, states were asked to indicate what progress they had made toward meeting their goals. Given that states had flexibility in how they set their goals, how they measured progress varied tremendously. As a result, it is difficult to summarize results from the diverse approaches taken by states. All states reported that they had made progress in meeting at least some of their goals. However, states often were not able to provide high-quality quantitative measures that could be used to assess progress. State measures of progress were generally best when dealing with goals related to access to computers and Internet connectivity on which data are relatively easy to collect and quantify. Progress measures seemed to be less reliable for professional development and the integration of technology into the curriculum, areas in which it is more difficult to measure outcomes. Chapters 4 through 7 of this report use a combination of ISET and SPR data to provide national profiles of technology implementation in each of the key goal areas noted above.

District and school technology plans

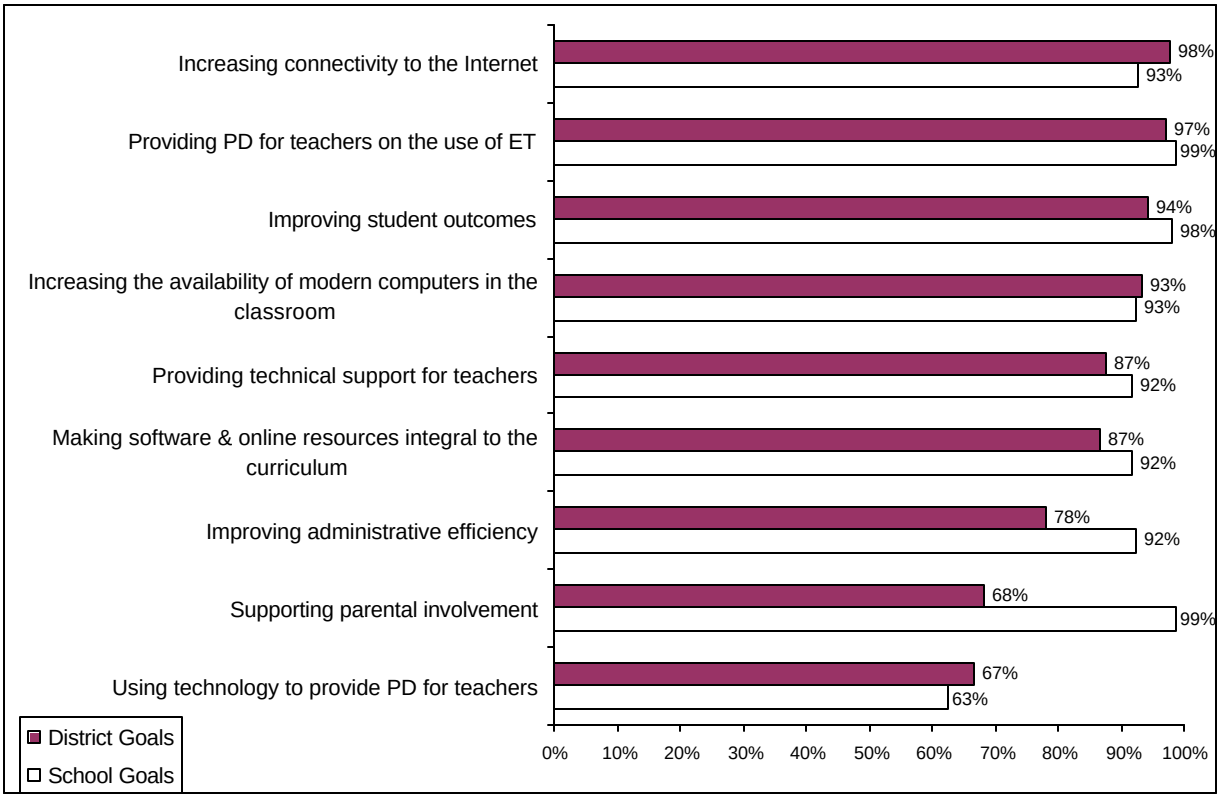
Technology plans were frequently found at the district and school levels. The ISET Survey of District Technology Coordinators found that virtually all districts (98 percent) reported that they had a technology plan as of spring 2001, with nearly all the remaining districts in the sample planning to develop one (i.e., 93 percent of the remaining two percent). Forty-two states required school districts to have technology plans; the E-Rate program also requires that applicants have an educational technology plan. It is notable that the percentage of districts with technology plans in place far exceeded the percentage that applied for or received TLCF subgrants (i.e., those districts that would have had to have plans in place to apply for TLCF subgrants). This large percentage of districts with plans indicates that educational technology and the ways to best use it for learning and instruction are common concerns for the nation's districts.

In addition to school districts, 50 percent of individual schools had developed their own technology plans. About half of the respondents to the ISET Survey of School Principals reported having developed a school-specific technology plan. An additional 41 percent had adopted or adapted their district's or state's technology plan. There was little variation by school poverty or district size in whether the schools had developed technology plans.

District and school technology goals

The goals for educational technology reported by districts and schools generally were similar to those reported at the state level, although districts and schools were not limited to reporting on goals related to the TLCF program. Goals related to the TLCF program—professional development and technical support, access to modern computers and the Internet, and integration of software and online resources—were almost universally cited by both schools and districts (Exhibit III-2).

Exhibit III-2. Goals represented in district and school technology plans



As it did with states, the SPR asked districts that received TLCF grants to describe their goals with respect to their use of funds. In describing their status with respect to goals, subgrantees also provided a narrative that generally described their experience in using TLCF funds to meet their goals. Subgrantees often reported that obstacles related to one goal prevented extensive progress on any of the other goals. For example, the lack of computers reduced the effectiveness of training teachers, which had a negative impact on effectively implementing the limited technology available in the district. Chapters 4 through 7 present more detailed discussions of subgrantees' reports, including barriers to the adoption and use of technology.

Policy Environments Supporting Technology Use

States can support the adoption and use of technology among schools by setting polices that define the environment in which technology is used. Important policy

elements include standards for teachers and for students regarding technology; standards for district and school accreditation; and various guidelines for technology-related facility designs, equipment, software, or connectivity.

State standards for educational technology

Articulating and setting standards for students or teachers are important leadership strategies for states. Examples of standards for students include basic operations and concepts, technology research tools, and technology problem-solving and decision-making tools. Examples of standards for teachers include the amount and the types of professional development in educational technology that teachers should have, levels of technology proficiency, and uses of technology in the classroom. Of the 44 states and the District of Columbia that reported this information in the ISET Survey of State Technology Coordinators, 35 had educational technology standards for students, 22 had educational technology standards for teachers, and 19 states had standards for both teachers and students.

Data from the ISET Survey of State Technology Coordinators indicate that many states based their standards on those developed by the International Society for Technology in Education (ISTE). Eleven of the reporting states adopted ISTE student standards directly, and the others adapted ISTE or another entity's standards to fit the local context. Nine states adopted ISTE teacher standards directly, and the others adapted ISTE or another entity's standards to fit the local context.

Educational technology standards for students. Educational standards for students were most commonly integrated into standards for learning by the inclusion of technology standards in core subject areas (23 states). Twenty-two of these 23 states integrated educational technology standards into all four core content areas; Vermont integrated educational technology standards into only mathematics and science standards. States that integrated technology standards into core content areas in general also integrated educational technology standards for learning into other subject areas, particularly foreign language, fine arts, and vocational education (18 states). Although student standards for educational technology are widespread, most states did *not* directly assess student progress in meeting educational technology standards. Of the nine states

that assessed student progress in educational technology, only a few indicated that they reported the results.

Educational technology standards for teachers. Twenty-two states reported that they have technology proficiency standards for teachers. Twelve states reported that they require teachers to meet technology proficiency standards at initial certification or licensure;[21] a dozen states also recommend technology proficiency as a condition for employment. Only seven states required teachers to meet technology proficiency standards at recertification or contract renewal.[22] Most commonly, states defined these standards by requiring teachers to complete a specific number of hours of technology-related preservice training or in-service professional development. Even fewer states actually assessed teacher proficiencies in educational technology than assessed student proficiency.

Standards for district and school accreditation. State standards related to technology for district or school accreditation were less common. Eleven states reported having technology-related standards for district accreditation, and 10 states reported having technology-related standards for school accreditation.

State guidelines for educational technology

States can also set guidelines that delineate how educational technology is to be defined in terms of hardware and, to a lesser extent, software. The ISET Survey of State Technology Coordinators found that 28 states had guidelines for technology-related design features for new school buildings. Additionally, 26 had such guidelines for existing school buildings. Twenty-two states had guidelines for equipment (e.g., CPU speed, minimum RAM or ROM configurations), and 24 states had guidelines for connectivity (e.g., speed, type, or number of connections to the Internet). However, guidelines for software (e.g., type of content; frequency of updates) were relatively rare, with only 11 states reporting that such guidelines were in place.

[21]California, Georgia, Idaho, Kansas, Louisiana, Michigan, North Carolina, Pennsylvania, Texas, Virginia, Vermont, and West Virginia
[22]Connecticut, Georgia, Kansas, North Carolina, Pennsylvania, Texas, and Virginia

District standards for educational technology

School districts can also set educational technology standards for teachers that are quite similar to those set by states, and they can also set standards for students. The ISET Survey of District Technology Coordinators found that 55 percent of districts set standards for teachers, and 62 percent had technology standards for students. High-poverty TLCF districts were less likely than other high-poverty districts to have teacher standards for educational technology (52 percent versus 83 percent). There were no significant differences in the prevalence of student standards for teachers when district TLCF and poverty status were considered.

Infrastructure Environments

In addition to setting policy, states can also undertake activities that either directly provide or facilitate the acquisition of hardware, software, and network connections. Examples of some activities that support educational technology infrastructure elements include statewide computer networks, the provision of distance learning, and consortium purchasing programs for hardware, software, and online services (other than E-Rate). The ISET Survey of State Technology Coordinators found that

- 30 states provided or were building computer networks linking most of their districts;
- 17 states had or were building networks linking most of their schools;
- 38 states provided distance learning;
- 29 states provided hardware consortium purchasing programs;
- 28 states provided software consortium purchasing programs; and
- 15 states provided consortium purchasing programs for online services (other than E-Rate).

The activities that states undertook to assist districts are discussed below.

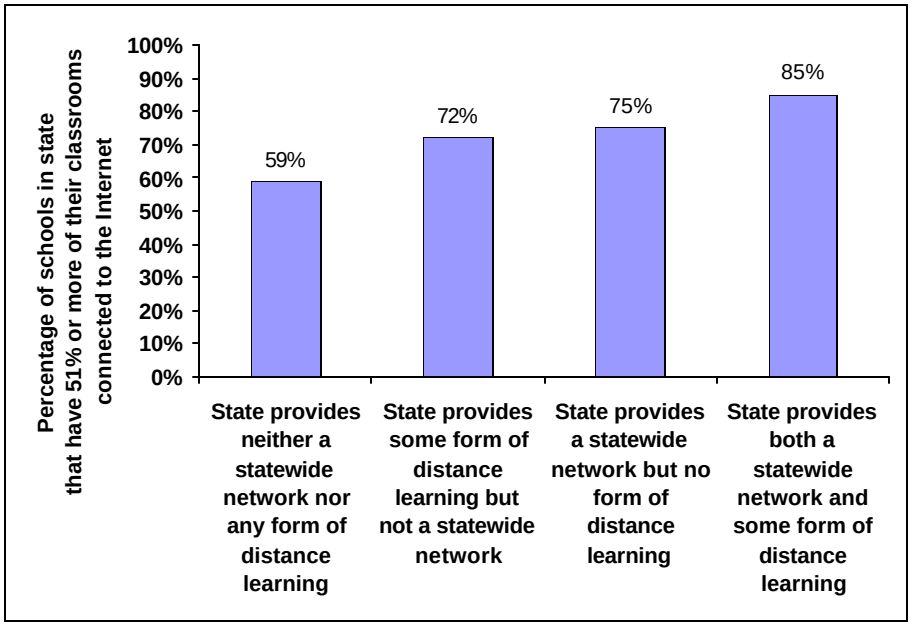
Statewide networks and distance learning

Statewide networks are an important means of connecting districts and schools across a state, particularly if the network provides both low-cost and high-speed connections to the Internet. In the ISET Survey of State Technology Coordinators, 30 states reported either having or being in the process of installing statewide networks

connecting 51 percent or more of the districts in their states. Statewide networks generally provided high-speed Internet connections at a lower cost than commercial carriers. The networks were typically shared with the higher education community, public libraries, and other government agencies[tgd13].

Distance learning and other "distributed learning" can bring new learning and professional development opportunities to schools. Distance learning is of particular importance for states with many rural areas. Thirty-eight states reported that they provided some form of distance learning to their districts, with 31 states providing two-way, interactive distance learning. Of the 45 states and the District of Columbia that responded to items on both network availability and distance learning, 28 states provided both a statewide network and some form of distance learning, 9 states provided some form of distance learning but no statewide network, 5 states provided neither a statewide network nor any form of distance learning, and 2 states provided a statewide network but no form of distance learning. State technology infrastructure does appear to be related to classroom connectivity: schools in states that had more of a statewide technology infrastructure (i.e., provided a statewide network and distance learning) reported greater levels of Internet connectivity (see Exhibit III-3).

Exhibit III-3. State technology infrastructure and school connectivity



Purchasing consortia

Purchasing consortia offer a powerful and effective means for increasing the availability of technology in a state's schools. The majority of states reported using such consortia to enhance their local technology infrastructures. Twenty-nine states reported that they had consortium purchasing programs for hardware, 28 states reported that they had consortium purchasing programs for software, and 15 states reported that they had consortium purchasing programs for online services other than the E-Rate.

Formal Evaluations of Educational Technology Initiatives

Setting standards, requiring technology plans, putting guidelines in place, and providing or facilitating the local technology infrastructure are all important elements in establishing a technology-rich culture. However, the effectiveness of those efforts must be assessed in order to monitor progress and establish new goals. State and district evaluations of their educational technology initiatives can provide this type of information.

As noted previously, the SPR data indicated that states' measures of progress were generally best when dealing with goals related to access to computers and Internet connectivity on which data are relatively easy to collect and quantify. Progress measures seemed to be less reliable for professional development and the integration of technology into the curriculum, areas in which it is more difficult to measure outcomes.

The data from the Survey of State Technology Coordinators shows that states are concerned about collecting educational technology data. Of the 43 states and the District of Columbia that responded to this series of questions in the ISET Survey of State Technology Coordinators, the majority (38) reported that they either had conducted evaluations of educational technology or were planning to do so.

Although gathering data is not the same as doing an evaluation, states also reported collecting a variety of data related to educational technology. The most common type of educational technology data that states reported collecting on a regular basis was an inventory of hardware (31 states gather these data at least every two years), closely followed by counts of classrooms or schools connected to the Internet (30 states gather

these data at least every two years). Data specific to educational technology outcomes were not widely collected at the state level.

As with state goals, summarizing the results of state evaluations is difficult because of the diversity of approaches and applications studies. Some states conducted more extensive studies of the uses of educational technology, such as those supported by the TLCF. Some states, such as Virginia and North Carolina, assessed student proficiency in using technology as part of broader systems of assessing student achievement. Other states, such as Missouri and West Virginia, sponsored initiatives for specific instructional uses of educational technology and used targeted longitudinal studies with careful measurement of instructional use and achievement impacts, including control groups to assess the effects of specific uses of educational technology on student achievement.

With regard to TLCF subgrant evaluations, 4 states reported that they did not collect these evaluations, and 19 others reported that they had gathered these data but had yet to decide how to use the information. Of the 20 states that did gather and use TLCF subgrant evaluations,

- 12 states changed the quantity or type of technical assistance they provided;
- 10 states changed the structure of the subgrant competitions;
- 9 states changed the way funds were targeted (e.g., modified eligibility requirements to include all high-poverty and high-technology-need districts, not just high-poverty and high-technology-need districts located in rural areas; modified restrictions to eligible uses of funds); and
- 6 states changed the method of distributing state funds to districts (e.g., from few but larger subgrants to many but smaller subgrants).

In terms of district-level evaluation activities, 84 percent of the respondents to the ISET Survey of District Technology Coordinators reported that they did plan to undertake an evaluation or had already done so. There were no statistically significant differences across district characteristics (size, poverty, locale, TLCF, or poverty status) with regard to propensity to evaluate their technology initiatives. Although the survey results indicated that evaluations were an integral part of districts' management of educational technology, the content of the responses taken from the district-level SPR data suggest that there is room for improvement with respect to the quality of the evaluations that are conducted at the local level. For example, some districts used

hardware data such as the number of computers or hardware inventory to demonstrate progress on a goal that was cognitive by nature (e.g., improve test scores, integrate technology in all aspects of the curriculum, improve the teaching and learning process).

Summary

Technology plans were quite common among the nation's districts and schools. Districts and schools typically had a single multipurpose plan, and having multiple technology plans was not common. State and districts reported that they monitored progress toward their technology goals, but tended to emphasize computer or connectivity counts over less easily quantifiable outcomes such as those related to professional development or integration of technology into the curriculum[tgd14].

The data from the ISET surveys indicate that standards related to educational technology are common but not universal, as are statewide networks and provision of distance learning. There was also a clear connection between school progress (in terms of instructional classrooms connected to the Internet) and the availability of such infrastructure: the more developed the statewide technology architecture, the greater connectivity at the school level.

The results reported in this chapter show that states were actively involved in supporting technology on both the infrastructure and policy ends. The results also illustrate some of the policy and infrastructure elements that were available to coordinate with the TLCF. This chapter was intended to lay out the context within which the TLCF program operated. In following sections of this report, we address further the role of policy and infrastructure environments — along with that of the TLCF — in the status of educational technology implementation in the nation, specifically as they related to four key issues: access to technology, professional development, technical support, and use of technology in the classroom.

Chapter 4. Access to Educational Technology

Access to educational technology is a necessary condition to its effective use. A primary purpose of the Technology Literacy Challenge Fund (TLCF) program was to help states and school districts improve access to technology—specifically, access to modern computers and Internet connections—for educators and students. The Integrated Studies of Educational Technology (ISET) surveys provide some important information on the availability of educational technology across schools and districts in the nation.

The ISET surveys also yield data about potential barriers to the use of technology. A program like the TLCF can help make computers and other equipment physically available, but barriers may still be present that make it difficult to effectively use this equipment and integrate it into the curriculum. The ISET teacher surveys indicate that the majority of teachers identified substantial access-related barriers to the acquisition and use of technology that included a lack of adequate network facilities to connect to the Internet. Professional development and technical support, other necessary conditions for effective use of technology, are addressed in later chapters.

Current Status of Access to Technology

Access to educational technology in our nation's schools has grown rapidly in recent years. With data collected at a single point in time, this study assesses patterns of access, including the relation between receipt of TLCF program funds and reported levels of access. While the available data allows assessment of access levels, without longitudinal data it is not possible to accurately estimate the program's impact on increasing access. It can only report whether funds have gone to sites with high need.

Availability of modern computers

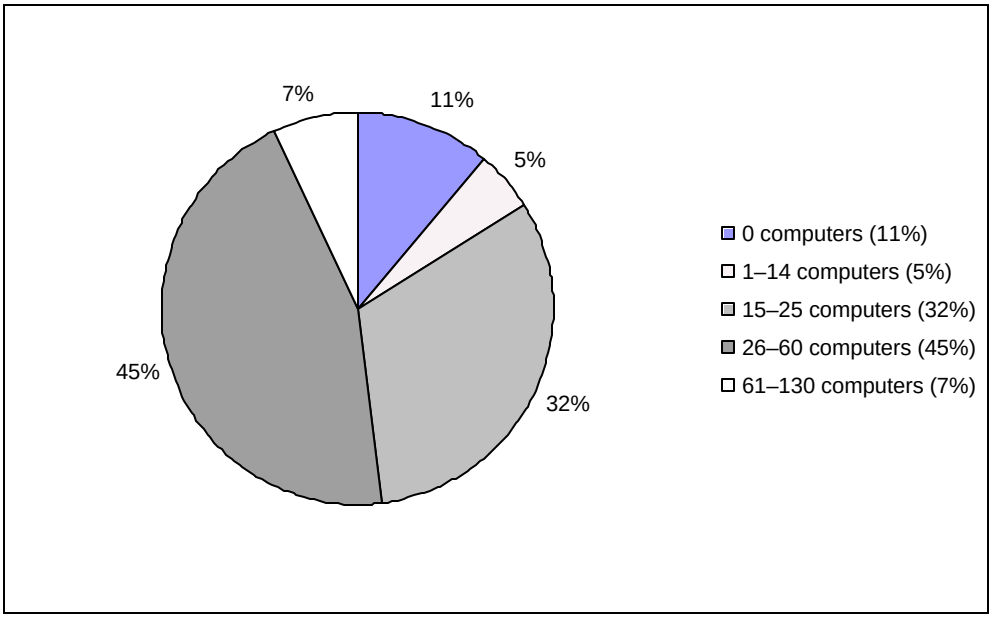
The ISET surveys provide a detailed picture of the educational technology that was available in schools and classrooms. Although only a small percentage (7 percent) of teachers reported that they did not have a computer in the classroom, the bulk of teachers (70 percent) reported having from 1 to 3 computers available for their classroom use (see Exhibit IV-1).

Exhibit IV-1. Teacher reports of classroom computer availability

Total number of classroom computers	Percent of teachers
None	7
One	37
Two	21
Three	12
Four	9
Five	5
Six	2
More than six	7

A larger number of computers were available in computer laboratories. Seventy-seven percent of teachers reported that 15 to 60 computers were located in their computer laboratories (see Exhibit IV-2).

Exhibit IV-2. Teacher reports of availability of computers in computer labs



Because computers could be accessed in the classroom or in the computer lab, we constructed a computer availability index that combined data from these two measures. The majority of teachers (81 percent) reported having 2 or more computers in the

classroom or 25 or more computers in a laboratory to which their students had access. For this report, we classified availability into three levels:

- ***High availability:*** Having 2 or more computers in the classroom *and* having access to a computer laboratory with 25 or more computers. This group represents 30 percent of teachers.
- ***Medium availability:*** Having *either* 2 or more computers in the classroom *or* having access to a computer laboratory with 25 or more computers. This group represents 51 percent of teachers.
- ***Low availability:*** *Not* having at least 2 computers in the classroom *and not* having access to a computer laboratory with 25 or more computers. This group represents 19 percent of teachers.

Teachers' reports of computer availability varied by the characteristics of school districts. Fifteen percent of teachers in rural districts were in the high-availability group, compared with 29 and 33 percent of teachers in suburban and urban districts, respectively. Teachers in small districts were also less likely to be in the high-availability group; 21 percent of teachers in small districts reported conditions that would place them in the high-availability group, compared with 33 and 30 percent in the large and mid-sized districts, respectively. No significant differences were found by receipt of TLCF funding or poverty status.

Respondents to the ISET surveys of teachers and of school principals reported on the availability of other supporting forms of technology, such as telephones, televisions, and VCRs, as well as multimedia peripherals such as scanners, printers, and external drives (Zip or Jazz drives). Teachers and principals reported the following availability of supporting forms of technology:

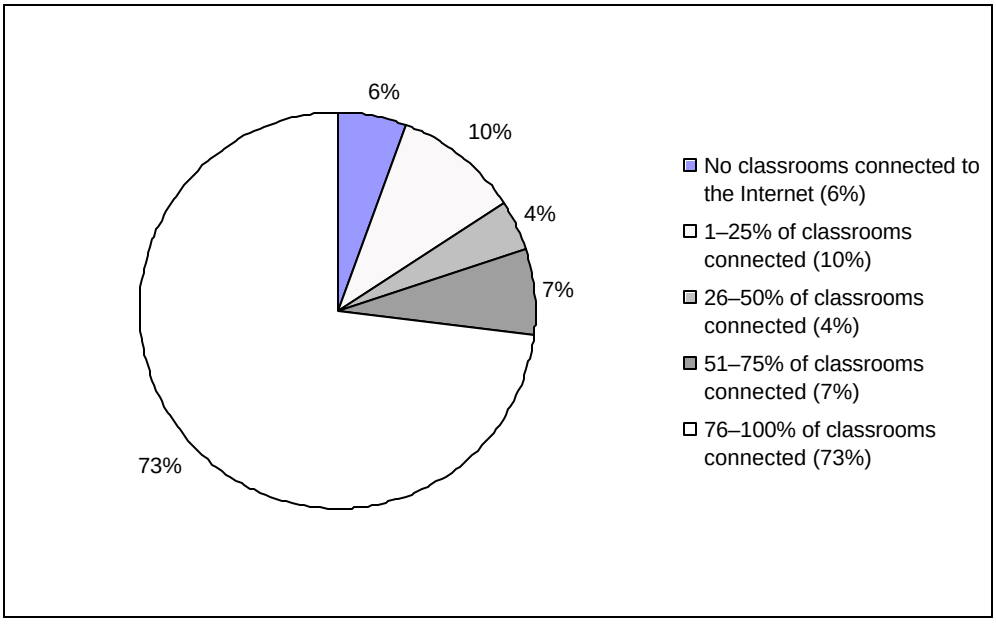
- Basic forms of technology, such as telephones, televisions, VCRs, and fax machines were available to 92 percent of teachers. Notably, 9 percent of teachers reported having *none* of these basic forms of technology available.
- Basic peripherals such as printers and CD-ROM drives were available to more than half of teachers (66 percent and 59 percent, respectively). Consistent with teachers' reports, principals noted that basic equipment such as CD-ROM drives and printers was available in most or all classrooms (82 percent and 75 percent, respectively[r15]).
- Multimedia peripherals such as digital cameras, computer projection screens, hand-held computers, or DVD drives were still relatively scarce, according to teachers and principals. This type of equipment was generally available in only a few classrooms, if at all[r16].

- Teachers in high-poverty districts, in high-poverty TLCF districts, in small districts, and in urban districts reported more limited availability of these forms of technology (basic supporting technology; basic peripherals; multimedia peripherals) than their counterparts[r17].
- Schools in high-poverty districts reported more limited availability of hardware (e.g., laptops, printers, CD-ROM drives, multimedia peripherals) than schools in other districts[r18].

Classroom Internet connectivity

In addition to examining whether computers were available to teachers, the ISET surveys collected information on whether computers were connected to the Internet. According to the ISET Survey of School Principals, the majority of schools (73 percent) had 76 to 100 percent of their instructional classrooms connected to the Internet. This is comparable to the NCES finding that as of fall 2000, 77 percent of instructional classrooms were connected to the Internet.[23] The percentages of schools in the remaining connectivity categories were quite low, as shown in Exhibit IV-3.

Exhibit IV-3. School reports of the percentages of instructional classrooms connected to the Internet



[23]National Center for Education Statistics. (2001). *Internet Access in U.S. Public Schools and Classrooms: 1994-2000* (Report No. 2001-071). Washington D.C.: National Center for Education Statistics.

For our analyses of connectivity, we placed schools that reported that the majority (51 to 100 percent) of their classrooms were connected to the Internet in the high-Internet-connectivity group.

Comparisons among different types of districts showed that schools in urban districts, large districts, high-poverty districts, and high-poverty TLCF districts reported significantly fewer instructional classrooms connected to the Internet than did other districts.[24] Specifically:

- 68 percent of schools in high-poverty TLCF districts were in the high-Internet-connectivity group, compared with 81 percent and higher for schools in other types of districts.
- 67 percent of schools in urban districts were in the high-Internet-connectivity group, compared with 86 percent of schools in suburban and 85 percent in rural districts.
- 74 percent of schools in large districts were in the high-Internet-connectivity group, compared with 82 percent of schools in mid-sized and 91 percent in small districts.
- 72 percent of schools in high-poverty districts were in the high-Internet-connectivity group, compared with 85 percent of schools in other districts.

Barriers to access to modern computers and the Internet

Barriers to access to modern computers. Physically having computers, other equipment, and the Internet available does not mean that the available technology is modern, is equipped with necessary accessories such as printers, or has Internet connections. As part of the ISET surveys, teachers were asked to report on barriers to technology use that they faced, and Exhibit IV-4 summarizes the reported prevalence of these barriers by characteristics of district. More than 60 percent of teachers reported that they perceived barriers to the use of educational technology related to its availability.

Teachers in TLCF districts (across poverty levels) were slightly more likely to report outdated computers as barriers to accessing technology than were other teachers. This is notable because the availability to computers and equipment appeared to be

[24]In making comparisons across districts in availability of technology, we used multiple regression to control for the following district characteristics: poverty status, receipt of TLCF funds, size, locale. The TLCF receipt variable and the poverty status variable were entered as an interaction to distinguish high-poverty TLCF districts from others.

Exhibit IV-4. Percentages of teachers reporting barriers related to computer access, by district characteristics

Characteristic of TLCF subgrantee	There are not enough up-to-date computers in your school or classroom	There are not enough computers connected to the Internet in your school or classroom	You do not have needed accessories (printers, projectors, Zip drives, etc.)
Overall percentage	67%	63%	67%
District TLCF and poverty status			
TLCF, high poverty	70	67[b]	68
TLCF, not high poverty	66	62	66
Not TLCF, high poverty	46[a]	46[a]	49[a][r19]
Not TLCF, not high poverty	69	58	67
District poverty status			
High poverty	63	61	63
Other districts	68	60	67
District locale			
Urban	63	58.6	59[c]
Suburban	68	62.6	66
Rural	66	58.3	70
District size			
Small	60	50[a]	62
Mid-sized	69	65	69
Large	66	61	64

Note: Significance tests (at the.05 level) were conducted and statistically significant results are presented as follows:
[a] This group is significantly different from all other groups within variable.
[b] This group is significantly different from not-TLCF, not-high poverty.
[c] This group is significantly different from rural districts.

similar to that of other teachers (i.e., no significant differences in numbers of computers available in classrooms or laboratories were found across TLCF recipient status).[25]

In addition, the ISET data indicate that teachers in the high-computer-availability group were significantly more likely to report the following barriers to their use of technology in the classroom:

- ***Lack of up-to-date computers:*** 71 percent of teachers in the high-computer-availability group reported that lack of up-to-date computers was a barrier, compared with 57 percent of teachers in the low- and medium-availability groups.

[25]In making comparisons in availability of technology, we used logistic regression to control for the following district characteristics: poverty status, receipt of TLCF funds, size, locale. The TLCF receipt variable and the poverty status variable were entered as an interaction to distinguish high-poverty TLCF districts from others. The use of logistic regression is appropriate here, in that the outcome variable is dichotomous (e.g., does a barrier exist or does it not?).

- ***Lack of computers connected to the Internet:*** 64 percent of teachers in the high-computer-availability group reported that lack of computers connected to the Internet was a barrier, compared with 53 percent of teachers in the low- and medium-availability groups.
- ***Lack of computer accessories:*** 70 percent of teachers in the high-computer-availability group reported that lack of computer accessories was a barrier, compared with 56 percent of teachers in the low- and medium-availability groups.

The lower quality of the available technology reported by teachers in TLCF districts suggests that TLCF monies were directed to where there was a greater need.

Barriers to access to the Internet. Because Internet connections may be available but not sufficiently rapid or reliable for effective instructional use, we also examined schools' and teachers' reports of Internet-related barriers by type of district. There were some differences in the prevalence of barriers to connectivity across district characteristics, which are reported in Exhibit IV-5:

- Schools in high-poverty TLCF districts were significantly more likely than other districts[26] to report building security and inadequate electric power supply or wiring as barriers.
- Schools in urban districts were significantly more likely than those in other districts to face infrastructure barriers: inadequate space; inadequate electrical supply or wiring; inadequate heating, ventilation, and air conditioning (HVAC); and inadequate building security.
- Schools in large districts also reported significantly greater problems with their power supply, wiring, and HVAC than schools in small or mid-sized districts.
- Schools in large districts, along with those in high-poverty districts, also reported significantly greater concerns regarding building security than schools in other types of districts.

The reliability and speed of Internet connections are widely reported by teachers as a barrier to using the Internet for instruction. Among teachers, 61 percent reported "Internet connection is not fast enough to use while teaching" as a barrier. In addition, 60 percent of teachers reported "Internet connection is not reliable enough, the network is down frequently" as a barrier. This was a problem facing schools regardless of whether

[26]That is, not-high-poverty, TLCF districts; high-poverty, non-TLCF districts; and not-high-poverty, non-TLCF districts.

they were located in a rural, suburban, or urban area; were in large or small districts; or were high poverty or not. There were no significant differences among teachers' reports of slow Internet connections being a barrier to use (see Exhibit IV-5) by district TLCF status, poverty status, locale, or size.

Exhibit IV-5. Percentages of school principals and classroom teachers reporting barriers related to connectivity, by district characteristics [tgd20]

	School principals				Classroom teachers	
Characteristic of TLCF subgrantee	**Inadequate school building space**	**Inadequate school building electric power supply or wiring**	**Inadequate school building HVAC**	**Inadequate school building security**	**Internet connection is not fast enough for use while teaching**	**Internet connection is not reliable enough, the network is frequently down**
Overall percentage	50%	49%	39%	36%	61%	60%
District TLCF and poverty status						
TLCF, high poverty	54	58[a]	44	47[a]	59	56
TLCF, not high poverty	48	48	38	34	64	67[b]
Not TLCF, high poverty	41	37	38	28	59	46
Not TLCF, not high poverty	50	47	35	31	57	58
District poverty status						
High poverty	50	52	42	41[a]	60	54[a]
Other districts	50	48	36	32	60	62
District locale						
Urban	61[a]	64[a]	52[a]	46[a]	61	56
Suburban	46	41	31	34	61	64[a]
Rural	43	45	34	30	56	56
District size						
Small	46	43	32	29[d]	55	53
Mid-sized	45	45	35	31[d]	57	63[c]
Large	54	55[c]	43[c]	42	63	59

Note: Significance tests (at the.05 level) were conducted and statistically significant results are presented as follows:
[a] This group is significantly different from all other groups within variable.
[b] This group is significantly different from TLCF, high poverty.
[c] This group is significantly different from small districts.
[d] This group is significantly different from large districts.

There were differences across different types of districts in reports of unreliable connections to the Internet being a barrier to its use. Teachers in high-poverty districts were less likely to report unreliable connections as a barrier than did teachers in other districts. Teachers in suburban districts were more likely to report unreliable connections

as a barrier than did teachers in urban or rural districts. Teachers in mid-sized districts were also more likely to report unreliable connections as a barrier than did teachers in small districts. However, teachers in TLCF districts that were not high poverty were more likely to report that unreliable Internet connections were barriers to their use of technology in the classroom than teachers in high-poverty TLCF districts.

Additional analyses indicate that teachers in the high-Internet-connectivity group (those in schools that reported that more than half of their classrooms were connected to the Internet) were less likely to report slow Internet connection speed as a barrier. The data do suggest that teachers in the low-Internet-connectivity groups—those in urban districts, large districts, high-poverty districts, and high-poverty TLCF districts—had slower connections as well. This indicates that a digital divide still existed, where those with fewer Internet connections had connections of lesser quality[tgd21].

Students' access to technology outside of the school

One factor that may affect students' ability to use educational technology in the classroom is their experience with this technology outside of school. Access to educational technology outside of school may affect factors such as student proficiency in using the technology, student expectations, and the nature of homework assignments. Student access to technology outside of the classroom may also affect how schools implement technology (e.g., the frequency of use and the placement of computers in labs where students can use them after school[TG22]).

Teachers reported on their students' access to computers and the Internet outside of school (Exhibit IV-6). Overall, approximately four out of every five teachers reported students' lack of access to technology as a barrier. About 85 percent of teachers in high-poverty districts (regardless of TLCF status) reported their students' inadequate access to technology (87 percent) and to the Internet outside of school (84 percent) as barriers to their use of technology. Teachers in urban, in rural, in large, and in small districts reported similar concerns, with about 80 percent of each group noting limitations to their students' home access to technology. The ISET data indicate that students in high-

Exhibit IV-6. Percentages of teachers reporting barriers related to student access to technology outside of school, by district characteristics

Characteristic of TLCF subgrantee	Students do not have adequate access to technology outside of school	Students do not have adequate access to the Internet outside of school
Overall percentage	82%	81%
District TLCF and poverty status		
TLCF, high poverty	90 [a]	86
TLCF, not high poverty	80	81
Not TLCF, high poverty	80	79
Not TLCF, not high poverty	66 [a]	66 [a]
District poverty status		
High poverty	87 [a]	84 [a]
Other districts	73	73
District locale		
Urban	84	83
Suburban	69 [a]	69 [a]
Rural	83	82
District size		
Small	78	77
Mid-sized	72 [a]	72 [b]
Large	80	80

Note: Significance tests (at the.05 level) were conducted and statistically significant results are presented as follows:

[a] This group is significantly different from all other groups within variable.
[b] This group is significantly different from large districts.

poverty TLCF districts were more likely than those in other districts to have *inadequate* access to technology outside of schools.[27]

In sum, although modern computers and connectivity to the Internet are becoming widespread in schools, a disparity in access to technology is still apparent across districts, especially between TLCF and non-TLCF districts. In particular, although computers in TLCF districts are available, they are not necessarily modern. Large districts appear to be facing two connectivity obstacles, with their relatively fewer Internet connections also being less reliable. The disparity in access is also evident with respect to teachers' reports of their students' access to technology outside of school. The majority of teachers in high-poverty districts, in urban districts, in rural districts, in small districts, and in large districts reported as barriers the limited access their students had to technology outside of school.

[27]The logistic regression specification used here was similar to that used to examine whether teachers indicated that various barriers to the use of technology existed.

Leadership in Providing Access to Technology

The previous chapter on leadership described the prevalence of some of the various forms of support that states and districts offer to enhance educational technology, such as establishing standards for students and teachers, constructing a statewide network connecting schools, or developing mandatory guidelines for school buildings. To examine the relationship between policies that are aimed at improving access to computers and Internet connectivity, Exhibit IV-7 shows first the percentage of teachers who reported that they were in the high-computer-availability group and then the percentages of schools in the high-Internet-connectivity group [TG23], presented across a range of state and district policy and infrastructure settings to show how individual policies are associated with access to technology.

Exhibit IV-7. Percentages of teachers and schools in the high-technology-access groups, by state and district policies[28]

	Percent of teachers in the high-computer-availability group		Percent of schools in the high-Internet-connectivity group	
	State or district policy in place	State or district policy *not* in place	State or district policy in place	State or district policy *not* in place
State policies, guidelines, programs				
Statewide network connecting most schools	29%	30%	88%*	75%*
Regional technology center	31	28		
State application for E-Rate	35*	26*	83*	76*
Mandatory ET-related guidelines for existing school buildings	22	31	80	79
Mandatory ET-related guidelines for new school buildings	24*	31*	81	79
Hardware purchasing consortium	31	27	81*	73*
Software purchasing consortium	32	26	80	78
Online services purchasing consortium (other than E-Rate)	35*	26*	81	77
Educational technology standards for **students**	31	28	83*	71*
Educational technology standards for **teachers**	31	28	81	78
District policies				
Educational technology standards for **students**	28	27	79	83
Educational technology standards for **teachers**	31	26	81	80

[28]Percentages that have asterisks next to them are significantly different from each other at alpha = .05. High computer availability was defined as having 2 or more computers in the classroom and 25 or more in the computer lab. High Internet connectivity was defined as having 51 percent or more of a school's classrooms connected to the Internet.

Infrastructure environment and access to technology

Exhibit IV-7 shows that the infrastructure elements that were significantly related to teachers' reports of greater computer availability were online purchasing consortia and their state's applying for the E-Rate. It is notable that both efforts relate to the cost of providing technology to schools. The availability of online purchasing consortia and E-Rate discounts through the state's efforts may help free up funds at the state and district levels to be used for computers instead of for wiring and telecommunications. Hardware purchasing consortia were not a significant factor in computer availability.

As we discussed in the leadership chapter, a clear connection exists between schools' reports of numbers of instructional classrooms connected to the Internet and the availability of statewide technology networks and distance learning (see Chapter 3 for details). The greater the infrastructure a state provided, the greater the degree of classroom-level connectivity, as reported by *school principals*. State application for the E-Rate and hardware purchasing consortia were also positively related to school connectivity.

Policy environment and access to technology

No significant relationship emerged between computer availability and state standards for teachers (e.g., standards regarding proficiencies, uses of technology), state standards for students, or district standards for students or teachers. The only policy variable significantly associated with school connectivity was the presence of state standards for students. Schools in states that had standards for students reported greater percentages of instructional classrooms connected to the Internet. However, state standards for teachers and district standards for teachers or students were not significantly related to schools' connectivity (see Exhibit IV-7). The mixed results here suggest that more detailed data are necessary to understand whether standards affect outcomes such as technology access.

As a whole, software purchasing consortia and mandatory guidelines for new or existing school buildings were unrelated to teachers' reports of computer availability and to schools' reports of Internet connectivity. Of this set of infrastructure and policy variables, programs and initiatives that directly decreased schools' costs for purchasing

technology appeared to be most strongly related to teachers' reports of computer availability in their classrooms and in computer laboratories.

Progress Toward Access to Technology and the TLCF

As previously described, 93 percent of districts and 93 percent of schools reported that increasing the availability of modern computers in the classroom was one of the goals set forth in their technology plans. Similarly, 98 percent of districts and 93 percent of schools stated that increasing connectivity to the Internet was a goal. This section examines reported change in TLCF subgrantees' access to technology during the period 1997 to 2000 by addressing access to modern computers and connectivity to the Internet.

District reports of progress toward greater access to technology

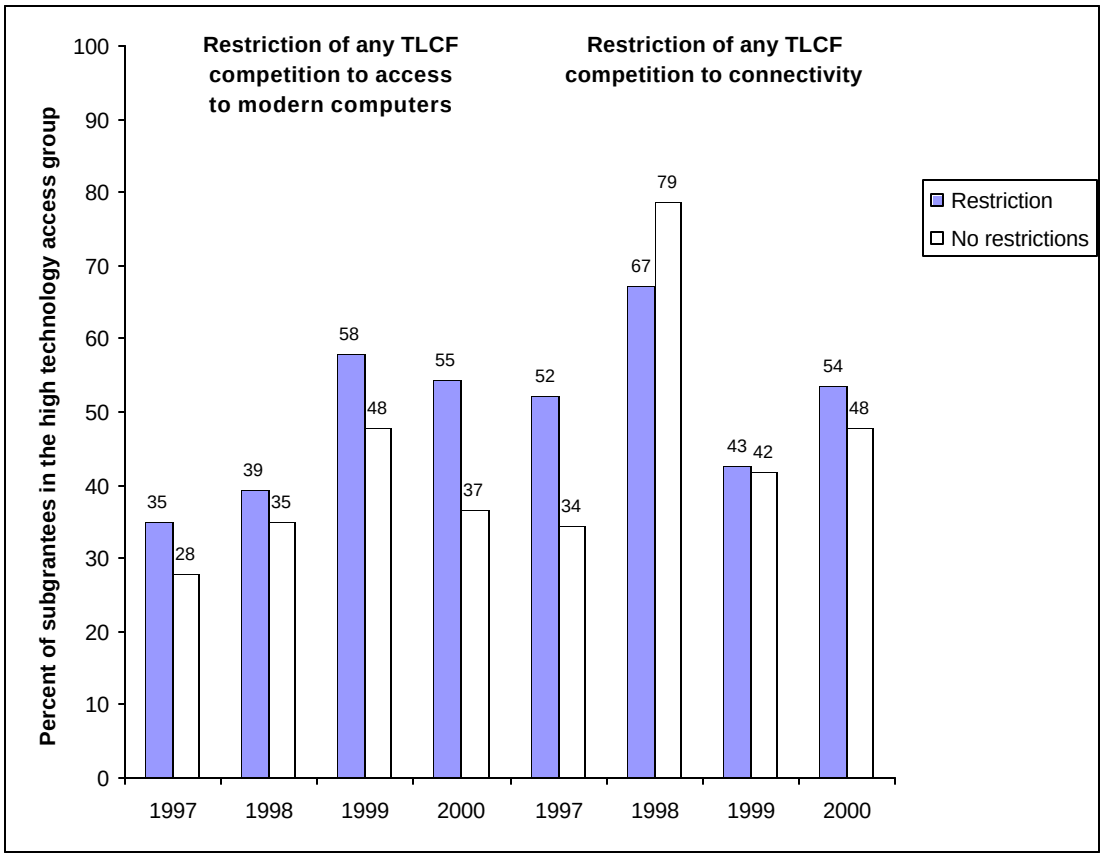
District technology coordinators reported on the progress that their districts had made on their various technology goals. The majority of respondents noted that they had made "a great deal of progress" on increasing the availability of modern computers in the classroom (67 percent) and on increasing connectivity to the Internet (82 percent).

States' restrictions on use of TLCF funds and TLCF subgrantees' access to technology

As noted in Chapter 2, 15 states restricted at least one of their TLCF competitions to access to modern computers; this number rose to 23 in 1998 and dropped to 10 in 1999 and to 4 in 2000. In 1997, 20 states restricted at least one of their TLCF competitions to connectivity; this number increased to 22 in 1998 and fell to 10 in 1999 and to 2 in 2000. It appears that states were more active in trying to direct funds toward increased computer and Internet access during the first two years of TLCF funding. Notably, it was in 1998 that E-Rate discounts became widely available to schools and districts.

Consistently across the years 1997 to 2000, subgrantees in states that restricted TLCF competitions to access to modern computers reported lower student-to-multimedia computer ratios (i.e., reported greater access, see Exhibit IV-8). The pattern was less distinct among subgrantees whose states restricted TLCF competitions to connectivity. Although subgrantees in states that restricted TLCF competitions to connectivity reported greater access to the Internet in 1997, 1999, and 2000, the reverse was true in 1998.

Exhibit IV-8. Percentages of 1997–2000 TLCF subgrantees in the high-technology-access groups, by state TLCF competition restrictions[29]



Again, this may be due to the fact that 1998 was the year that E-Rate discounts became widely available, and so regardless of state restrictions to connectivity, districts may have been able to improve their Internet connectivity through E-Rate subsidies.

Subgrantee primary use of TLCF funds for access to technology

The State Performance Reporting (SPR) collected information from districts to indicate whether they used at least 25 percent of their TLCF funds for specific purposes. It appears that improving access to modern computers was a primary goal of districts in terms of their awards. As reported previously, 54 percent of FY2000 TLCF subgrantees used 25 percent or more of their TLCF funds for access to modern computers. This

[29]High computer availability was defined as scores of 4 or 5 on the continuum used in the SPR report (student to multimedia computer ratio of less than 13:1). High Internet connectivity was defined as scores of 4 or 5 on the continuum used in the SPR report (more than 55 percent of classrooms connected to the Internet).

number varied across states, ranging from zero to 95 percent, with the median at 57 percent.

According to the 2000 SPR data, TLCF subgrantees that used 25 percent or more of their funds primarily for computers reported slightly greater access to modern computers (64 percent in the high-computer-access group) than did subgrantees that used their TLCF funds primarily for other purposes (59 percent in the high-computer-access group).

Only 5 percent of FY2000 TLCF subgrantees used 25 percent or more of their TLCF funds for Internet connectivity. This number ranged from zero to 37 percent across states, with the median at zero percent. As noted earlier, Internet connectivity had become nearly universal by 2000, and so fewer districts were targeting large portions of their TLCF awards to connectivity. There were no substantive differences in percentages of classrooms connected to the Internet between 2000 subgrantees who used 25 percent or more of their TLCF funds for connectivity and those who did not use their TLCF funds primarily for connectivity (for those who used at least 25 percent of their funds for connectivity, 89 percent were in the high-Internet-access group, compared with 87 percent in the high-Internet-access group for those who used their funds for other purposes.)

Summary

Although modern computers and connectivity to the Internet are becoming widespread in schools, a disparity in access was still apparent, especially between TLCF and non-TLCF districts. That is, although computers in TLCF districts may be available, they may not necessarily be modern, and Internet connections that exist may not necessarily be reliable. The access may be there (i.e., quantity of computers, widespread Internet connectivity), but the quality of the access does differ across districts. Large districts appear to be facing the barriers of relatively fewer and less reliable Internet connections, even after controlling for factors such as locale.

The difference in access is also evident with respect to teachers' reports of their students' access to technology outside of school. Although this was a concern common among teachers, teachers in high-poverty, urban, rural, small, and large districts were

particularly concerned about the limited access their students had to technology outside of school.

Although TLCF monies appear to have been effectively targeted to high-poverty and high-technology-need districts, without appropriate longitudinal data it is difficult to draw any definitive conclusions about the relationship between competition structures and technology access. Of the of infrastructure and policy variables examined, programs and initiatives that directly decreased schools' costs for purchasing technology appeared to be most strongly related to teacher reports of computer availability, school reports of Internet connectivity, and TLCF subgrantee reports of computer and Internet access. The relationship between state restrictions of TLCF competitions to technology access and subgrantee reports of technology access produced mixed results. The great diversity across states drove these mixed and inconclusive findings regarding access and competition structures. Nevertheless, the flexibility of the TLCF program structure appears to be effective in allowing states to target TLCF funds through a variety of state-specific approaches.

Chapter 5. Professional Development

One of the four goals of the original Technology Literacy Challenge Fund (TLCF) legislation was to support the professional development of teachers in the use of educational technology and its adoption in the classroom. Beginning in 1998, the Department of Education specifically encouraged districts to spend at least 30 percent of TLCF funds they received on technology-related professional development for teachers. Similarly, the Educational Technology State Grants Program authorized in the 2002 No Child Left Behind Act requires 25 percent of funds to be directed toward professional development.

This chapter first summarizes teachers' reported needs for professional development as of the 1999–2000 school year as reported in the Integrated Studies of Educational Technology (ISET) Survey of Classroom Teachers. We then describe the professional development in which teachers participated and report on the specific leadership activities that states and districts provided to support professional development. Additional information regarding teacher professional development may be found in the *ISET Professional Development and Teachers' Use of Technology* report (e.g., differences across teacher demographics; more details regarding professional development activities).

Current Status of Professional Development

The ISET Survey of Classroom Teachers found that professional development in the area of educational technology was quite common, with 76 percent of teachers reporting that they had received professional development in this area during the previous 12 months. Despite the high prevalence of professional development, the majority of teachers felt that they were either not at all prepared to use computers and the Internet in the classroom (16 percent) or only somewhat prepared to do so (42 percent of teachers). Of all teachers, 31 percent felt moderately prepared to use computers and the Internet in their classroom and only 11 percent felt very prepared in this area. Teachers' reports of how well prepared they were to use computers and the Internet for classroom instruction showed no differences by district poverty level, locale, or size. But teachers in high-

poverty TLCF districts were more likely than teachers in not-high-poverty TLCF districts to report being "not at all prepared" (19 percent versus 13 percent[tgd24]). This perceived lack of preparedness on the part of teachers was in contrast to the perceptions of the district technology coordinators, the majority of whom (80 percent) felt that districts were able to meet the need for technology-related teacher professional development fairly well or very well.

The ISET Survey of Classroom Teachers collected data on the range of educational technology topics for which teachers felt that they needed professional development (Exhibit V-1). No single item dominated the expressed needs for professional development, and high levels of need were indicated across a range of topics.

Exhibit V-1. Teacher reports of moderate or high need for professional development in various topics

Professional development topic or area	Percent of teachers reporting moderate or high need
Seeing demonstrations of technology-incorporated classroom activities	89
How to integrate technology into the curriculum	88
How to use technology to help students improve basic academic skills	88
How to manage classroom activities that integrate technology	86
Creating lesson plans that incorporate technology and the Internet	85
Learning about technology activities that require only one computer for the classroom	84
Use of various software application packages (e.g., PowerPoint, Photoshop, etc.)	84
Learning new ways to evaluate student work using technology	84
Using software or technology activities that have already been developed	83
How to select good software	78

Compared with teachers in other districts, teachers in high-poverty districts reported significantly higher need for professional development in the following topics: using technology to help students improve basic academic skills, learning new ways to use technology to evaluate student work, using various types of software, learning ways to take advantage of distance learning opportunities, and learning basic computer skills. The same pattern was observed when contrasting teachers in high-poverty TLCF districts with those in not-high-poverty TLCF districts. In addition to the five topic areas listed previously, teachers in high-poverty TLCF districts also reported high need for using

classroom software or technology activities that have already been developed and for training in the effective and ethical use of the Internet[tgd25].

Professional Development Activities

The following section provides a brief overview of professional development activities in which teachers reported participating.

Levels of participation

As noted above, 76 percent of all teachers had participated in at least one type of formal professional development activity related to educational technology during the 12 months prior to the survey. Most teachers (56 percent) indicated that they had participated in only one or two types of professional development activities. Participation in formal professional development activities (e.g., workshops, training seminars) did not vary significantly across various types of districts, including those that received TLCF funding.

In addition to formal professional development, 78 percent of all teachers reported that they had participated in some *informal* professional development activity related to the use of educational technology, such as going to Web sites to get information or materials about educational technology and informally working with peers, family, or friends on skills related to technology in teaching. Participation in informal professional development experiences also did not vary by district characteristics, including the receipt of TLCF funds.

Professional development provided by districts

Districts reported using an array of methods for increasing teachers' abilities to effectively use educational technology. The most common approaches were to send teachers to workshops or conferences or to send trainers to such workshops so that they in turn could return to their schools and train the other teachers. Using teacher teams, providing professional development by means of distance learning technologies, and hiring building-level technology coordinators were also widely used strategies (see Exhibit V-2).

Exhibit V-2. Methods used by districts to increase teachers' abilities to effectively use educational technology

Method	Percent of districts that use this method
Sending teachers to workshops, conferences or summer institutes	98
Sending teachers or technology leaders to technology-related training with the expectation that they will return to their schools and train other teachers ("train the trainer" approach)	87
Having teachers or teacher teams develop new curriculum units that incorporate technology	86
Providing teachers with the opportunity to participate in courses about the use of technology in instruction via the Internet, video conferencing, or other form of distance learning strategy	78
Hiring building level technology coordinators to work with teachers on incorporating technology into teaching	71
Contracting with a software vendor or other for-profit company that provides professional development in the use of technology in instruction.	51
Partnering with an institution of higher education	49
Partnering with another district	36

Differences in the professional development provided did exist across district characteristics.[30] Perhaps because of the costs, high-poverty districts, urban districts, and high-poverty TLCF districts, compared with other districts, were slightly less likely to send their teachers to conferences or workshops and were more likely to use distance learning technologies to provide professional development. Large districts were more likely than small or medium-sized districts to use the "train the trainer" approach or to partner with an institution of higher education. Small and rural districts were more likely than other districts to partner with another district to provide professional development. Forty-eight percent of small districts partnered with other districts to provide professional development, compared with 22 percent of mid-sized and 26 percent of large districts. Similarly, 45 percent of rural districts partnered with other districts to provide professional development, compared with 32 percent of suburban and 13 percent of urban districts. Not-high-poverty, non-TLCF districts were much more likely than other districts[31] to have building-level technology coordinators available to provide their teachers with professional development.

[30]In making comparisons in whether various forms of professional development were used, we used logistic regression to control for the following district characteristics: poverty status, receipt of TLCF funds, size, locale. The TLCF receipt variable and the poverty status variable were entered as an interaction to distinguish high-poverty TLCF districts from others. The use of logistic regression is appropriate here, in that the outcome variable is dichotomous (e.g., was a given form of professional development offered or not within the district?).

[31]That is, high-poverty, non-TLCF districts; high-poverty TLCF districts; and not-high-poverty TLCF districts.

Providers of professional development supported by districts also varied greatly. Professional development is supplied by many different sources, and no single source stands out as a primary provider (see Exhibit V-3). No meaningful differences emerged by district poverty level or locale. Small districts were significantly more likely than large districts to report having *none* of their professional development related to educational technology provided by district office technology coordination staff, faculty or staff from institutions of higher education, business partners, or an online professional development community or other online resource. There were several differences according to district TLCF and poverty status. High-poverty TLCF districts were more likely than high-poverty, non-TLCF districts to report the following:

- Most or all professional development was provided by a formally assigned technology coordinator or expert teachers or administrators within the district.
- Some or a moderate amount of professional development was provided by a librarian or a media specialist.
- Slightly less professional development was supplied by the district's office of technology coordination staff.
- Slightly more professional development was supplied by faculty or staff from institutions of higher education, business partners, independent consultants, volunteer organizations, and an online professional development community.

Exhibit V-3. Amount of district-paid professional development provided by different sources

Source of professional development	Amount of professional development provided			
	None (0%)	Some (1–25%)	Moderate amount (26–50%)	Most, all, or almost all (51–100%)
The technology coordinator (formally assigned)	13%	44%	16%	27%
Librarian or media specialist	35%	45%	15%	5%
District office technology coordination staff	31%	31%	15%	23%
Expert teachers or school administrators from within your district	7%	52%	28%	13%
Expert teachers or school administrators from outside your district	46%	42%	10%	2%
Faculty or staff from institutions of higher education	71%	21%	7%	1%
Business partners	87%	11%	2%	0%
Independent consultants	59%	33%	5%	2%
For-profit vendors	69%	26%	4%	1%
State, regional, or county technical assistance or resource center	42%	35%	15%	8%
Representatives from a volunteer organization	89%	10%	1%	1%
An online professional development community or other online resource	76%	21%	3%	0%
Students	67%	27%	4%	1%

Leadership in Providing Professional Development

The presence of state proficiency requirements and standards for teachers was associated with very little variation in teachers' participation in professional development, in the perceived quality of the professional development, or in coverage of technology integration topics in teacher's professional development[tgd26]. Teachers in states that had technology standards for teachers reported being neither more nor less well prepared to use technology in the classroom than teachers in states that did not have technology standards for teachers. District proficiency standards for either teachers or students were unrelated to teachers' reports of participation in, quantity of, or type of professional development[tgd27].

Progress Toward Professional Development and the TLCF

As described in the educational technology policies chapter (Chapter 3), school and district goals related to professional development for teachers were common. Ninety-seven percent of districts and 99 percent of schools reported that providing professional development for teachers on the use of educational technology was one of the goals set forth in their technology plans.

District reports of progress

As part of the ISET district-level survey, district technology coordinators reported on the progress that their districts had made on their various technology goals. Nearly half of respondents noted that they had made "a great deal of progress" on goals related to *professional development for teachers on the use of educational technology* (48 percent); an additional 50 percent of districts reported that they had made "some progress," for a total of 98 percent of districts reporting some or a great deal of progress on providing professional development. High-poverty districts (both TLCF and non-TLCF recipients) were more likely to report having made a great deal of progress than districts not considered high poverty, and small districts and rural districts reported greater levels of overall progress (i.e., that some or a great deal of progress had been made) than larger and non-rural districts.

Notably fewer districts reported a great deal of progress with respect to the goal of providing *professional development for integrating technology into instruction* (21 percent), although 74 percent noted that they had made some progress on this front, for a total of 96 percent of districts reporting some degree of progress toward this goal.

TLCF and participation in professional development, 1997–2000

As part of the annual SPR, TLCF subgrantees reported on the status of the professional development and technical support they provided to their teachers. Notably, the SPR combined subgrantee reporting on the provision of professional development with provision of technical support. Specifically, TLCF subgrantees reported their status on the following scale:

- 1 = No members of the teaching workforce participated in ongoing training and receiving support
- 3 = Half of the teaching workforce participated in ongoing training and receiving support
- 5 = The entire teaching workforce participated in ongoing training and receiving support

For the purposes of this report, subgrantees that reported a 4 or a 5 were placed in a "high" provision group, whereas subgrantees reporting from 1, 2, or 3 were placed in a "lower" provision group. In FY2000, the same year as the ISET data collection, 53 percent of subgrantees were in the high provision group, which means that 53 percent of subgrantees reported that they were providing ongoing training and support to over half of their teachers.

These figures must be interpreted with caution. Part of the difficulty in interpreting these data is that subgrantees reported end-of-year numbers, without providing baseline figures. Without knowing where each subgrantee began and when the subgrantee received funds, it is difficult to determine whether and when the TLCF funds had an effect on professional development and technical support.

States' restrictions on use of TLCF funds and TLCF subgrantees' participation in professional development

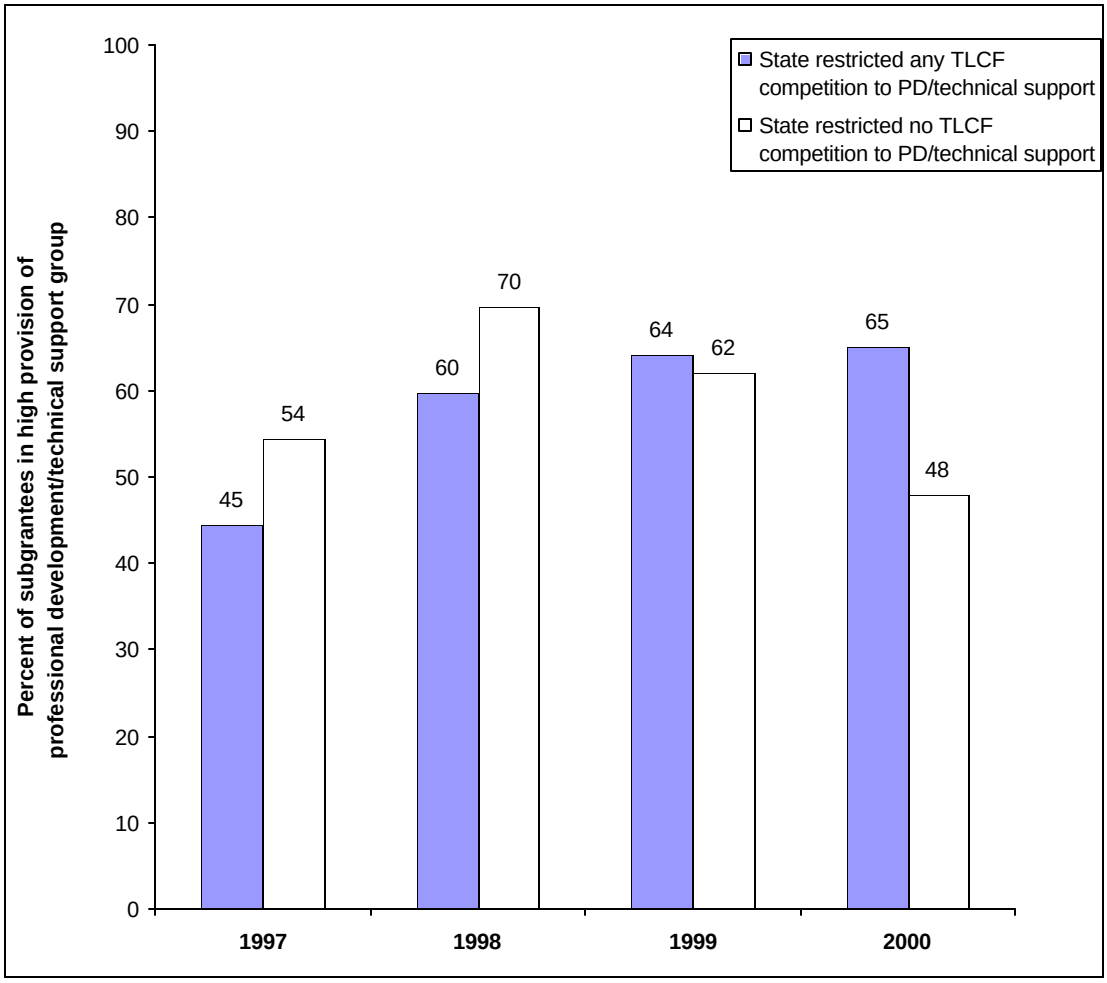
As noted in the TLCF implementation chapter (Chapter 2), several states restricted their TLCF subgrant competitions to applications for professional development and technical support. As reported in Exhibit II-3, 29 states restricted one or more of their 1997 TLCF competitions to professional development, and 29, 13, and six states placed the same restrictions during the 1998, 1999, and 2000 years, respectively.

Exhibit V-4 shows the reported status of subgrantees in states that restricted competitions to professional development and technical support with the status of subgrantees in states that did not focus competitions on these areas (state restrictions to professional development and technical support were combined). In 1997 and 1998, states that restricted TLCF competitions to professional development, technical support, or both had relatively fewer subgrantees in the high-provision group (i.e., subgrantees that provided professional development and technical support to more than half of their teachers). The pattern was reversed in 1999 and 2000, when subgrantees in states that restricted TLCF competitions to professional development or technical support reported greater levels of provision of training and support to their faculty.

Subgrantee primary use of TLCF funds for professional development

Professional development was an area targeted by a large percentage of TLCF subgrantees. In FY2000, nearly 48 percent of subgrantees reported using at least 25 percent of their TLCF funds for professional development. This figure varied across states, ranging from zero to 100 percent, with the median at 44 percent. There were no substantive differences in percentages in the high provision of professional development and technical support group between subgrantees that used at least 25 percent of their funds for professional development (64 percent) and those that used their TLCF funds for other purposes (65 percent).

Exhibit V-4. Percentages of 1997–2000 TLCF subgrantees in the high professional development and technical support provision group, by state TLCF competition restrictions



Summary

When surveyed in 2000–2001, the majority of teachers reported having participated in at least one technology-related professional development activity over the previous 12 months. Although professional development participation was common, most teachers still reported feeling inadequately prepared to use computers and the Internet in their instruction. Teachers reported a need for professional development in a wide variety of technology topics, as well as a need for time to learn and practice using technology in instruction. Despite teachers' unease with using technology in their pedagogy, district technology coordinators reported that they were able to serve professional development needs well and that their districts had made progress in training

teachers how to use technology and how to integrate technology into instruction. They also reported procuring professional development from a wide variety of sources.

The difference in the reports between districts and teachers is notable. Although we have covered *participation* in professional development, the frequency, duration, and quality of professional development must also be considered. These factors are critical in determining the outcomes of professional development, but are beyond the scope of this report. For additional information regarding these factors, please refer to the *ISET Professional Development and Teachers' Use of Technology* report.

Chapter 6. Technical Support

The mere presence of technology at a school or in a classroom is insufficient for the effective integration of technology into the curriculum. Along with professional development for teachers, technical support—for installing, maintaining, and troubleshooting hardware and networks; selecting software; and using technology in instruction—is needed to make technology a regular tool in a teacher's instructional repertoire. High-poverty districts [PC28]did report greater needs for certain forms of technical support, indicating that Technology Literacy Challenge Fund (TLCF) program funds were indeed being directed to those with greater technology needs.

This chapter describes the technical support that teachers received in using educational technology; their remaining needs; and the technical support that schools, districts, and states reported offering to meet these needs.

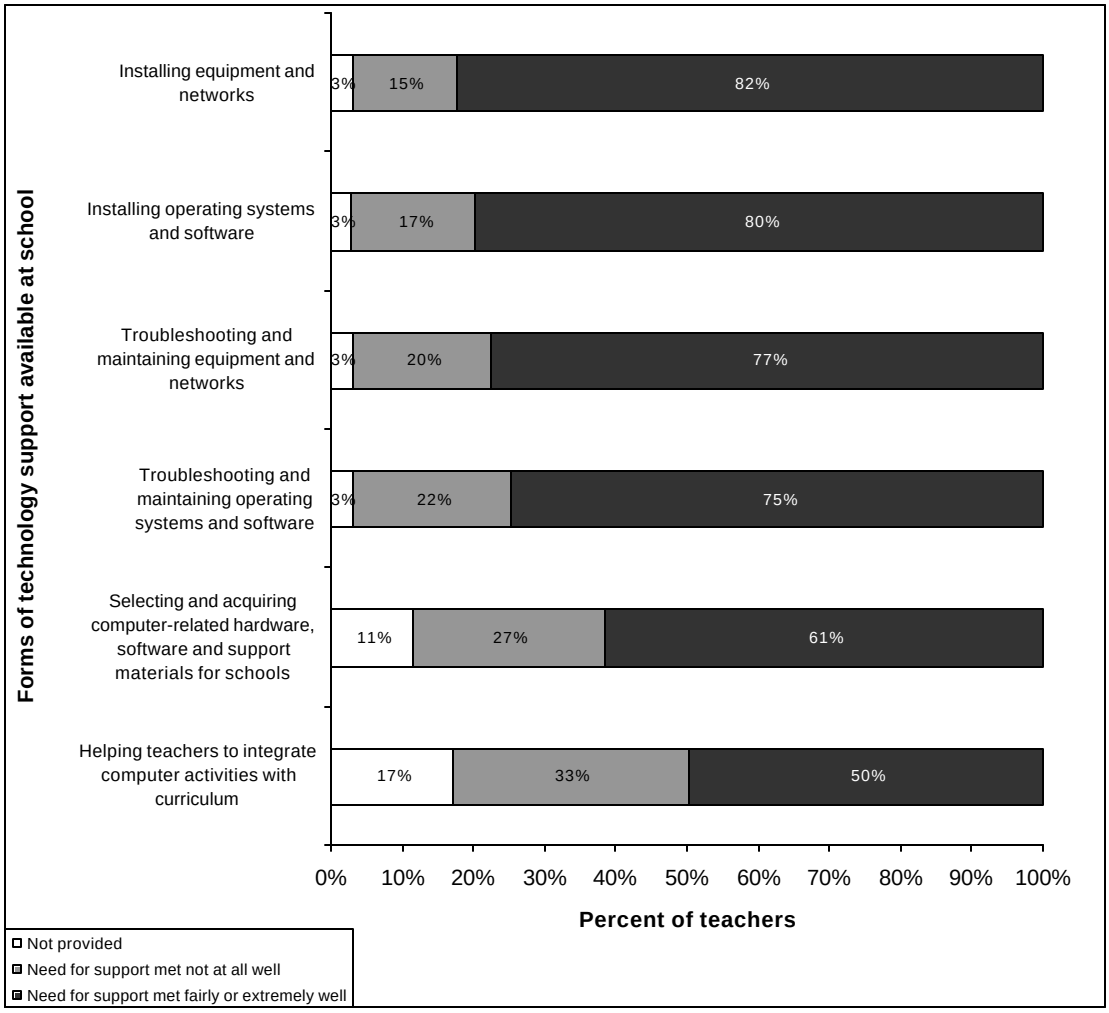
Current Status of Technical Support

Availability and quality of support

In general, teachers noted that their various needs for technical support were well met. Depending on the type of support, between 50 and 82 percent of teachers responding to the ISET survey reported that their needs for technical assistance were met either "extremely well" or "fairly well" (Exhibit VI-1).

Providing resources to teachers for integrating technology into their instruction is perhaps the most important form of support from the standpoint of improving the use of educational technology in the classroom. It is notable that technical support in terms of helping teachers integrate computer activities with the curriculum was the form of support that was least well met. Teachers in large districts, compared with teachers in small districts, were more likely to report that this particular need was not well met. Interestingly, teachers in high-poverty districts were more likely than teachers in other districts to report that the need to help teachers integrate computer activities in the curriculum was very well met.

Exhibit VI-1. Teacher reports of quality of technical support provided at schools

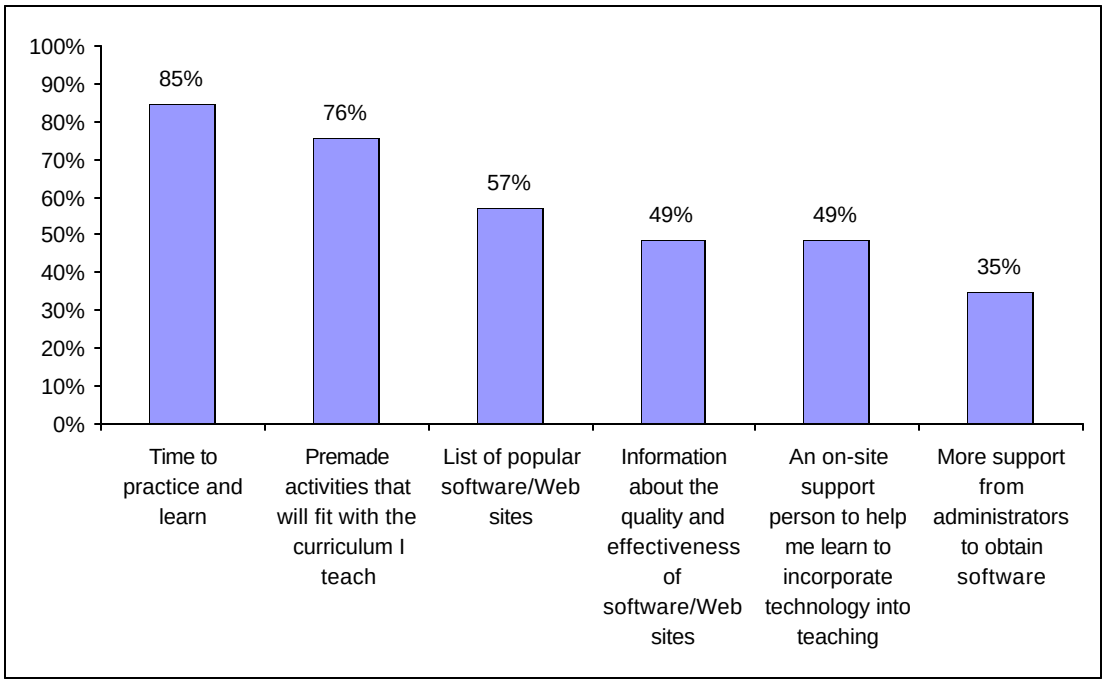


Although there were no significant differences in how well technical support needs were met by district locale, teachers in high-poverty districts, in high-poverty TLCF districts, and in large districts were more likely than teachers in contrasting types of districts to report that the needs for troubleshooting and maintaining operating systems, equipment, and networks were not well met. Teachers in high-poverty TLCF districts were also more likely to report that support in selecting and acquiring computer-related hardware, software, and support materials for schools was not provided.

In addition to the technical support already provided by the schools and districts, teachers reported that time to practice and learn was the most common form of other

support needed (85 percent). Teachers also reported a high need for more premade activities that fit with the curriculum that the teacher taught (76 percent; see Exhibit VI-2).

Exhibit VI-2. Other educational technology–related support needed by teachers



There were no significant differences by district poverty level, locale, or size in teachers' reports of needs for additional forms of technical support. However, high-poverty TLCF districts tended to report greater need for information about the quality and effectiveness of software and Web sites. Interestingly, teachers in high-poverty TLCF districts were slightly *less* likely to report a need for time to practice and learn (80 percent), compared with not-high-poverty TLCF districts (88 percent) and high-poverty non-TLCF districts (91 percent).

The majority of teachers reported that they had a technology coordinator at their schools (80 percent), and this was the person to whom they were most likely to turn for technology-related questions. There were no significant differences in the presence of school technology coordinators by district poverty, TLCF status, size, or locale. Other sources of answers to technology questions were other teachers (28 percent), school

librarians and media specialists (12 percent), and friends and family (10 percent). Fewer than 3 percent reported turning to the Internet or to students for assistance, and fewer than 1 percent sought assistance from hardware or software vendors. These results suggest that school technology coordinators are a very important source of technical information for teachers. As noted in the previous chapter, they are also an important source of professional development for teachers.

As part of the ISET teacher survey, respondents were asked to report on the length of time it took for technology problems to be fixed at their schools. Fewer than 30 percent of teachers reported that it took one to two days to fix technology problems, but another 29 percent reported that it took five or more days to fix technology problems. There were no significant differences by district poverty, locale, size, or TLCF status in the time necessary for technology-related repairs.

The ISET data indicate that inadequate technical support or advice was a moderate or great barrier for 45 percent of teachers; only 24 percent of teachers indicated that this was not a barrier at all. However, no differences were found across district characteristics in teachers' perceptions of inadequate technical support as a barrier.

Providers of technical support

Technical support for educational technology may be provided at the school, district, and state levels. These sources vary in the type of support they provide, with the schools and districts generally taking more of a hands-on approach to assisting with individual machines and applications and the state taking more of a planning and coordination role.

Technical support provided by the school. At the school level, 35 percent of schools reported having full-time, paid technology directors or coordinators who took primary responsibility for supporting educational technology; another 11 percent of schools had part-time coordinators serving this function. A teacher or a staff member who takes on technology coordinator responsibilities was the primary support person in 17 percent of schools. District staff members who worked across schools provided the primary support for educational technology for 15 percent of schools.

Schools in high-poverty districts (including those in high-poverty TLCF districts) and in urban districts were less likely than those in other types of districts to have had full- or part-time coordinators. Instead, a combination of school or district staff provided educational technology support. Indeed, schools in urban and in large districts were significantly more likely to rely on other school-based staff to provide technical support.

Technical support provided by the district. At the district level, more than 90 percent of districts reported providing the following forms of technical support: installing, troubleshooting, and maintaining equipment and networks; installing, troubleshooting, and maintaining operating systems and software; and selecting and acquiring computer-related hardware, software, and support materials for schools. However, the percentage fell to 76 percent when it came to helping teachers integrate computer activities with the curriculum. Not surprisingly given these high percentages, there were no significant differences by district poverty level, locale, or size in the type of assistance provided by the district.

Technical support provided by the state. The majority of states reported offering a wide array of technical support to their constituents. Two out of three respondents to the ISET Survey of State Technology Coordinators (35 or more) reported that their states provided at least one of the following forms of technical assistance:

- Developing technology plans
- Providing professional development for district technology coordinators and other district-level staff
- Providing professional development for school technology coordinators, teachers, and other school-level staff
- Employing state technology specialists who visit districts or who provide advice and help from a distance

It was slightly less common for states to provide technical training programs for district or school staff, or to provide other technology advisors who visit districts or provide assistance from afar (15–29 states). In addition, 23 states provided regional technology centers (16 other states reported that regional technology centers existed but were not funded through the state itself).

Progress Toward Technical Support and the TLCF

As noted in Chapter 3, 88 percent of districts and 92 percent of schools reported that providing technical support to teachers was one of their technology goals. As part of the ISET district-level survey, district technology coordinators reported on the progress that their districts had made on their various technology goals. Over half of the respondents (52 percent) noted that they had made a great deal of progress on goals related to providing technical support for teachers; an additional 47 percent noted that they had made some progress on this front.

States' restrictions of use of TLCF funds and TLCF subgrantees' levels of technical support

As we discussed in Chapter 2, through their TLCF subgrant competitions, several states restricted uses of funds to technical support. Exhibit II-3 shows that 12 states restricted one or more of their 1997 TLCF competitions to technical support and 7 states placed the same restriction during the FY1998 competitions. The 1999 and 2000 SPR did not address technical support as a separate area (please refer to Chapter 5 for a discussion of states' restriction on the use of TLCF funds to these goal areas and its relationship to TLCF subgrantees' professional development and technical support status[tgd29]).

Subgrantee primary use of TLCF funds for technical support

As reported in Chapter 2, only 5 percent of FY2000 subgrantees used 25 percent or more of their TLCF subgrant for maintenance and technical support. This figure varied from zero to 60 percent across the states, with the median at 1 percent.

Summary

Teachers reported that the basic forms of technical support necessary for working with educational technology (e.g., installation, maintenance, and repair) were generally available and that their technical support needs were generally well met. However, teachers in high-poverty TLCF districts were more likely to report that their technology support needs were not well met and that support in selecting and acquiring hardware, software, and other materials was not provided. In general, teachers reported that they

required more support to actually work with technology to integrate it into instruction, thus going beyond the support needed to generally ensure that educational technology was available and in working order.

Chapter 7. Use of Technology in the Classroom

This chapter describes how educational technology was used in instruction, what types of software teachers used, and how teachers perceived their needs for software resources. It also reports on state and district policies for promoting the integration of technology into the classroom, including whether state or district technology standards made a difference. The chapter also considers the role of the TLCF in promoting use.

Current Status of Integrating Technology Into the Curriculum

Frequency of use

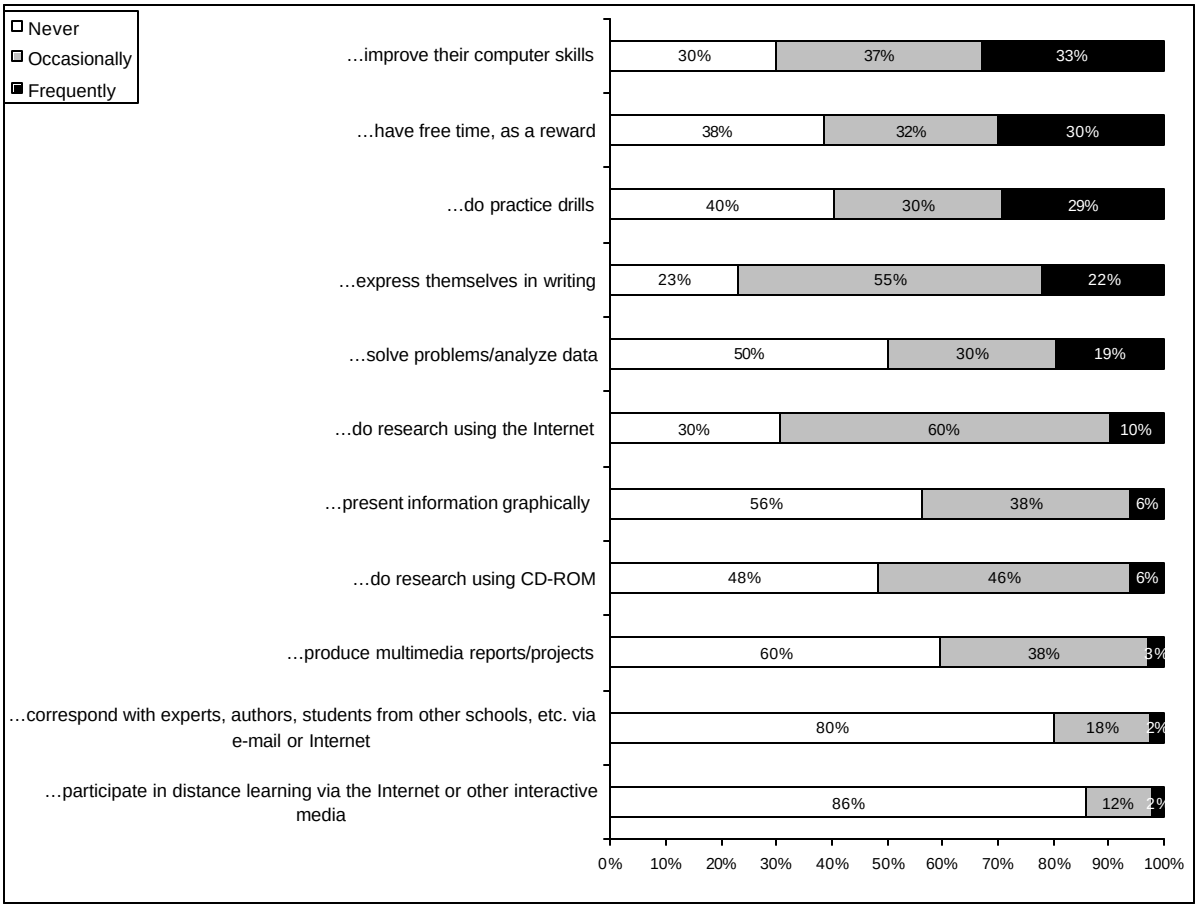
Data from the Integrated Studies of Educational Technology (ISET) Survey of Classroom Teachers showed that more than half (55 percent) of teachers engaged in at least one computer-related activity with students at least once per week. Thirty-seven percent of teachers reported infrequent use (i.e., a few times a month to less than once a month), and 8 percent reported not using technology with students at all[tgd30].

Teachers in high-poverty districts (in both TLCF and non-TLCF recipient districts) reported using educational technology more frequently than did teachers in other districts. However, these tended to be basic uses (e.g., to do practice drills; to correspond through e-mail or the Internet; to give a reward) rather than advanced uses (e.g., to solve problems and analyze data; to produce multimedia reports and projects). There were relatively small (and statistically significant) differences in size and locale, with small districts reporting slightly higher frequencies of basic and advanced use and rural districts reporting slightly lower frequencies of basic and advanced use[tgd31].

Use of technology for instructional purposes

The ISET Survey of Classroom Teachers asked respondents to describe how they used technology in their instruction. Teachers reported using technology most often (i.e., frequently or occasionally) to allow students to express themselves in writing, to improve computer skills, to do research on the Internet, to use as a reward, and to do practice drills (see Exhibit VII-1). Although technology was used for higher-level cognitive tasks by

Exhibit VII-1. Teacher use of technology for different instructional purposes



teachers in all types of districts, teachers in high-poverty districts were more likely to use technology for practice drills or as a reward. This is consistent with the research that indicates that poor (and frequently minority) students often receive instruction that is repetitive and not challenging.[32] Teachers in high-poverty districts were also less likely to use technology to present information graphically or to do research on the Internet; the same held true for teachers in high-poverty TLCF districts.

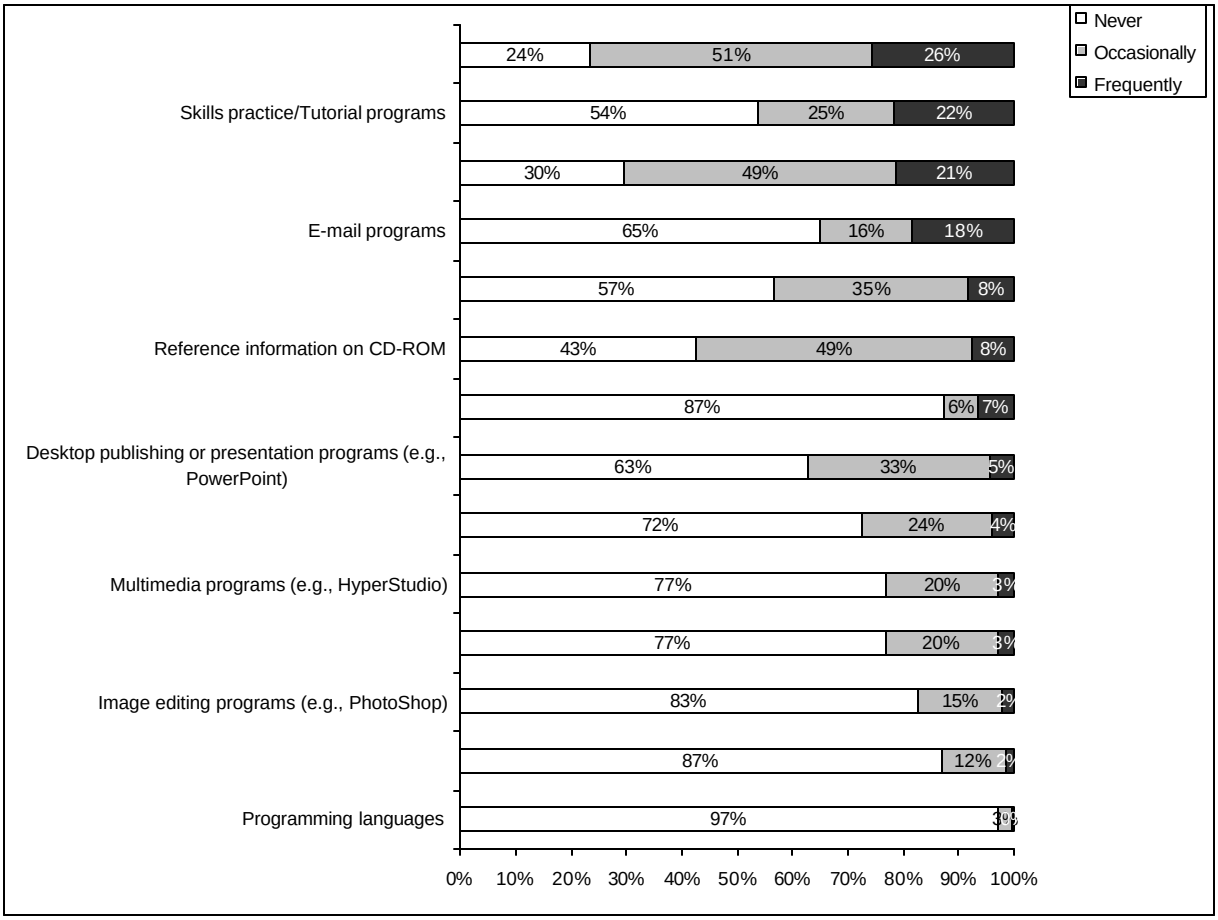
No significant differences emerged in the use of technology for instruction by locale, and the only significant difference by district size was that teachers in small districts were slightly more likely to use technology to present information graphically.

[32]Means, B., & Knapp, M.S. (1991). Cognitive approaches to teaching advanced skills to educationally disadvantaged students. *Phi Delta Kappan*, *73*(4), 282–289; Knapp, M.S., Turnbull, B.J., & Shield, P.M. (1990). New directions for educating the children of poverty. *Educational Leadership*, *48*, 4–9

Teachers' uses of various software programs during instruction

The ISET Survey of Classroom Teachers asked respondents to report on what types of software programs they used in their instruction. Exhibit VII-2 presents teachers' responses to the question. The responses varied widely with no one use clearly dominating. Teachers were most likely to use word processors, Internet browsers, and reference information on CD-ROM. Teachers were least likely to use programming languages, integrated learning systems, or Web page creation programs.

Exhibit VII-2. Teacher use of different software applications during instruction



Teachers in high-poverty districts were less likely than other teachers to use word processing programs, desktop publishing or presentation programs, CD-ROMs with reference content, Internet browsers, or tutorial programs. However, teachers in high-poverty districts were slightly more likely to use integrated learning systems (14 percent

used these at least once a week) than were teachers in lower poverty districts (3 percent used these at least once a week). There were no significant differences by locale, but teachers in small districts were slightly more likely to use integrated learning systems. Teachers in high-poverty TLCF districts were slightly more likely to use drawing or painting programs and slightly less likely to use Internet browsers or e-mail programs, spreadsheet programs, or integrated learning systems.

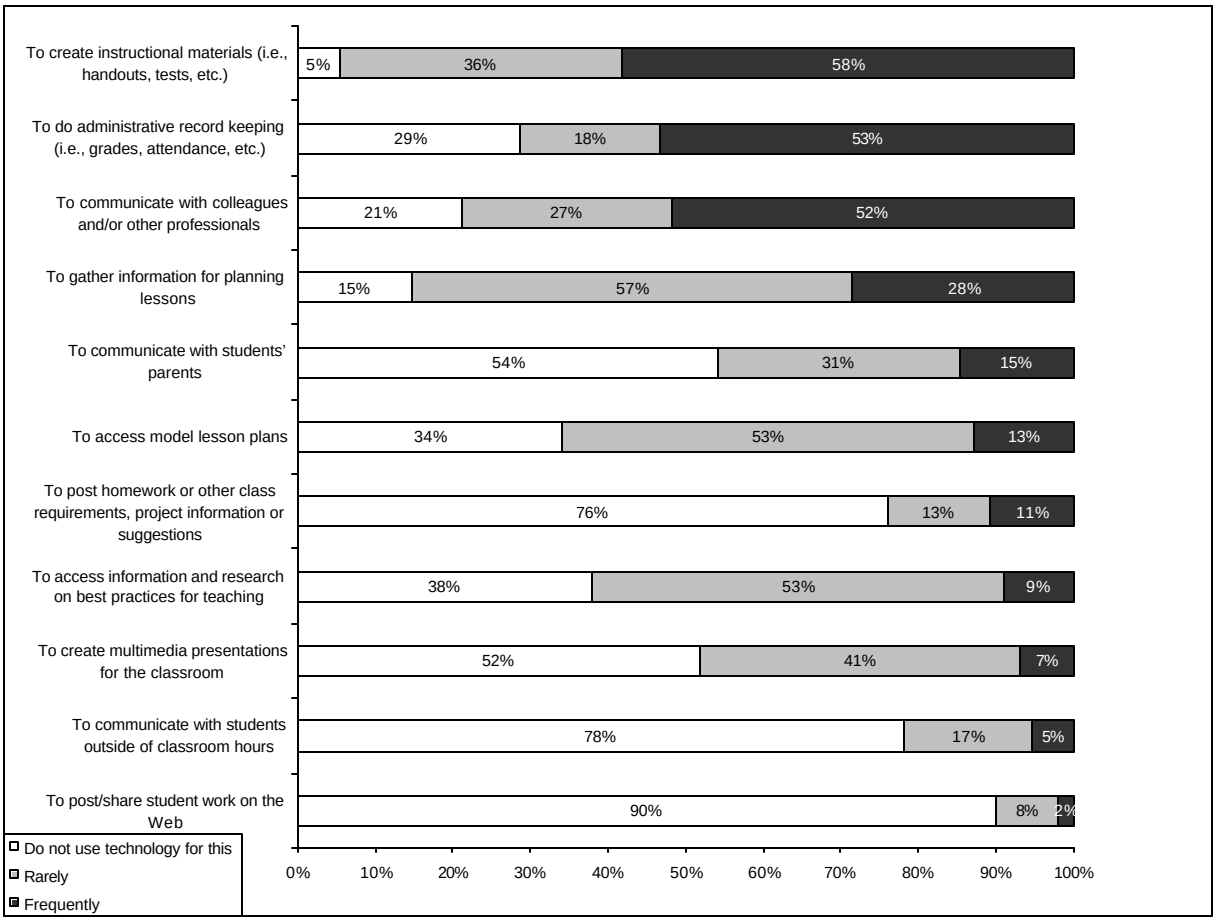
Appropriate use policies. District technology coordinators also reported that the overwhelming majority of districts have in place appropriate use policies for students (98 percent) and for teachers (86 percent). There were no significant differences across district characteristics in this regard. To ensure appropriate use, 94 percent of districts nationwide required students to sign a contract, and 98 percent have teachers, librarians, and media specialists use classroom management techniques to monitor appropriate use. Use of filters to ensure appropriate use was also widespread (79 percent), as was providing professional development to teachers, librarians, and media specialists on the appropriate use of the Internet in the classroom (77 percent).

Use of technology during professional activities

The majority of teachers reported using basic software programs (word processing programs, Internet browsers) as part of their professional activities, such as creating instructional materials or communicating with colleagues. Just over half of teachers reported that they frequently used technology to create instructional materials (e.g., handouts and tests), perform administrative duties (e.g., recording grades and attendance), and communicate with colleagues and other professionals (see Exhibit VII-3). However, teachers were much less likely to use technology for other professional activities. Teachers were least likely to use technology to communicate with students outside of classroom hours; to post homework or other class requirements, project information, or suggestions; or to post or share student work on the Web.

There were significant differences in how teachers used technology across district characteristics. Teachers in high-poverty districts, compared with those in other districts, were less likely to use technology to create instructional materials, to gather information for planning lessons, to keep administrative records, or to communicate with colleagues and

Exhibit VII-3. Teacher use of technology in professional activities



other professionals. However, teachers in high-poverty districts were slightly more likely to frequently use technology to access model lesson plans. There were no significant differences in the use of technology for professional activities by locale, but teachers in large districts were slightly less likely to use technology to gather information for planning lessons and to access model lesson plans.

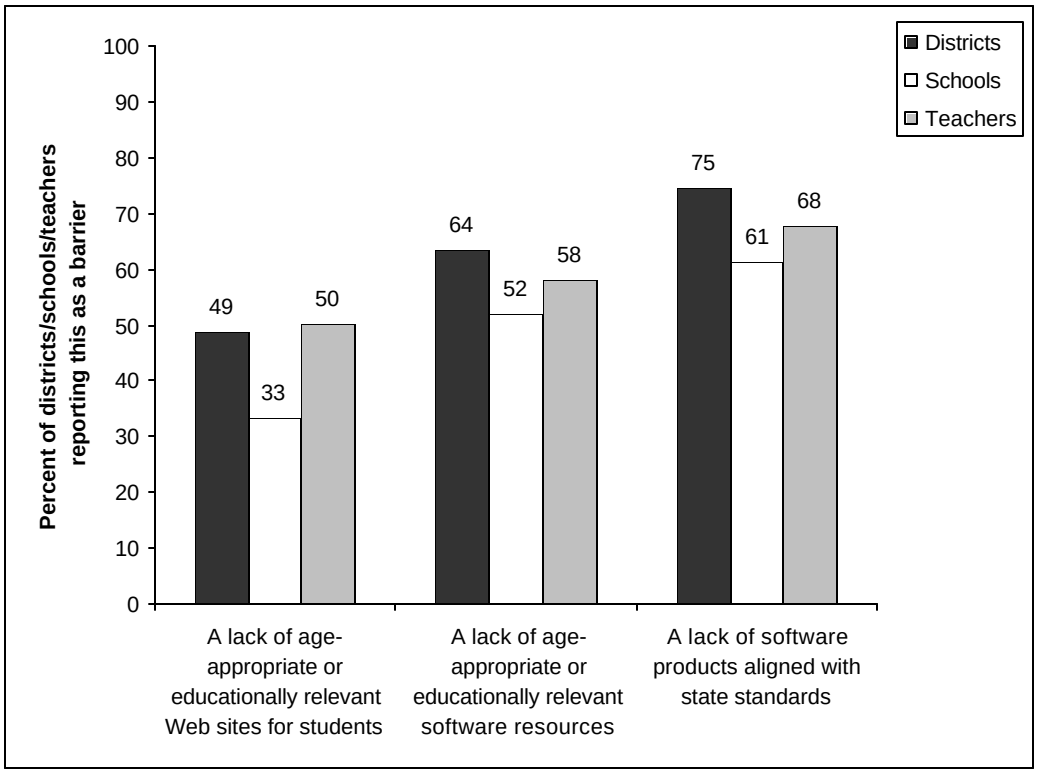
Availability of resources

As part of the ISET, districts, schools, and teachers were asked questions related to three types of barriers in the use of educational technology:

- A lack of age-appropriate or educationally relevant Web sites for students
- A lack of age-appropriate or educationally relevant software resources
- A lack of software products aligned with state standards

We used their responses to gauge the perceived availability of software and online resources that teachers could use in their instruction. A summary of responses from districts, schools, and teachers is presented in Exhibit VII-4. According to district technology coordinators, school principals, and classroom teachers, the greatest barrier to the use of educational technology was a lack of software products aligned with state standards, followed by a lack of age-appropriate or educationally relevant software resources, then by a lack of age-appropriate or educationally relevant Web sites for students.

Exhibit VII-4. District, school, and teacher reports of barriers related to the integration of technology into the curriculum



A lack of age-appropriate or educationally relevant Web sites for students was seen as more of a barrier by teachers in large districts, rural districts, and TLCF districts (particularly those in high-poverty TLCF districts) than teachers in other districts. This suggests a greater need for disseminating information on high-quality, educationally sound Web sites to teachers in these districts. A lack of age-appropriate or educationally relevant software resources and a lack of software products aligned with state standards were

perceived as greater barriers by teachers in high-poverty, high-poverty TLCF, large, and urban districts. This indicates a need for engaging and effective software within these districts.

In addition, 59 percent of teachers reported that their schools' not acquiring appropriate software resources was a barrier to their use of educational technology; 65 percent of teachers reported that they had to purchase relevant software themselves, a factor that also was considered a barrier to their use of technology in the classroom. Compared with other teachers, those in high-poverty districts, larger districts, urban districts, and TLCF districts (both high poverty and not high poverty) saw this lack of software as greater barriers to their use of educational technology.

Leadership in Integrating Technology Into the Curriculum

States and districts implemented a wide range of strategies for encouraging the use of technology in the classroom, the most common being providing training and providing curriculum resources (e.g., software, model lessons). There were few significant differences between districts in the strategies used to encourage student use of technology. State technology standards for students were related to greater district progress in curriculum integration, but technology standards for teachers were unrelated to reports of progress.

State leadership

The ISET state survey asked whether the state supported the development of software and other educational technology resources for teaching to state standards in core subjects. Providing professional development and Web-based curriculum resources were most frequently reported as state supports by the 13 states that answered this question. Some responses are shown in Exhibit VII-5.

State technology coordinators were also asked whether their states had established criteria for determining the degree to which software and other technology resources are aligned with state standards. Only seven states reported that they had articulated state criteria for establishing the alignment between technology resources and state standards.

Exhibit VII-5. Sample state responses regarding state supports for the development of software and other educational technology resources[r32]

LOUISIANA
Louisiana has developed the Making Connections project, which allows teachers to submit educationally sound lesson plans that integrate online resources and state standards. This resource can be viewed at www.lcet.doe.state.la.us/connections

MICHIGAN
TLCF statewide projects as well as Goals 2000 projects have included development of such resources as 1) an online clearinghouse of teacher resources for educational technology; 2) "best practice" model lesson plan process for integrating technology into the curriculum; and 3) a CD of resources for core curriculum areas. All these efforts are aligned with the Michigan Curriculum Framework.

MISSISSIPPI
Training for reading integration (grades 4–8) was developed and delivered; a technology resource guide for grades 4–8 was developed, K–12 Globe training, K–12 Marco Polo training, CD-ROM—Success Mississippi Style (K–12)—best practices of technology use in the classroom.

NEBRASKA
A Web resource has been developed for this purpose called the Slate Project. In it, teachers submit lesson plans they use that correlate with state standards and with the infusion of technology

SOUTH CAROLINA
The state has purchased Abacus software for all districts and schools. This tool matches resources to standards. Abacus will be made available to districts in a few months. It will take about 2 years to completely roll out this project.

VERMONT
The state has developed an online tool set in partnership with IBM. Every teacher has access to and has been (or will be) provided training in the use of the Standards Into Action (SIA) tool set. SIA supports standards-based instructional unit development, collaboration, benchmarking, rubric creation, and assessment management. All grades. All subjects.

VIRGINIA
The Virginia Department of Education works with the Southern Regional Education Board (SREB) to provide Evalutech software evaluations to Virginia teachers. One dollar of every 13 provided by the state for hardware may be used for software purchases. All grades and subjects for both.

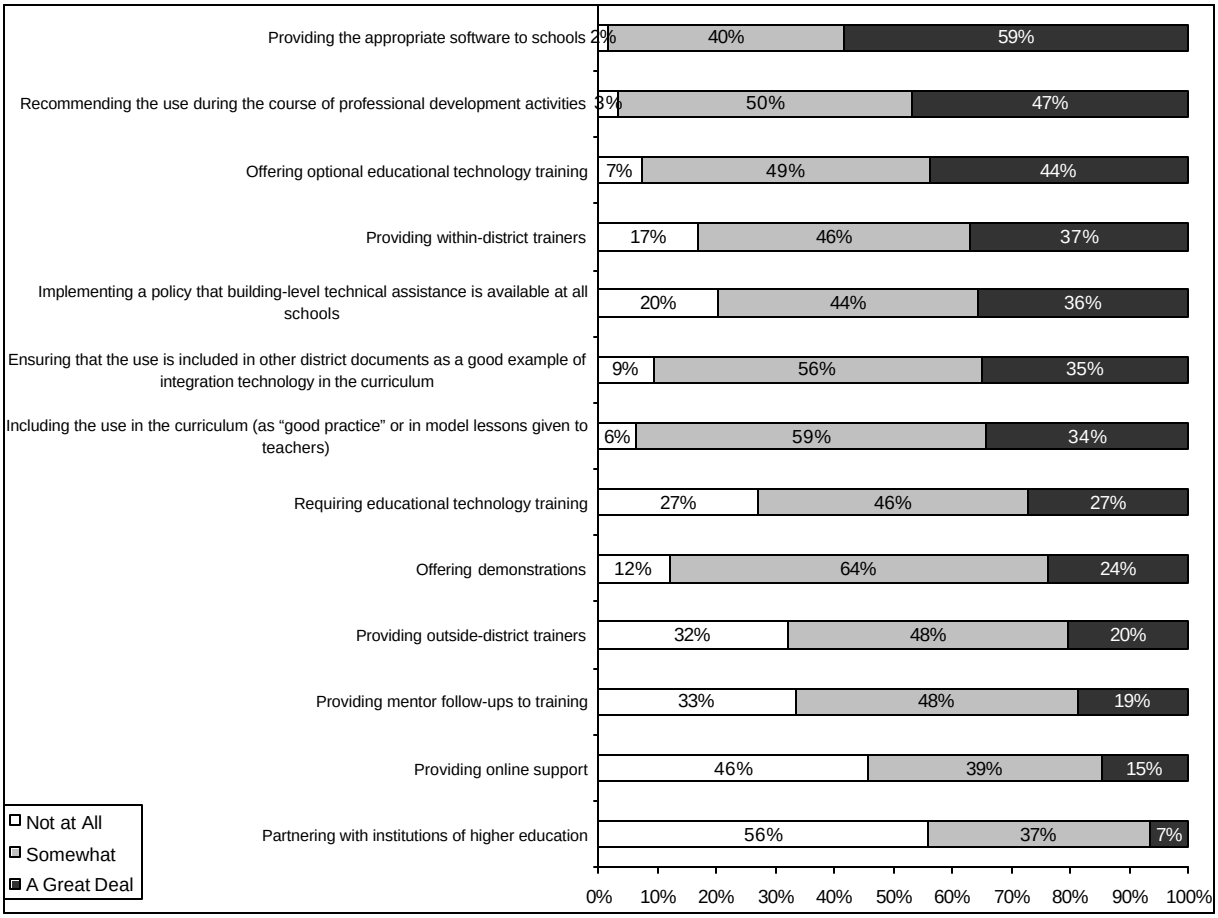
WISCONSIN
The Wisconsin Educational Communications Board has developed a wide variety of video and Web-based products, which are available to schools. All curricular materials are aligned to state standards. The WDPI has developed a standards matrix that aligns the core standards with the information and technology standards. The instructional media and technology team of WDPI provides workshops to assist schools with using this matrix effectively for curriculum development.

District leadership

The ISET Survey of District Technology Coordinators asked respondents to report the ways in which they promoted students' uses of computers. Districts employed a variety of approaches to supporting use. The most common (and nearly universal) strategy that school districts used to promote student uses of computers was providing software to schools. This is an interesting contrast to teachers' reports of lack of software being a barrier to their use of technology during instruction. Other common strategies were offering optional educational technology training, recommending the use during professional development activities, and including the use in model lessons or as examples of best

practice (see Exhibit VII-6). The least common strategies were partnering with institutions of higher education and providing online support.

Exhibit VII-6. Districts' methods for promoting various types of student uses of computers



High-poverty districts were much more likely to "include the use (of technology in that manner) as a good example in district documents" and to require educational technology training. Similarly, high-poverty TLCF districts were more likely to provide within-district trainers. No significant differences emerged by district locale or size in the strategies that districts used to encourage student use of technology.

State and district technology standards

Teachers in districts and states that had either teacher or student technology standards reported greater use of educational technology in their instruction. This was true

for both basic uses (e.g., for practice drills; for correspondence by means of e-mail or the Internet; as a reward) and advanced uses (e.g., to solve problems and analyze data; to produce multimedia reports and projects).

There were no significant differences between states that had and states that did not have technology standards for students in teachers' reports of students' basic skills in technology. However, teachers in districts that had technology standards for students were more likely to report that their students had mastered basic computer skills (94 percent) than did teachers in districts that did not have technology standards for students (87 percent).

Progress Toward Curriculum Integration and the TLCF

As described in the policies chapter, 87 percent of districts and 92 percent of schools reported that making software and online resources an integral part of every school curriculum was one of their technology goals.

As part of the ISET district-level survey, district technology coordinators reported on their educational technology goals and the progress that their districts had made on reaching their various technology goals. "Progress" was a general assessment made by the district technology coordinator with respect to the various technology goals held by the district. The question read, "What are the major goals of your district's technology initiatives and reforms? How much progress has been made toward achieving each goal?"

Making software and online resources an integral part of every school curriculum was a goal of 85 percent of districts; high-poverty districts (both TLCF and non-TLCF) and suburban districts were more likely than other districts to report this as one of their educational technology goals. Thirty percent of respondents noted that they had made "a great deal of progress" on goals related to making software and online resources an integral part of every school curriculum; an additional 62 percent of respondents reported that they had made "some progress" on this front. High-poverty districts (both TLCF and non-TLCF) were more likely than other districts to report having made progress on integrating technology into the curriculum. In addition, mid-sized and suburban districts were more likely than their counterparts to state that they had made "great progress" on their curriculum integration goals.

TLCF and integration of technology into the curriculum, 1997–2000

As part of the annual SPR, TLCF subgrantees reported on the status of their integration of technology into curricula. Specifically, TLCF subgrantees reported their status on the following scale:

- 1 = Effective and engaging software and online learning resources not in use in any core content areas
- 3 = Effective and engaging software and online learning resources in use in half the content areas
- 5 = Effective software and online learning resources in use in all core content areas

Subgrantees that reported a 4 or a 5 were placed in the "high" curriculum integration group, whereas subgrantees reporting 1, 2, or 3 were placed in a "lower" curriculum integration group. In FY2000, the same year as the ISET data collection, 46 percent of subgrantees were in the high curriculum integration group, which means that 46 percent of subgrantees reported that effective software and online learning resources were being used in more than half the content areas.

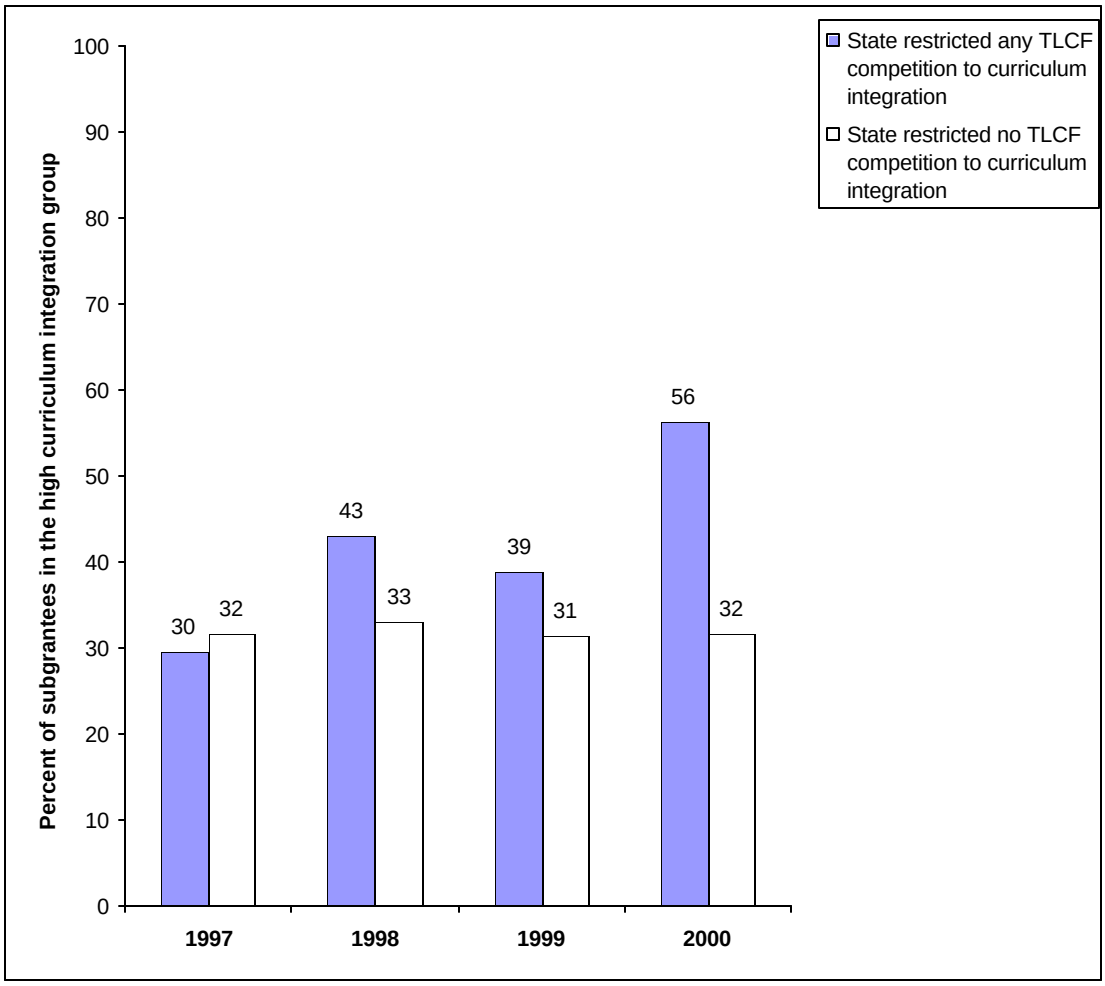
These figures must be interpreted with caution. Part of the difficulty in interpreting these data is that subgrantees reported end-of-year numbers, without providing baseline figures. Without knowing where each subgrantee began and when the subgrantee received funds, it is difficult to determine whether and when the TLCF funds had an effect on curriculum integration.

States' restrictions of use of TLCF funds and TLCF subgrantees' curriculum integration

As noted in Chapter 2, through their TLCF subgrant competitions, several states restricted uses of funds to the area of curriculum integration. As reported in Exhibit II-3, 18 states restricted one or more of their 1997 TLCF competitions to curriculum integration, and 23, 8, and 3 states placed the same restrictions during the 1998, 1999, and 2000 years, respectively.

Exhibit VII-7 shows the reported status of subgrantees in states that restricted competitions to areas of curriculum integration and the status of subgrantees in states that did not focus competitions on this area. In 1997, states that restricted TLCF competitions to

Exhibit VII-7. Percentages of 1997–2000 TLCF subgrantees in the high curriculum integration group, by state TLCF competition restrictions



curriculum integration had relatively fewer subgrantees in the high integration group (i.e., subgrantees where effective and engaging software and online learning resources were in use in more than half the content areas). The reverse was true in the subsequent years, 1998 to 2000: there were more subgrantees in the high curriculum integration group within states that restricted TLCF competitions to curriculum integration. [tgd33]

Subgrantee primary use of TLCF funds for curriculum integration

As noted previously, hardware and professional development were the main areas targeted by TLCF subgrantees. In FY2000, just over 12 percent of subgrantees reported using at least 25 percent of their TLCF funds for curriculum integration (i.e., software and

online resources). This figure varied across states, ranging from zero to 70 percent, with the median at 7 percent.

Use of at least 25 percent of TLCF funds for curriculum integration was not substantively related to percentages of subgrantees in the high curriculum integration group. For those that used at least 25 percent of their TLCF funds for curriculum integration, 56 percent fell into the high curriculum integration group, compared to 59 percent in the high curriculum integration group for those that used their TLCF funds for other purposes.

Summary

The results of this broad review of teachers' uses of technology indicate that teachers used technology in rather limited and circumscribed ways. Basic forms of software, such as word processors, tutorials, and browsers, were most commonly used, and they were typically used for less complex instructional goals, such as general computer skill improvement, as a reward, or for drills. In using technology for professional activities, teachers tended to use technology for essential functions, such as record keeping or creating handouts or tests. The pattern of uses reported here is consistent with what was reported in the previous two chapters. That is, teachers reported that they felt ill prepared to use technology in instruction (see Chapter 5) and that the technical support in integrating technology into lessons was not available (see Chapter 6). If teachers lack fluency in technology, it is not surprising that their uses of technology are rather limited. More details on teachers' use of technology are presented in the *ISET Professional Development and Teachers' Use of Technology* report.

The pattern of results discussed in the key issues chapters (Chapters 4–7: access to technology, professional development, technical support, and uses of technology) follows the general technology implementation model. That is, the first stage of technology implementation has been set: greater numbers of computers and Internet connections are available, and greater numbers of teachers are participating in professional development in educational technology. However, the second stage, where technology is integrated into the curriculum, has yet to be accomplished: teachers still lack technical support in developing lessons that use technology and, therefore, are unable to capitalize fully on the educational potential of technology.

Chapter 8. Conclusions

The ultimate goal of all educational technology programs is to integrate technology into instruction in ways that improve teaching in learning. To accomplish this goal, technology must be available and current, teachers must be trained in its uses, and technical support must be available not only to provide and maintain equipment, but also to support the use of technology in classroom teaching and learning. The late 1990's marked a period when states and districts were actively working to increase access to technology and to integrate technology into the curriculum. The TLCF program provided grants to support efforts to use educational technology to improve teaching and learning.

The data collected through the Integrated Studies of Educational Technology (ISET) surveys and TLCF annual program reports indicate that states varied widely in how they used TLCF funding to support local educational technology initiatives. Although there was substantial similarity in the priorities represented in state educational technology plans, TLCF implementation differed across states, reflecting differences in existing state infrastructure and policy environments and in the availability of other funding sources (e.g., E-Rate). States differed in whether and how they focused TLCF competitions to particular uses (e.g., computer access; professional development) and in how they awarded subgrants to districts. The absolute size of subgrants and size of subgrants on a per-pupil basis not only varied across states but also across years within a single state. As the TLCF appropriations grew from 1997 to 2000, states typically expanded the proportion of districts receiving subgrants.

The TLCF program did appear to be implemented effectively, at least in terms of the following elements of process:

- TLCF funds were *targeted* to high-poverty and high-technology-need districts. States typically used eligibility for free and reduced-price lunch to determine poverty and technology counts data to determine technology need. The lesser availability of technology and greater numbers of technology-related barriers reported by teachers and schools in high-poverty TLCF districts indicated that funds were targeted appropriately.
- States provided a wide range of *technical assistance* to TLCF applicants, which was generally found useful and informative. Technical assistance was delivered in a variety of ways, including personal assistance (e.g., district visits; feedback

on technology plans) and information resources (such as email and web-based materials).

- The program *flexibility* allowed each state to tailor its subgrant competitions to state-defined priorities, so that states were able to respond to local needs and make progress toward goals articulated in state plans.
- Program flexibility also allowed districts to use TLCF funds to make progress toward district technology goals. TLCF funds went toward a diversity of uses, including hardware, connectivity, professional development, maintenance and technical support, and software and online resources. Districts often used partnerships to help coordinate and leverage additional sources of technology funds.

Data from the ISET state, district, school, and teacher surveys indicate that that as of the 1999–2000 school year, educational technology is generally available, although there are disparities in the quality and usefulness of computer hardware and software across school districts. The availability of technology in TLCF districts is comparable to those in other districts, but teachers' reports suggest that available computers were not necessarily modern, and Internet connections were not necessarily reliable. Differences in access were also evident with respect to teachers' reports of their students' access to technology outside of school.

As a source of funding for educational technology initiatives, the Technology Literacy Challenge Fund (TLCF) contributed to greater levels of technology access and training reported by districts, schools, and teachers. However, the surveys indicate there were additional needs for professional development and support for the use of technology in the classroom and that most of these needs cut across all types of school districts. The majority of teachers still did not regard themselves as technologically fluent and desired additional support in integrating technology into their instruction. Teachers' reports of how they used technology in the classroom indicated that use of technology tended to be more basic than advanced (particularly among teachers in high-poverty districts).

The specific contribution of the TLCF to the current status of technological availability (or changes in educational technology) is difficult to determine because many factors (e.g., state technology initiatives) were operating during the same 1997–2000 period to enhance the availability and use of educational technology. In addition, the program supported a diverse range of activities (e.g., improving connectivity, providing professional

development) across different levels of schools, so it is difficult to identify unique outcome measures that would generally measure program impact. The TLCF was also often used to supplement or to help leverage funds or equipment from other sources, and subgrantees were encouraged to use TLCF funding to leverage other sources of funds. Many subgrantees pursued specific program activities by combining TLCF support with state technology funds, E-Rate subsidies and discounts, and partnerships with businesses or institutions of higher education.

Although it is difficult to measure specific effects in a program such as the TLCF that supported a broad range of initiatives, many subgrantees did describe how they believed the program had affected their ability to better use educational technology. Examples of these reports follow:

> *Without this grant we would not have been able to take the steps we have to bring out students and community into the world of technology. We are a rural, farming district and simply would not have spent district tax dollars for technology.*
>
> *Within our very poor school corporation, we had little prospect of keeping pace which our neighboring schools in terms of our ability to purchase high quality, appropriate technological applications. We are now on a track to keep our students competitive with their peers in terms of our ability to purchase high-quality, appropriate technological applications. We are now on a track to keep our students competitive with their peers in terms of acquiring technology skills. Places and people to whom we previously had no conceivable access are now at our fingertips through the Internet.*
>
> *The key to effective technology utilization is giving the teachers what they need most: the time to become comfortable with the technology and the insights in which to fully realize its potential in the classroom. Thank you so much for this opportunity. You have not only given us the chance to get teachers acclimated to the technology but you have truly given them the platform to teach differently. Thank you for your program and especially, acting as an agent for reform. Effective technology utilization has become our catalyst for impactful change and increasing academic achievement.*

Such comments indicate that at least for some subgrantees, TLCF funding supported initiatives for instructional use of technology that might otherwise not have been undertaken or enhanced the scale or scope of these initiatives. TLCF funds complemented existing funding streams, such as Title I, E-Rate, and state programs, providing targeted resources to help catalyze access and effective use of educational technology.

As the Educational Technology State Grants Program proceeds, these findings suggest that flexible, technology-focused programs can support the use of educational technology. However, given the flexibility and blending permitted by the new program, care will be needed in future evaluations to define and measure the program's effects to accurately determine the program's impact on teaching and learning in our nation's schools.

APPENDIX A

TLCF Allocations by State, FY 1997–2001

STATE	FY 1997	FY 1998	FY 1999	FY 2000	FY2001	TOTL
Alabama	3,536,029	6,767,676	6,977,507	6,761,395	7,016,251	31,058,858
Alaska	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
Arizona	2,772,006	6,403,705	6,290,730	6,349,707	6,759,013	28,575,161
Arkansas	2,113,832	4,050,741	4,177,712	4,155,152	4,402,591	18,900,028
California	20,568,622	46,549,397	45,942,372	49,833,809	55,910,034	218,804,234
Colorado	1,872,235	3,922,640	3,892,451	3,737,675	3,540,698	16,965,699
Connecticut	1,481,944	3,803,227	3,795,972	3,684,123	3,961,450	16,726,716
Delaware	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
Florida	7,901,240	18,631,872	18,519,414	19,174,306	21,615,810	85,842,642
Georgia	4,792,173	10,891,218	10,762,883	11,035,407	12,462,971	49,944,652
Hawaii	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
Idaho	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
Illinois	9,100,428	17,992,404	18,019,068	17,298,200	17,195,244	79,605,344
Indiana	3,085,379	6,162,855	6,321,150	6,142,228	6,224,264	27,935,876
Iowa	1,449,079	2,695,752	2,877,004	2,761,599	2,612,528	12,395,962
Kansas	1,487,041	3,037,380	3,035,302	2,932,445	3,041,404	13,533,572
Kentucky	3,525,385	6,949,329	7,059,516	6,776,628	6,903,567	31,214,425
Louisiana	5,348,827	10,272,812	10,592,292	10,167,918	10,086,672	46,468,521
Maine	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
Maryland	2,447,779	5,528,434	5,486,189	5,388,264	5,727,168	24,577,834
Massachusetts	3,424,955	8,115,371	8,076,491	7,935,186	7,859,733	35,411,736
Michigan	8,621,429	18,215,451	18,069,513	17,401,424	17,714,845	80,022,662
Minnesota	2,321,232	4,888,611	4,801,542	4,604,715	4,361,266	20,977,366
Mississippi	3,511,568	6,696,008	6,903,692	6,627,314	6,378,138	30,116,720
Missouri	3,246,535	7,002,554	6,972,362	6,980,860	7,464,334	31,666,645
Montana	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
Nebraska	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
Nevada	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
New Hampshire	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
New Jersey	3,954,548	8,969,777	8,929,639	9,094,025	9,462,864	40,410,853
New Mexico	1,671,215	3,516,603	3,458,675	3,480,502	3,887,966	16,014,961
New York	17,313,404	37,787,905	37,580,311	38,534,228	42,421,720	173,637,568
North Carolina	3,693,671	7,698,246	7,700,987	7,738,808	8,878,706	35,710,418
North Dakota	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
Ohio	8,504,025	16,650,418	16,576,794	15,918,779	15,183,430	72,833,446
Oklahoma	2,357,624	4,787,553	4,806,262	5,014,310	5,476,241	22,441,990
Oregon	1,894,570	3,785,276	3,773,798	3,623,745	3,640,779	16,718,168
Pennsylvania	8,617,078	18,328,348	18,326,060	17,679,471	17,847,681	80,798,638
Rhode Island	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
South Carolina	2,596,840	5,107,330	5,209,756	5,244,846	5,858,834	24,017,606
South Dakota	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
Tennessee	3,457,692	7,184,544	7,123,515	6,991,296	7,011,388	31,768,435
Texas	16,339,913	35,344,118	34,944,672	35,170,428	38,333,996	160,133,127
Utah	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
Vermont	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
Virginia	2,851,387	6,155,251	6,090,035	6,119,482	6,812,166	28,028,321
Washington	2,800,894	6,112,694	5,999,333	5,759,388	5,627,085	26,299,394
West Virginia	1,975,565	3,973,755	4,063,186	3,899,015	3,939,681	17,851,202
Wisconsin	3,473,991	6,840,340	6,933,962	6,655,800	6,465,265	30,369,358
Wyoming	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
District of Columbia	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
Puerto Rico	7,139,865	13,930,405	14,534,853	13,952,522	15,164,217	64,721,862
Subtotal	***197,250,000***	***418,750,000***	***418,625,000***	***418,625,000***	***443,250,000***	***1,896,500,000***
American Samoa	240,930	509,392	505,192	505,192	544,030	2,304,736
Guam	234,542	477,433	491,913	267,794	289,345	1,761,027
Northern Marianas	114,340	270,923	267,794	491,913	490,401	1,635,371
Virgin Islands	410,188	867,252	860,101	860,101	926,224	3,923,866
BIA	1,000,000	2,125,000	2,125,000	2,125,000	2,250,000	9,625,000
Other Non-State Allocations	750,000	2,000,000	2,125,000	2,125,000	2,250,000	9,250,000
Subtotal	***2,750,000***	***6,250,000***	***6,375,000***	***6,375,000***	***6,750,000***	***28,500,000***
TOTAL ALLOCATION	***200,000,000***	***425,000,000***	***425,000,000***	***425,000,000***	***450,000,000***	***1,925,000,000***

APPENDIX B

Implementation Study of the TLCF Educational Technology State Grants Program: Methodology Report

This methodology report is divided into seven main sections: introduction, sampling methodology, recruitment and follow-up procedures, and archiving information. The introduction contains an overview of the study design, data sources, and instruments, whereas more details regarding sampling and administration are provided in the sections that follow. Information regarding obtaining copies of the surveys and data files is located at the end of this document.

Introduction

In response to the increasing investments in and concerns about educational technology, as well as to better understand the federal role in supporting technology in schools, the U.S. Department of Education (ED) commissioned three major studies, together known as the Integrated Studies of Educational Technology (ISET):

- Implementing the Technology Literacy Challenge Fund (TLCF) Educational Technology State Grants Program
- Professional Development and Teachers' Use of Technology
- A Formative Evaluation of the E-Rate Program

The TLCF implementation study, conducted by the American Institutes for Research (AIR), sought to answer the following questions:

- What is the status of state and district planning and leadership with respect to educational technology and what is the role of TLCF in these areas? What types of activities have TLCF funds supported?
- How are states and districts initiating and supporting the use and evaluation of educational technology?
- How is educational technology used and supported in schools and classrooms? How does use differ by local characteristics?

The multilevel, nested design of ISET allowed an examination of educational technology at the state, district, school, and classroom levels. ISET enables ED to provide policymakers and program managers with the information needed to inform future decision-making about federal investments in educational technology.

Study Design and Data Sources

ISET includes surveys of all state technology coordinators; a stratified, national probability sample of public school districts; a probability sample of schools nested within the selected district sample; and a probability sample of teachers nested within the school sample. This sampling design allows the analysis of interrelationships of policies and programs at all levels of the education system. The ISET strategy of linking surveys from multiple contractors is designed to enhance the evaluations of the TLCF, the E-Rate, and teacher professional development while reducing the burden on state, district, and school staff. ISET surveys supplement analyses of existing program data, reviews of technology plans, and case studies.

The primary sources of data for the TLCF implementation study were

- surveys of state and district technology coordinators;
- data from the school and teacher ISET surveys; and
- TLCF State Performance Reports.

Survey Development and Content

The ISET surveys were developed jointly between the Department of Education and the three contractors. The content areas for each survey were first established, and existing instruments and data sources such as Milken and Market Data Resources were examined for possible use. Although some items from other surveys were adapted for ISET, the vast majority of survey items were new, developed in an iterative, collaborative process between ED staff and the contractors. Because of the nested character of the ISET data collections, surveys were reviewed to ensure that parallel questions were being posed to different respondents, to enhance our ability to triangulate across multiple data sources. For example, states and districts were asked about technical assistance provided during TLCF competitions (to obtain the views of providers and recipients), and districts and schools were asked about their goals for educational technology (to gauge the coherence of technology planning across levels).

All surveys were pilot tested for content and length in July and August 2000. Data collection instruments and procedures were subsequently refined in light of feedback from pilot test respondents. That is, item wording was clarified, response options were

modified, and some items were deleted or added. The online versions of the state, district, E-rate, and school surveys were pilot tested in September and October 2000. The content and format of the surveys were then further refined, and data collection began in November 2000.

Content of Survey of State Technology Coordinators

This instrument consists of five sections and 55 items (because of skip patterns, respondents were not necessarily asked the full set of 55 items):

- **Section I. Statewide Infrastructure and Support** This section had to do with support for technology that is provided by the state, such as statewide networks, regional technology centers, and technical support. (14 items)
- **Section II. Standards, Assessments, and Integration of Technology** This section asked about how technology is being integrated in teacher education, student assessments, and curriculum standards. (21 items)
- **Section III. Technology Resources** This section focused on the sources, amount, and uses of technology funds in the state. Some of the information in this section was prefilled with data from the Department of Education to assist the respondent in reviewing and filling-in the requested information. (10 items)
- **Section IV. Evaluation of Educational Technology Initiatives** This section focused on the ways states are assessing the impact of their technology programs and initiatives. (9 items)
- **Section V. Respondent Comments and Feedback** (1 item)

The state survey, annotated with frequency counts of responses to each question, can be found in Appendix C. An electronic copy of this survey may be obtained at the ISET Web site, http://www.ed.gov/technology/iset.html.

Content of Survey of District Technology Coordinators

The original district survey consisted of nine sections and 79 items (because of skip patterns, respondents were not necessarily asked the full set of 79 items):

- **Section I. The Role of Technology in the District: Technology Planning** This section of the survey asked about the district's strategic vision for the use of educational technology. (17 items)
- **Section II. The Role of Technology in the District: TLCF Funding** This set of questions asked about the district's overall experience with applying for TLCF funds. Districts that never applied were not asked this series of questions. (7 items)

- **Section III. Technology Resources: Use of Funds for Educational Technology** These questions asked about how the district directed its technology resources. (5 items)
- **Section IV. Technology and Instruction: Professional Development and Technical Support** This section focused on the district's professional development and technical support initiatives. (15 items)
- **Section V. Technology and Instruction: Equipment Availability and Use** One of the items in this section used data from Market Data Resources to establish baseline equipment counts for districts. Districts were asked to review the data for accuracy and to provide information on current equipment availability and use. (3 items)
- **Section VI. Technology and Instruction: Use of Software and Online Resources in the Curriculum** These items asked districts how they promote different uses of software in their schools. (5 items)
- **Section VII. Technology and Instruction: Connectivity to Networks and the Internet** One of the items in this section used data from Market Data Retrieval to establish baseline connectivity counts for districts. Districts were asked to review the data for accuracy and to provide information on current connectivity to networks and the Internet. (10 items)
- **Section VIII. Evaluation of Technology Initiatives** This section focused on the ways the district was assessing the impact of its technology initiatives. (11 items)
- **Section IX. Respondent Background and Final Thoughts** This section asked district technology coordinators to provide some information about their training, background, and tenure at their current district. (6 items)

The critical items or core version of the district survey consisted of 23 items, culled from the original survey. The core district survey, annotated with frequency counts of responses to each question and weighted to the district population, can be found in Appendix D. To see both the original and the core versions of the survey, please visit the ISET Web site at http://www.ed.gov/technology/iset.html.

Content of Survey of School Principals

The original school survey consisted of nine sections and 70 items (because of skip patterns, respondents were not necessarily asked the full set of 70 items):

- **Section I. School Background Information** This section obtained background information about the school, including the type of school, number of instructional staff, total enrollment, and student demographic characteristics. (7 items)

- **Section II. Educational Technology Planning** This section asked about whether the school had a technology plan, how it was developed, technology schools, and any efforts to track progress against those goals. (7 items)
- **Section III. Resources for Educational Technology** Questions in this section focused on resources available to the school for educational technology, whether they applied for E-rate subsidies, and if not, why. (5 items)
- **Section IV. Equipment Availability and Use** This section collected information about the availability of technology in the school, how it is allocated to teachers and classrooms, barriers to the effective use of technology, and policies and practices in place to ensure the appropriate use of technology. (15 items)
- **Section V. Connectivity to Networks and the Internet** Questions in this section focused on school networking and access to the Internet. (4 items)
- **Section VI. Technical Support for Educational Technology** This section asked about access to technical assistance related to educational technology, sources used, and the adequacy of existing support. (6 items)
- **Section VII. Technology and the Learning Environment** This section asked about how technology is used for classroom instruction, efforts to support its use for instruction, and the perceived effect of technology on the school, teachers, and students. (11 items)
- **Section VIII. Teachers and Professional Development** This section included questions about the availability and use of professional development of teachers related to educational technology. (7 items)
- **Section IX. Respondent Background and Final Thoughts** This final section included questions about the characteristics of the respondent, his/her current expertise with technology, and final thoughts about the effect of technology on the school. (8 items)

The critical items or core version of the school survey consisted of a total of 14 items, culled from the original survey. To see both versions of the survey, please visit the ISET Web site, at http://www.ed.gov/technology/iset.html.

Content of Survey of Classroom Teachers

The teacher survey consisted of five sections and 60 items (because of skip patterns, respondents were not necessarily asked the full set of 60 items):

- Section I. Teacher Background (11 items)
- Section II. About Your School (10 items)
- Section III. Your Technology Use (7 items)

- Section IV. Technology-Related Professional Development Activities (19 items)
- Section V. Technology Use in Teaching (13 items)

To view the teacher survey, please visit the ISET Web site, at http://www.ed.gov/technology/iset.html.

Authorization

The Integrated Studies of Educational Technology were authorized for data collection by the Office of Management and Budget (OMB). The OMB numbers assigned for this research were OMB 1875-0179 and OMB 1875-0189.

Survey Administration: Overview

Data were collected during the period from late November 2000 to June 30, 2001. The state and district surveys were initially offered as online surveys only; the school survey was mailed out to respondents, with the option to complete the survey online or on paper. Because initial response rates from the district- and school-level respondents were low, survey administration for these samples followed a mixed-modes design, with respondents given the option to complete the survey online, on paper, or in a telephone interview. The teacher survey was administered only as a mail survey. Further details about administration are documented below in the ***Recruitment and Follow-Up Procedures*** section.

The ISET state, district, and school surveys were made available online through AIR's proprietary data collection system, Informant (now named Edoceon). Potential respondents were assigned userids and passwords, which were included in the notification and follow-up materials. Informant was accessed through a link made available on the Department of Education Web site. However, data collection was hosted on AIR servers. The Informant system uses active server page technology; accordingly, ISET data were saved on host servers and not within cookies on respondents' computers.

The initial mailing included a "Using the ISET Online System" manual. To assist respondents in using the system, two methods for obtaining help were available. A frequently asked question (FAQ) page provided answers to common issues and was

accessible from each page at the click of a button. Two toll-free telephone numbers (one for the district- and the other for the school-level data collections) and e-mail addresses were provided in all contact letters. The 800 numbers and e-mail addresses were also displayed at the beginning and end of each online survey, as well as in the FAQ page, so users had ready access to our technical support staff.

Once the respondents entered the Informant system, they were presented with the survey questions, formatted as table grids, memo fields, or pull-down menus, as appropriate. The content of the online surveys matched that of the paper surveys, but the presentation differed in certain sections to accommodate programming considerations (e.g., "trigger" questions had to be placed, in order to implement skip patterns). Respondents were able to navigate forward and back through the survey and had the option of printing out their responses at any time during a session.

The use of the online data collection system was, as a whole, successful. It provided an efficient and accurate means of gathering data, as demonstrated by the site statistics reported below. The majority of users was satisfied with the interface, although as with any system, some users experienced difficulties and required technical assistance. Users with slower connections were frustrated by the pace (regardless of the power of a server, a slow connection will still take longer). Statistics generated from WebTrends show that from December 1, 2000, to June 30, 2001:

- Fewer than 1 percent (0.64%) of logons failed (75 out of 11,802 login attempts).
- Once logged on, just over 1 percent (1.49%) experienced connection failure.
- The overwhelming majority (99.95%) of forms submitted were successful (i.e., each page of a survey is a "form").
- 82.51% used MS Internet Explorer (88.89% of which used version 5.x).
- 16.5% used Netscape (95.48% of which used version 4.x).
- The remaining 1% used other browsers such as MS Front Page or MS Proxy.

For additional technical information about Informant/Edoceon, please contact Andrew Cullen, Senior Systems Analyst, at acullen@air.org.

Sampling Methodology

Strata

Sampling began with the selection of districts. We used the 1997–1998 Common Core of Data Agency File as the sampling frame. Only the districts in the 50 states and the District of Columbia, and those defined as "regular"[33] were included in the sampling frame, resulting in a total N of 14,427 districts. The universe was then validated against NCES's *Overview of Public Elementary and Secondary Schools and District: School Year 1997-98, NCES 99-322* from May 1999.

Data on the E-Rate recipiency of each district were developed as part of a separate ISET analysis of E-Rate administrative data[34] and ED provided administrative data on receipt of TLCF funds. Poverty data were also provided by ED, using Census data and 1994–1995 NCES codes. Missing values for poverty were imputed using predicted values from an OLS regression model.[35]

The districts were divided into six superstrata, on the basis of their E-Rate and TLCF status and their poverty status. Superstratum 6 was selected first, to be composed of the 60 largest districts with an urbanicity of "large central city." Superstrata 1 through 5 are defined as follows:

Exhibit B-1. ISET sampling strata

	E-Rate		Non-E-Rate	
	TLCF	Non-TLCF	TLCF	Non-TLCF
High-poverty districts	2	3	1	
Districts in other poverty levels	4	5		

[33]Districts that had enrollment=0, that were not located in 50 states and DC, or that were not a "regular" school district were removed from the district sampling frame. "Regular" school districts were those designated as an "Independent Local School District" or a "Union Component Local School District" by NCES. "Supervisory Union Administrative Centers," "Regional Education Service Agencies," "State-Operated Institutions," "Federally-Operated Institutions," and "Other Education Agencies" were not included in the sampling frame.

[34]Puma, M., Chaplin, D., & Pape, A. (2000). E-Rate and the Digital Divide: A Preliminary Analysis from the Integrated Studies of Educational Technology. Washington, D.C.: U.S. Department of Education.

[35] District poverty is based on 1990 U.S. Census data. To predict district poverty we used data on the fraction of students in the district eligible for free or reduced-price lunches, the fraction minority, the urban location of the district, and district size.

Selection of Districts

Districts were selected with probabilities proportional to the size of the district. The district measure of size is simply the quantity (total enrollment for the district divided by the total enrollment for the superstratum in which the district falls) multiplied by the number of districts selected in that superstratum. That is, the district MOS is

$$\Pr(district_l \mid superstratum_k) = \frac{c_k \times district\_total_l}{superstratum\_total_k}$$

Weights

Weights for an estimated total number of districts, schools, and teachers are simply the inverse of the probability of selection at each level. Weights for the total number of students in a district are the product of the district enrollment and the inverse of the district measure of size. Because the *Survey of State Technology Coordinators* involved such limited numbers of respondents, no weights or nonresponse adjustments were made for this data set.

The district nonresponse weight that weights up to the student population was computed as follows. First, we calculated the response rate within each sampling stratum. Next, we adjusted the probability of selection by the response rate by multiplying the response rate by the probability of selection. For example, if the response rate is 80 percent for a stratum and the probability of selection of a district is 0.9, the adjusted probability of selection is (0.8)(0.9) = 0.72. The weight for this district is (1/0.72) rather than (1/0.9). The weight adjusted for nonresponse is larger than the unadjusted one.

Because districts were selected by probability proportional to size, the weight that we computed to weight to the number of districts does not recover the district population of 14,000+, but does recover the sum of the district weights (we would then assume this sum is the district "population"). The district nonresponse weight that weights to the district "population" was computed in the following manner. Within each stratum, we summed the district weights to obtain a total (Y). Next, we summed across the weights of the districts that responded within the stratum (X). The response rate within the stratum was calculated as X/Y, and the adjusted weight therefore, 1/(X/Y).

Response rates for districts in the certainty sample (of large urban districts) were computed in a slightly different way, because the certainty sample districts are self-representative of districts. Response rates for these districts were calculated by dividing [the total number of students in the certainty sample districts that responded] by [the total number of students in the certainty sample of districts]. For example, if there are five districts in the certainty sample, the number of students in those five districts is A. If only three of those five districts respond, the number of students in the three districts is B. The response rate is computed as (B/A). The adjusted weight is therefore 1/(B/A).

AIR used Stata to compute the standard errors associated with the results presented in the district analyses. Stata uses a Taylor series procedure to produce standard errors that account for the survey's complex sampling design. Taylor series procedures produce error terms that are consistent with those created using jackknife replication procedures and are consistent with the standards for variance estimation specified in NCES Statistical Standards, while being computationally more efficient than jackknife procedures.

School and Teacher Samples

For additional information on how schools and teachers were sampled and weighted, please refer to the ISET reports, *A Formative Evaluation of the E-Rate Program* and *Professional Development and Teachers' Use of Technology*.

Recruitment and Follow-Up Procedures

The recruitment and follow-up procedures used in the ISET studies were tailored to meet the needs and characteristics of potential respondents. We followed principles of Dillman's Tailored Design Method[36] to plan our notification and contact strategies and to construct the online survey interface. To help maximize our response rates, we offered incentives to all but the state technology coordinators. These methods are described below.

[36]Dillman, D.A. (2000). Mail and Internet Surveys: The Tailored Design Method. New York:Wiley.

Recruitment of State Technology Coordinators

The state technology coordinators of all 50 states and the District of Columbia were asked to complete the *Survey of State Technology Coordinators*. Initial notification letters from the Department of Education (signed by Linda Roberts and Patricia Gore) were sent in late October 2000, with an informational brochure about ISET enclosed.

Approximately two weeks later, state personnel were mailed a packet containing

- a cover letter signed by AIR staff;
- login information;
- a user's guide to the ISET online system;
- a document request form; and
- a prepaid Federal Express return mailer.

The state technology coordinators were asked to

- complete the online Survey of State Technology Coordinators;
- provide copies of TLCF requests for proposals (RFPs) for all competitions held during the 1997–1998, 1998–1999, and 1999–2000 years;
- provide lists of awarded and non-awarded applicants; and
- provide a copy of the current state technology plan.

A list of districts and schools sampled within the state was also enclosed, and state technology coordinators were asked to encourage responses to the ISET data collection initiative. State technology coordinators were sent follow-up letters by AIR in early January 2001, and were contacted several times in the subsequent months by Charles Lovett, the TLCF Program Coordinator. Because such a small number of people were involved at the state level, contacts were made either as a group, using the TLCF listserv or individually, through personal e-mails and telephone calls.

The majority of states provided us with all the materials requested; several states never responded, and others replied to our document request but did not do the online survey. Ultimately, 46 (45 states and the District of Columbia) of the 51 state technology coordinators completed the online survey. Partial data were collected from two additional states. The TLCF competition and subgrantee data that were obtained were coded and used to supplement data from the State Performance Report (SPR) system.

Recruitment of District Technology Coordinators

A stratified probability sample of 1,061 districts was drawn, according to the procedures described in the sampling section above.[37] Names and contact information (address and telephone number) were obtained from Market Data Resources (MDR) and used to personalize the correspondence to potential respondents.

The initial notification letter, as with the state technology coordinators, was printed on Department of Education letterhead (signed by Linda Roberts and Patricia Gore) and mailed in late October; a copy of the ISET brochure was also enclosed. The survey packet followed about two weeks later, in mid-November. We mailed the packet via Federal Express to districts with street addresses and via the U.S. Postal Service for districts with P.O. Box addresses. Each packet contained

- a cover letter with login information;
- a Rolodex card with the login information;
- a user's guide to the online system; and
- a list of schools that were sampled from the district (if any).

Districts were asked to complete the *Survey of District Technology Coordinators* and to encourage schools that were sampled from their district to participate in ISET. A $40 Amazon.com gift certificate was sent to each respondent who completed a district survey.[38]

Because of the timing of the request, initial response rates were quite low. The survey packet arrived at district offices during the holiday season (prior to Thanksgiving), with the request that the survey be returned by December 31. The work surrounding the busy holiday season precluded many district technology coordinators from responding to our requests. Reminder postcards from AIR were sent on December 8 and on January 2, but had little impact on our response rates (see Exhibit B-2). January also proved to be a less than optimal time for a survey request because the labor-intensive E-Rate

[37]Although Hawaii and the District of Columbia were drawn into our sample of 1,061, we decided to treat these as states instead of districts, to limit the burden on respondents. In addition, because of duplicates later found, the sample drawn dropped slightly, to 1,057 districts.

[38]At the end of the district survey, each respondent was asked to provide an e-mail address where the gift certificate code could be sent. Providing the gift certificates this way decreased the cost and labor involved in this portion of the ISET study.

applications, which were due late in the month, were of higher priority than our survey request.

AIR began calling districts on January 22, to remind them of the study and to ask that they log into the system and complete the survey. This follow-up extended several weeks, because the data we had obtained from MDR had many instances where the district technology coordinator had changed or the telephone number was incorrect and required Internet directory searches. District technology coordinators were also difficult to reach; contacting them entailed multiple telephone calls, once the correct contact information was ascertained.

Because we had less than a 30 percent completion rate at the end of February, we conducted another mail-out. Our next follow-up consisted of the following:

- A letter from the Department, on ED stationery, signed by Alan Ginsburg, in which respondents were given their login information once again and asked to complete the district survey.
- A prepaid Federal Express mailer was enclosed to facilitate the return of the district technology plan requested.

State technology coordinators were also enlisted in boosting our response rates. When state technology coordinators were followed-up at the end of February, the TLCF program office also asked them to assist in increasing participation rates at the district and school levels. We enclosed copies of district and school response rates for each state and asked the state technology coordinators for any assistance they could offer. Also, at the end of March, the state technology coordinators of the seven states with the highest numbers of nonrespondents (Arizona, California, Georgia, Illinois, New Jersey, New York, Texas) were contacted once again by the TLCF program office coordinator, Chuck Lovett, to help in encouraging districts to participate in ISET.

By the end of April, our district completion rate was at 46 percent (N = 486), with an additional 22 percent of the district sample (N = 232) having logged on to the system but not completed the survey. Our reviews of the user comments had shown that many of the respondents complained about the length of the survey. Although our pilot work had shown that the online survey was averaging approximately two hours to complete, our online statistics indicated that the time ranged from half an hour to several hours. A

district that was decentralized or had a relatively new district technology coordinator would find completing our survey more time-consuming and difficult than one where the district technology coordinator had been there for several years and who centrally administered different aspects of technology (e.g., curriculum integration, professional development, technical support).

Accordingly, a critical item version of the *Survey of District Technology Coordinators* was developed in early May. On May 18, we mailed to each nonrespondent district a packet containing the following:

- A letter on ED stationery, signed by Alan Ginsburg, requesting that they complete the district survey.
- A hard copy of the critical item version of the Survey of District Technology Coordinators. Respondents were given the option of filling out the survey by hand, or logging on to the website and completing it online (login information was provided in a label located in the inside cover of the survey).
- A prepaid Federal Express mailer to use in returning the survey if completed by hand.

We chose to offer the mail survey option because one of the limitations of an online survey is that the respondent is not able to leaf through the survey pages and have an immediate sense of the relevance and importance of the survey content. This skimming-through option can provide motivation to complete the survey; with the online survey, the respondent would have to first have the motivation to log on and only then might be further motivated by interest in the survey content.

As Exhibit B-2 indicates, we did get surges in our response rates after the two follow-ups that involved a signed letter from a Department of Education official. When the response rates reached a plateau at the beginning of June, AIR began telephoning districts and requesting that they complete the survey via telephone interview. AIR's attempts to actively contact respondents ended on June 29, when OMB clearance expired; we did, however, continue to accept any surveys that arrived in the mail through the end of July. Ultimately, we achieved a completion rate of 72.2 percent (N = 763). If incomplete surveys are included in the total, our final response rate reached 82.7 percent (N = 874). A breakdown of response rates by district characteristics is provided in Exhibit B-3.

Exhibit B-2. Response rates for district technology coordinator survey

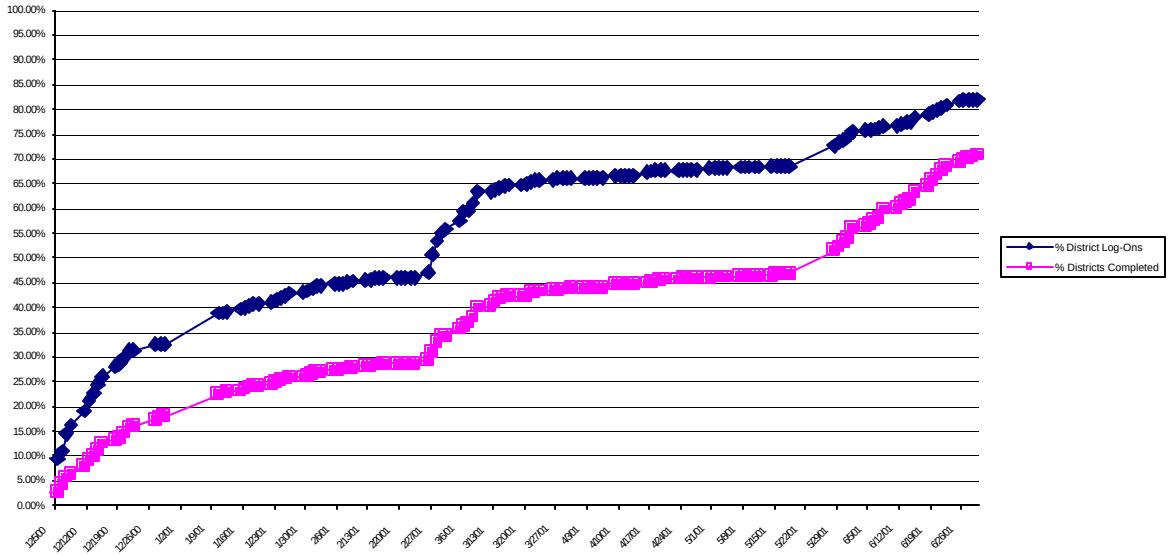


Exhibit B-3. ISET state and district survey response rates

	Number sampled	Number completed	Response rate
Survey of District Technology Coordinators	51	46	86.3%
Survey of District Technology Coordinators	1057[39]	763	72.2%
District poverty level			
High poverty (upper 25th percentile of children living in poverty)	263	189	72.9%
Not high poverty (lower than 75th percentile of children living in poverty)	794	574	72.3%
District Size			
Small districts (less than 1,675 students)	152	114	75.0%
Mid-sized districts (1,675 – 5,262 students)	313	229	73.2%
Large districts (more than 5,262 students)	592	420	70.9%
District Locale			
Rural	475	349	73.5%
Suburban	303	213	70.3%
Urban	279	201	72.0%
District TLCF Status			
TLCF recipient	564	415	73.6%
Non-TLCF recipient	493	348	70.6%
Sampling Strata			
Stratum 1: Non-E-Rate	125	88	70.4%
Stratum 2: High poverty, TLCF and E-Rate recipient	249	196	78.7%
Stratum 3: High poverty, non-TLCF, E-Rate recipient	187	135	72.2%
Stratum 4: Not high poverty, TLCF and E-Rate recipient	249	174	69.9%
Stratum 5: Not high poverty, TLCF and E-Rate recipient	188	136	72.3%
Stratum 6: Large, high poverty, urban, TLCF recipient	59	34	57.6%

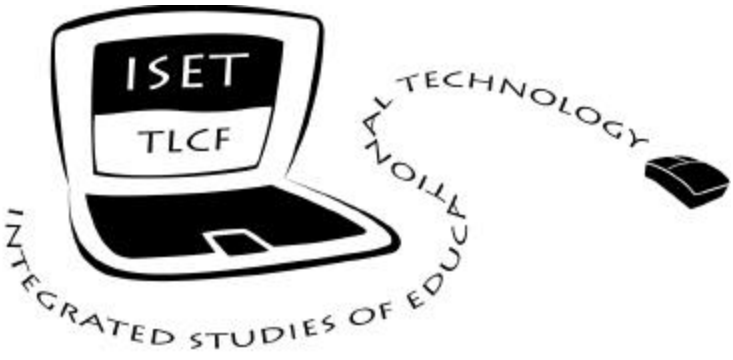
[39] Although 1,061 districts were sampled initially, the District of Columbia and Hawaii were taken out of the district sample and instead treated as states. Two additional districts were deleted because they were duplications of districts already in among those sampled.

Archiving Information

ISET data files and associated documentation may be obtained by writing to the Department of Education. The documentation includes information regarding variable names, variable labels, value labels, missing data codes, and sampling weights. These materials also include detailed descriptions of other procedures done to prepare the file, such as edits performed to clean the data, imputations and recodes performed, and how variables were computed (e.g., summated scales and results of reliability analyses). Survey instruments and documentation for the data are available as MS Word and .pdf files. Data files are available in text-only (ASCII) and SAS formats.

APPENDIX C

State Survey With Frequencies



INTEGRATED STUDIES OF EDUCATIONAL TECHNOLOGY

WWW SURVEY OF STATE TECHNOLOGY COORDINATORS

Fall 2000

PLEASE NOTE:
THE ONLINE VERSION OF THIS SURVEY IMPLEMENTS SKIP PATTERNS THAT GUIDE THE RESPONDENT TO THE APPROPRIATE SERIES OF QUESTIONS.
BECAUSE OF THIS AND OTHER PROGRAMMING CONSIDERATIONS, THE ONLINE VERSION WILL *LOOK DIFFERENT* FROM THIS HARD COPY OF THE STATE SURVEY, BUT WILL HAVE THE SAME CONTENT.

American Institutes for Research
1000 Thomas Jefferson Street, NW
Suite 400
Washington, DC 20007
1-888-944-5001 (Select Option 3)

A project of t he Department of Education, Planning and Evaluation Services.

This project is being conducted under Title III of PL 103-382 and the Telecommunications Act of 1996. While you are not required to respond, your cooperation is needed to make the results of the study comprehensive, accurate and timely. The information you provide is being collected for research purposes only and will be kept strictly confidential.

O.M.B. NO. 1875-0179 ? Approval Expires 06/30/2001

Section I. State-wide Infrastructure and Support

This section has to do with support for technology that is provided by the State. We are particularly interested in Statewide networks, regional technology centers and technical support. Please tell us about the support structures related to educational technology that your State has implemented.

1. Does the State Department of Education or other State agency provide a Statewide electronic network linking districts in the State?[40] (The number of states responding to this item was 48.)

14 No

5 A Statewide electronic network is currently being constructed.

29 Yes. If so, please estimate the following numbers:

What do you estimate to be the number of:	NONE (0%)	SOME (1-25%)	A MODERATE NUMBER (26-50%)	MOST (51-75%)	ALL OR ALMOST ALL (76-100%)
...districts connected to the network	0	1	0	4	23
...schools connected to the network	2	1	1	4	20

2. Is this network shared with any of the following entities? (The number of states responding to these items was 28, out of 29 who were routed to this item.)

Is the network shared with:	YES	NO
…the higher education community?	18	10
...museums?	6	22
...public libraries?	13	15
...other government agencies?	16	12
...telecommunication industries?	2	26
...other commercial/private enterprises?	3	25
Other. Please specify:		

[40] If the answer to Q1 is "No" the respondent will be automatically taken to Q5, and not asked Q2-4.

3. Does the network provide districts and/or schools with high-speed connections (i.e., 1.5M/T1/DS1 or higher) to the Internet? (The number of states responding to this item was 29, out of 29 who were routed to this item.)

2 No

27 Yes. If so, please estimate the percentage of districts and schools that have these high-speed connections:

	NONE (0%)	SOME (1-25%)	A MODERATE NUMBER (26-50%)	MOST (51-75%)	ALL OR ALMOST ALL (76-100%)
Districts	0	1	2	4	18
All Schools	1	1	6	7	10
Elementary schools	2	4	2	9	8
Middle/junior high schools	1	3	4	6	11
High schools	1	0	5	5	14

4. Does this network provide districts and/or schools with discounted connections to the Internet? (The number of states responding to this item was 29, out of 29 who were routed to this item.)

3 No

26 Yes. If so, please estimate the percentage of districts and schools that are taking advantage of these discounted connections:

	NONE (0%)	SOME (1-25%)	A MODERATE NUMBER (26-50%)	MOST (51-75%)	ALL OR ALMOST ALL (76-100%)
Districts	0	0	1	3	21
All Schools	1	0	3	3	17
Elementary schools	1	1	2	5	15
Middle/junior high schools	1	1	2	4	16
High schools	1	0	2	3	18

5. Does the State Department of Education or other State agency contribute to make distance learning technology available to districts (e.g., pay for or subsidize installation or ongoing costs)? (The number of states responding to these items was 46.)

Type of distance learning technology	Funding for this supported by State?		If yes, please estimate the percentage of districts that receive this form of distance learning technology:
	YES	NO	
Two-way audio and video	31	15	mean: 44.8%
Two-way audio, one-way video	20	26	mean: 43.6%
One-way live video	23	23	mean: 51.9%
One-way pre-recorded video	26	20	mean: 62.8%
Two-way audio	16	30	mean: 47.9%
One-way audio	13	33	mean: 59.4%
Two-way online (Web-based)	30	16	mean: 49.0%
Other. Please specify:			mean: 9.0%

6. Has the State implemented any of the following programs or guidelines related to educational technology? (The number of states responding to these items was 46.)

State program or guideline:	YES	NO
A State-wide program that provides administrative or data systems to school districts (e.g., fiscal databases, student assessment results)	35	11
A consortium purchasing program (group buys) for hardware	29	17
A consortium purchasing program (group buys) for software	28	18
A consortium purchasing program (group buys) for online services, other than E-Rate	15	31
Guidelines for technology-related facility design features for new school buildings 15 These guidelines are mandatory 13 These guidelines are suggested	28	18
Guidelines for technology-related facility design features for existing school buildings 7 These guidelines are mandatory 19 These guidelines are suggested	26	20
Technology-related standards for district accreditation	11	35
Technology-related standards for school accreditation	10	36
Guidelines for equipment (e.g., CPU speed, minimum RAM/ROM configurations)	22	24
Guidelines for software (e.g., type of content; frequency of updates)	11	35
Guidelines for connectivity (e.g., speed, type, or number of connections to the Internet)	24	22
Districts required to have technology plans	42	4
Other. Please specify:		

7. Does your State have a formal, long-term plan for general professional development of teachers (either stand-alone or integrated into another document)? (The number of states responding to this item was 46.)

29 Yes
14 No
3 Don't know

8. To what extent does it specifically address professional development related to technology? Please select one:[41] (The number of states responding to this item was 29, out of the 29 that were routed to this item.)

4	Not at all discussed
6	Discussed briefly
11	Discussed in some detail
8	Discussed in great detail
0	Don't know

9. Is there a Statewide initiative related to teacher professional development in educational technology? If so, please describe the initiative briefly (2-3 sentences). Please provide the name of a contact person and/or a URL if the document is available online.

_____

_____

_____

10. Please tell us about what your State is doing to increase teachers' ability to make effective use of educational technology. If you are using a particular method, please indicate how much of a factor it is in the State's efforts to provide professional development specific to technology during the past year (July 1999 – June 2000): (The number of states responding to these items was 46.)

Method used in the state for increasing teachers' ability to effectively use educational technology:	WAS THIS TYPE OF METHOD USED?			IF USED, HOW MUCH OF A FACTOR IS THIS METHOD IN YOUR STATE'S EFFORTS TO PROVIDE TECHNOLOGY-RELATED PROFESSIONAL DEVELOPMENT?		
	YES	NO	DON'T KNOW	NOT A FACTOR	MINOR FACTOR	MAJOR FACTOR
Partnering with institutions of higher education	45	1	0	2	19	24
Partnering with a business or group of businesses	37	4	5	2	23	12
Partnering with an organization that provides volunteer trainers	26	14	6	2	19	5
Contracting with a software vendor or other for-profit company that provides professional development in the use of technology in instruction. Please specify vendor_____	24	19	3	5	14	5
Supporting opportunities for teachers to collaborate with peers, share lesson plans and information related to educational technology via the Internet or other telecommunications.	45	1	0	3	12	30

[41]Q8 will be asked only if the answer to Q7 was "Yes." If the answer to Q7 was "No" or "Don't Know" the respondent will be automatically taken to Q9.

Method used in the state for increasing teachers' ability to effectively use educational technology:	WAS THIS TYPE OF METHOD USED?			IF USED, HOW MUCH OF A FACTOR IS THIS METHOD IN YOUR STATE'S EFFORTS TO PROVIDE TECHNOLOGY-RELATED PROFESSIONAL DEVELOPMENT?		
	YES	NO	DON'T KNOW	NOT A FACTOR	MINOR FACTOR	MAJOR FACTOR
Supporting opportunities for teachers to participate in courses about the use of technology via the Internet, video conferencing, or other form of distance learning strategy	42	4	0	3	13	26
Sending teachers or technology leaders to technology-related training with the expectation that they will return to their schools and train other teachers ("train the trainer" approach)	42	3	1	1	10	31
Supporting teachers or teacher teams in developing new curriculum units that incorporate technology	43	2	1	5	10	28
Supporting teacher study groups that meet regularly to work on using educational technology	31	10	5	3	14	14
Training students to serve as technology trainers for teachers	35	10	1	5	19	11
Supporting teacher attendance at workshops, conferences or summer institutes	42	4	0	2	12	28
Providing courses at teacher resource centers	34	11	1	4	11	19
Sending teachers and students together to workshops or summer institutes	29	13	4	3	19	7
Other. Please specify_____ _____				5	2	8

11. Please consider the different types of technology-related professional development provided or paid for by the State during the 1999-2000 school year. To what extent would you say the majority of those activities had the following characteristics? (The number of states responding to these items was 45.)

Was the technology-related professional development provided by the State:	To what extent was this characteristic present?		
	Not at All	Somewhat	A Great Deal
... directly related to the content teachers teach	3	15	27
...appropriate to teachers' varying levels of knowledge, skills and interests	3	9	33
...reflective of the best available research and practice in teaching, learning, and leadership	3	8	34
...given over a substantial amount of time	3	15	27
...delivered over multiple sessions, not a one-time experience	3	15	27
...followed by planning time during the workday to implement new practices in the classroom	9	25	11
...driven by a long-term plan, consistent with the goals for technology use in your State	4	8	33
...inclusive to other members of the school community	8	24	13

Was the technology-related professional development provided by the State:	To what extent was this characteristic present?		
	Not at All	Somewhat	A Great Deal
...accessible during school hours (i.e., substitutes were provided so teachers could attend professional development courses)	5	23	17
...accessible during evening/weekend hours	6	25	14
...planned or delivered with input from teachers in your State	4	17	24
...an opportunity for teachers to meaningfully engage with colleagues and materials	3	9	33
...effective in increasing teachers' ability to appropriately use educational technology in teaching	3	7	35

12. Please consider the different types of technology-related professional development provided or paid for by the State during the 1999-2000 school year. What topics were covered? (The number of states responding to these items was 45.)

Covered in professional development:	YES	NO	DON'T KNOW
Basic computer skills	39	4	2
Use of various software application packages (e.g., Power Point, spreadsheets, PhotoShop, etc.)	40	3	2
How to integrate technology into the curriculum	40	3	2
Effective/ethical use of the WWW	40	3	2
Creating activities using technology and the WWW	41	2	2
How to take advantage of distance learning opportunities	34	6	5
How to use technology to help students improve basic academic skills	36	5	4
New ways to assess student work using technology	32	9	4
Using software or technology activities that have already been developed	41	2	2
Seeing demonstrations of technology-incorporated classroom activities	39	4	2
Learning about technology activities that require only 1 computer per classroom	30	9	6
How to manage classroom activities that integrate technology	40	3	2
How to select good software	30	8	7
How to write grant applications for more technology resources	33	6	6
Other. Please specify:			

13. Does the State Department of Education or other State agency (e.g., regional assistance centers, BOCES) provide to districts any of the following types of assistance? (The number of states responding to these items was 45.)

Type of assistance provided by the State	YES	NO
Assistance in developing technology plans	44	1
Professional development in technology use (e.g., using software, developing computer use skills; integrating technology into the curriculum)		
...for district technology coordinators	43	2
...for school technology coordinators	41	4
...for teachers	43	2

Type of assistance provided by the State	YES	NO
...for other district-level staff	40	5
...for other school-level staff	36	9
Technical training program (e.g., network maintenance, computer repair, etc.)		
...for district technology coordinators	29	16
...for school technology coordinators	24	21
...for teachers	15	30
...other district-level staff	19	26
...other school-level staff	17	28
State technology specialist(s) who:		
...visit districts	38	7
...provide advice and help only from a distance (e.g., via email or telephone)	35	10
Other type of technology advisers (e.g., from the local higher education community) who:		
...visit districts	26	19
...provide advice and help only from a distance (e.g., via email or telephone)	24	21
State regional technology centers	23	22
Regional technology centers exist but are not supported through funding or services by the State education department or other State agency.	16	29
Other. Please specify:		

14. Generally speaking, how much of the technical support for educational technology received by districts in your State is provided by each of the following entities? (The number of states responding to these items was 45.)

Source of technical support received by districts:	NONE (0%)	SOME (1-25%)	A MODERATE AMOUNT (26-50%)	MOST (51-75%)	ALL OR ALMOST ALL (76-100%)
Your State agency	7	16	12	7	3
Regional technology centers	14	10	14	3	4
Districts themselves	1	4	15	13	12
Institutions of higher education	7	33	4	1	0
Community agencies	17	26	2	0	0
Partnerships with businesses	9	30	6	0	0
Vendors	5	29	9	2	0
Other. Please specify:	35	7	2	1	0

Section II: Standards, Assessments and Integration of Technology

This section asks about how technology is being integrated into teacher education, student assessments and curriculum standards. Please tell us about how your State has incorporated technology into its standards and assessments.

1. Does your State have technology standards for students (e.g., standards regarding proficiencies, uses of technology)? If so, how were they developed?[42] (The number of states responding to this item was 45.)

Our State does not have technology standards for students	10

If the State has technology standards for students, how were they developed?	**ELEMENTARY SCHOOL**		**MIDDLE/JUNIOR HIGH SCHOOL**		**HIGH SCHOOL**	
	YES	**NO**	**YES**	**NO**	**YES**	**NO**
We **adopted** the International Society for Technology in Education's (ISTE) or another organization's or entity's technology standards: Please specify which organizations or entities: _____ _____ _____	11	22	11	22	11	22
We developed our own technology standards, which were **adapted** from various sources. Please specify whose standards were adapted or used as models for your State's purposes: _____ _____ _____	24	8	25	7	27	5
Other. Please specify: _____ _____ _____						

[42] If the State does not have technology standards for students, the Web-based version will bring the respondent to Q11 automatically.

2. Are standards for technology integrated into subject areas or are they stand-alone?[43] (The number of states responding to this item was 32, out of the 35 that were routed to this item.)

23 Standards for technology are integrated

9 Standards for technology are stand-alone

3. What methods has the State used to integrate technology into standards for learning school subjects? (The number of states responding to these items was 23, out of the 23 that were routed to this item.)

Method of integrating technology into standards for learning	ELEMENTARY SCHOOL		MIDDLE/ JUNIOR HIGH SCHOOL		HIGH SCHOOL	
	YES	NO	YES	NO	YES	NO
Inclusion of technology standards in core subject areas	23	0	23	0	23	0
Inclusion of technology standards in non-core subject areas	18	5	19	4	19	4
Inclusion of technology standards in vocational education			20	3	21	2
Other. Please specify:						

4. At which grade levels and subject areas are State technology standards for students included? (The number of states responding to these items ranged from 22 to 23, out of the 23 that were routed to this item.)

	ELEMENTARY SCHOOL		MIDDLE/ JUNIOR HIGH SCHOOL		HIGH SCHOOL	
	YES	NO	YES	NO	YES	NO
Language Arts	22	1	22	1	22	1
Mathematics	23	0	23	0	23	0
Science	23	0	23	0	23	0
Social Studies	22	1	22	1	22	1
Non-core subject areas If yes, which subjects?	17	6	17	6	17	6
Vocational education			17	6	22	1
Other. Please specify subject(s) :	8	14	9	13	10	12

[43]If the response to Q2 is "stand-alone" the respondent will be brought to Q5 automatically, and not be presented with Q3-4.

5. Please describe which, if any of the following standards for technology your State has set for students at different grade levels: (The number of states responding to these items ranged from 21 to 23, out of the 23 that were routed to this item.)

	AT WHICH GRADE LEVELS HAVE TECHNOLOGY STANDARDS BEEN SET?			
	NO SUCH STANDARD EXISTS	ELEMENTARY SCHOOL	MIDDLE/ JUNIOR HIGH SCHOOL	HIGH SCHOOL
Basic operations and concepts E.g., Students demonstrate a sound understanding of the nature and operation of technology systems; Students are proficient in the use of technology	(no data)	18	19	19
Social, ethical and human issues E.g., Students understand the ethical, cultural and societal issues related to technology; Students practice responsible use of technology systems, information and software	(no data)	17	18	22
Technology productivity tools E.g., Students use technology tools to enhance learning, increase productivity and promote creativity; Students use productivity tools to collaborate in constructing technology-enhanced models, preparing publications and producing other creative works	(no data)	19	21	22
Technology communications tools E.g., Students use telecommunications to collaborate, publish and interact with peers, experts and other audiences; Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences	(no data)	21	22	23
Technology research tools E.g., Students use technology to locate, evaluate and collect information from a variety of sources; Students evaluate and select new information resources and technological innovations based on the appropriateness to specific tasks	(no data)	20	22	23
Technology problem-solving and decision-making tools E.g., Students use technology resources for solving problems and making informed decisions; Students employ technology in the development of strategies for solving problems in the real world	(no data)	16	20	22
Other. Please specify what:_____ _____				

6. Does the State assess student progress in meeting technology standards? If so, how are assessments conducted? (The number of states responding to this item was 32, out of the 35 that were routed to this item.)

The State does not assess student progress in meeting technology standards.	23

Method of assessment	**ELEMENTARY SCHOOL**		**MIDDLE SCHOOL**		**HIGH SCHOOL**		
	YES	**NO**	**YES**	**NO**	**YES, but not a State graduation requirement**	**YES, and a State graduation requirement**	**NO**
Assessment methods are developed/decided upon locally	7	2	6	3	3	4	2
State technology assessment: stand-alone paper-and-pencil test	2	7	2	7	1	1	7
State technology assessment: stand-alone computerized test	1	8	2	7	1	1	7
Technology items or sections within State assessments in core academic subject areas	4	5	4	5	3	1	5
Technology items or sections within State assessments in non-core academic subject areas	4	5	3	6	3	0	6
Requiring the completion of a course in technology	1	8	2	7	2	1	6
Other. Please specify:							

7. What changes related to educational technology have been made (or are planned to be made) to State student assessments in educational technology? (The number of states responding to these items was 34, out of the 35 that were routed to this item.)

Technology-related change:	**No change made or planned**	**Change made in the past three years**	**Don't Know**
Created a new assessment designed to assess student technology proficiency	20	6	8
Modified grade levels at which technology assessments are done	23	3	8
Other. Please specify:			

8. Have the results of student assessments of progress in educational technology been reported? If so, who received the information? How was the information reported? (The number of states responding to this item was 32, out of the 35 that were routed to this item.)

Results of student assessments in educational technology have not been reported	27

	YES	NO	DON'T KNOW
Who received the information:			
Legislators	4	1	0
Districts	4	1	0
Schools	4	1	0
Parents	4	1	0
Media	4	1	0
Other. Please specify:			
How information was reported:			
Meetings	1	3	1
Newsletters	1	3	1
Published report (e.g., technical report)	5	0	0
Web site	4	1	0
Press release	3	2	0
Other. Please specify:			
Is the report available electronically? If so, please list the URL where it may be accessed:			

9. Have your State's technology standards for <u>students</u> changed since October 1, 1996? If so, how?[44] (The number of states responding to this item was 32, out of the 35 that were routed to this item.)

Technology standards for <u>students</u> have <u>not</u> changed	7

Change in State technology standards for students:	YES	NO
Established stand-alone technology standards	10	15
Established technology standards integrated in:		
…core subject areas	15	10
…non-core subject areas	13	12
…vocational education	14	11
Moved from stand-alone technology standards to technology standards integrated into:		
…core subject areas	7	18
…non-core subject areas	6	19
…vocational education	6	19

[44]If State technology standards for students have not been changed, the Web-based version will omit Q10 and bring the respondent to Q11 automatically.

Change in State technology standards for students:	YES	NO
Moved from technology standards integrated into core academic subjects to stand-alone technology standards	2	23
Modified the grade levels for which standards are set	5	20
Modified the content of existing standards	15	10
Other. Please specify:		

10. If technology standards for students have changed, please indicate why: (The number of states responding to these items was 24, out of the 25 that were routed to this item.)

State technology standards for students changed:	YES	NO
...as part of a State educational reform initiative	20	4
...because of (a change in) the State technology plan	13	11
...because change is planned on a schedule	5	19
...because of the results of evaluations	3	21
...to match (new) State content standards	14	10
...to match new State assessments more closely	7	17
...because the technology changed	15	9
...because of legislation	8	16
...because of feedback from the public (e.g., parents)	12	12
...because of feedback from educators	17	7
Other. Please specify:		

11. What changes related to educational technology have been made (or are planned to be made) to State student assessments in core subject areas? (The number of states responding to these items was 44.)

Technology-related change:	No change made or planned	Change made in the past three years	Don't Know
Created a new assessment designed to assess student technology proficiency	29	4	11
Modified grade levels at which technology assessments are done	31	2	11
On existing State assessments in core subject areas:			
...added new items within subject areas that require the use of technology (e.g., use of graphing calculators)	26	6	12
...added new items within subject areas that assess technological proficiency/knowledge	28	4	12
...offered test via computer in addition to/instead of paper and pencil version	30	4	10
On existing State assessments in non-core subject areas:			
...added new items within subject areas that require the use of technology (e.g., use of graphing calculators)	31	4	9
...added new items within subject areas that assess technological proficiency/knowledge	32	3	9
...offered test via computer in addition to/instead of paper and pencil version	31	4	9
Other. Please specify:			

12. Does your State have technology standards for teachers (e.g., standards regarding proficiencies, uses of technology)? If so, how were they developed?[45] (The number of states responding to this question was 44.)

Our State does not have technology standards for teachers	22

If the State has technology standards for teachers, how were they developed?	**ELEMENTARY SCHOOL**		**MIDDLE/JUNIOR HIGH SCHOOL**		**HIGH SCHOOL**	
	YES	**NO**	**YES**	**NO**	**YES**	**NO**
We **adopted** the International Society for Technology in Education's (ISTE) or another organization's or entity's technology standards: Please specify which organizations or entities: _____ _____ _____	9	13	9	13	9	13
We developed our own technology standards, which were **adapted** from various sources. Please specify whose standards were adapted or used as models for your State's purposes: _____ _____ _____	15	7	15	7	15	7
Other. Please specify: _____ _____ _____						

13. When does the State require (or recommend) teachers to meet State technology proficiency standards? (The number of states responding to these items was 22, out of the 22 that were routed to this item.)

	ELEMENTARY SCHOOL TEACHERS		**MIDDLE/JUNIOR HIGH SCHOOL TEACHERS**		**HIGH SCHOOL TEACHERS**	
	YES	**NO**	**YES**	**NO**	**YES**	**NO**
…required at initial certification or licensure	12	10	12	10	12	10
…recommended as a condition for employment (e.g., new hires, teachers transferring into the State)	12	10	12	10	12	10
…required at re-certification or contract renewal	7	15	7	15	6	16

[45] If the State does not have technology standards for teachers, the respondent will be brought to Q18 automatically.

14. Does the State require teacher proficiency in technology for certification or licensure? If so, how is proficiency determined? (The number of states responding to these items ranged from 8 to 11, out of the 22 that were routed to this item.)

Method of assessment	INITIAL CERTIFICATION		AT RE-CERTIFICATION	
	YES	NO	YES	NO
Completion of a specific number of hours of technology-related pre-service training or in-service professional development	8	3	7	1
Paper and pencil assessment	3	8	2	6
Computerized technology proficiency assessment	3	8	2	6
Assessment methods are developed/decided upon locally			4	4
Other. Please specify:				

15. What other types of educational technology guidelines or standards related to teachers' proficiency in educational technology have been set by your State? (The number of states responding to these items was 22, out of the 22 that were routed to this item.)

State educational technology proficiency guidelines/standards for:	YES	NO
Pre-service teachers		
Educational technology standards for accreditation of teacher preparation programs	17	5
Educational technology standards for accreditation of teacher preparation programs for specialization in educational computing and technology	11	11
Guidelines for the infrastructure needed to support the application of technology in teacher preparation programs	3	19
Practicing teachers		
Standards for the amount of professional development in educational technology teachers should have (e.g., some number of hours each year)	11	11
Standards for the type of professional development in educational technology teachers should have (e.g., workshops, online training)	8	14
Other. Please specify:		

16. Have your State's technology standards for teachers changed since October 1, 1996? If so, how?[46] (The number of states responding to this item was 22, out of the 22 that were routed to this item.)

Technology standards for teachers have not changed	6

Change in State technology standards:	YES	NO
Established stand-alone technology standards	10	6
Established technology standards integrated in:		
…core subject areas	8	8
…non-core subject areas	6	10
…vocational education	9	7

[46] If technology standards for teachers have not changed, Q17 will be omitted and the respondent will be taken to Q18 automatically.

Change in State technology standards:	YES	NO
Moved from stand-alone technology standards to technology standards integrated into:		
…core subject areas	6	10
…non-core subject areas	6	10
…vocational education	7	9
Moved from technology standards integrated into core academic subjects to stand-alone technology standards	3	13
Modified the grade levels for which standards are set	6	10
Modified the content of existing standards	9	7
Other. Please specify:		

17. If technology standards for <u>teachers</u> have changed, please indicate why: (The number of states responding to these items was 16, out of the 16 that were routed to this item.)

State technology standards for <u>teachers</u> changed:	YES	NO
…as part of a State educational reform initiative	15	1
…because of (change in) State technology plan	9	7
…because change is planned on a schedule	5	11
…because of the results of evaluations	2	14
…to match (new) State content standards	7	9
…to match new State assessments more closely	3	13
…because the technology changed	9	7
…because of legislation	9	7
…because of feedback from the public (e.g., parents)	6	10
…because of feedback from educators	11	5
Other. Please specify:		

18. Are any additional technology-related changes to State standards in the core academic areas or in educational technology underway? Are there any additional technology-related changes to State standards for teachers planned (e.g., technology proficiency requirements will take effect in 2003)? If so, please describe.

19. How does the State encourage the integration of technology into instruction? (The number of states responding to these items was 22, out of the 44 that were routed to this item.)

The State promotes the integration of educational technology into instruction by:	NOT AT ALL	SOMEWHAT	A GREAT DEAL
Developing research-based technology integration models and disseminating them to districts	2	14	6
Providing funding for professional development to train teachers to integrate technology into instruction	0	5	17
Including technology integration strategies as part of the State's overall professional development plan	3	11	8
Providing software reviews/evaluations	9	9	4
Providing administrators with observation tools to use when evaluating whether teachers provide students with opportunities to learn in technology-rich environments	6	14	2
Providing software to schools (through a consortium purchasing program or by giving districts/schools funds earmarked for educational software)	7	10	5
Recommending the use of technology during the course of professional development activities	1	8	13
Including the use of technology in the curriculum (as "good practice" or in model lessons given to teachers)	1	6	15
Ensuring that the use of technology is included in other State documents as a good example of integration technology in the curriculum	0	14	8
Implementing a policy that building-level technical assistance is available at all districts/schools	11	8	3
Requiring educational technology training for:			
…district technology coordinators	16	6	0
…school technology coordinators	16	6	0
…teachers	10	6	6
…other district-level staff	12	8	2
…other school-level staff	12	7	3
Offering optional educational technology training (e.g., partnering with institutions of higher education to offer credit; partnering with businesses)			
…district technology coordinators	5	12	5
…school technology coordinators	5	12	5
…teachers	1	9	12
…other district-level staff	2	8	12
…other school-level staff	3	12	7
Offering demonstrations (e.g., classroom modeling by master teacher or curriculum specialist)	0	16	6
Other. Please specify:			

20. Has the State supported the development of software and other educational technology resources for teaching to State standards in core subjects? If so, what form does this support take (e.g., funding, training)? What specifically is being supported, and in what grades and subjects?

21. Has the State established criteria for determining the degree to which software and other technology resources are aligned with State standards? If so, what are they? Is this document available? Please provide the name of a contact person and/or a URL if the document is available online.

Section III. Technology Resources

This section focuses on the sources, amount, and uses of technology funds in the State. As you can see, some of the information is pre-filled. We obtained information from the U.S. Department of Education to fill in as much as we could. We hope this makes the survey a bit faster to complete, but we would like to request that you briefly review the pre-filled information for accuracy. Please make any necessary corrections in the space provided.

1. Please describe the sources and amount of funds awarded for elementary and secondary education technology in the State:

Funding for educational technology by source	FY 1997	FY 1998	FY 1999
State			
Specific appropriations in the General Fund for educational technology	mean: $50,885,818	mean: $51,831,507	mean: $53,441,766
Other State funding sources for educational technology (e.g., bonds sale, state lottery, share of sales tax). Please specify:			
	$19,158,848	mean: $10,390,504	mean: $15,797,059
	$10,000,000	$1,500,000	$3,464,811
	$8,367,018	$20,022,575	$30,651,861
			federal
Technology Literacy Challenge Fund (TLCF) Program Source: Department of Education	mean: $4,278,122	mean: $7,743,007	mean: $8,207,749
Other U.S. Department of Education technology programs Source: Department of Education			
Technology Innovation Challenge Grants (TICG)	$1,079,988	mean: $1,786,914	mean: $1,818,042
Preparing Tomorrow's Teachers to Use Technology (PT3)			$816,919
Community Technology Centers (CTC)			$233,894
Other. Please specify:	$3,401,255	$7,302,134	$8,162,459
	$3,384,401	$9,243,129	$11,459,235
	$359,191	$18,997,272	$17,577,284
Other federal non-technology programs (e.g., Title I, Title II, Title VI)	mean: $22,143,004	mean: $22,731,530	mean: $25,475,687
Other (e.g., contributions from private sources, including in-kind contributions). Please specify:	mean: $644,944	mean: $3,275,201	mean: $5,163,359
	$188,889	$327,778	$1,013,889
	$50,000	$50,000	$100,000

2. Since July 1, 1997, what methods has the State used to allocate State funds for educational technology to districts? Approximately what percentage of these funds was allocated by each method? Please exclude funding from federal (e.g., TLCF) and private sources when answering this question. (The number of states responding to these items was 44.)

Allocation Method Used	YES	NO	If yes, please estimate what percentage of funds was allocated by this method:
Direct allocation on a formula basis (e.g., per pupil, per building). Please specify:	31	13	mean: 77.3%
Competitive grant	21	23	mean: 40.7%
Other. Please specify:			mean: 35.8%
		TOTAL	**100%**

3. Since July 1, 1997, to which technology-related uses has State funding for educational technology generally been directed? Please exclude funding from federal (e.g., TLCF) and private sources when answering this question.

Degree to which State funding has been directed to the following technology-related uses:	Funds directed to this use?		If yes, please estimate what percentage of funds was directed to this use:
	YES	NO	
Professional development for teachers: Focus on technology use and skills (e.g., in computer basics, using multimedia, etc.)	(no data)	(no data)	mean: 7.7%
Professional development for teachers: Focus on integrating technology for instruction (e.g., teaching core academic subject areas, writing lesson plans and units that integrate computer activities with curriculum; developing computer-based activities; implementing research-based best practices)	(no data)	(no data)	mean: 9.3%
Technology maintenance and technical support (e.g., installing, troubleshooting, maintaining equipment, networks, operating systems and software)	(no data)	(no data)	mean: 5.3%
Computers and other educational technology hardware (e.g., purchasing more computers or peripherals, upgrading existing stock)	(no data)	(no data)	mean: 20.4%
Connectivity to the Internet: Wiring and infrastructure	(no data)	(no data)	mean: 19.9%
Connectivity to the Internet: Costs for services (e.g., cost of internet service provider; telecommunications costs)	(no data)	(no data)	mean: 6.7%
Software and online resources (e.g., purchasing new software or additional copies or licenses for instructional or administrative uses)	(no data)	(no data)	mean: 11.0%
Distance learning (e.g., telecourses for students; Web-based professional development for teachers)	(no data)	(no data)	mean: 5.8%

Degree to which State funding has been directed to the following technology-related uses:	Funds directed to this use?		If yes, please estimate what percentage of funds was directed to this use:
	YES	NO	
Program administration and other activities related to program administration (e.g., to pay the salary of the Technology and/or Network Coordinator)	(no data)	(no data)	mean: 2.3%
Program evaluation	(no data)	(no data)	mean: 1.4%
Other. Please specify:	(no data)	(no data)	mean: 2.5%
		TOTAL	100%

4. As a whole, to which technology-related uses has TLCF funding been directed? This question refers to all TLCF funds awarded by the State, not just funds reserved for State-level activities.

Degree to which TLCF funding has been directed to the following technology-related uses:	Funds directed to this use?		If yes, please estimate what percentage of funds was directed to this use:
	YES	NO	
Professional development for teachers: Focus on technology use and skills (e.g., in computer basics, using multimedia, etc.)	(no data)	(no data)	mean: 12.8%
Professional development for teachers: Focus on integrating technology for instruction (e.g., teaching core academic subject areas, writing lesson plans and units that integrate computer activities with curriculum; developing computer-based activities; implementing research-based best practices)	(no data)	(no data)	mean: 23.9%
Technology maintenance and technical support (e.g., installing, troubleshooting, maintaining equipment, networks, operating systems and software)	(no data)	(no data)	mean: 4.1%
Computers and other educational technology hardware (e.g., purchasing more computers or peripherals, upgrading existing stock)	(no data)	(no data)	mean: 26.8%
Connectivity to the Internet: Wiring and infrastructure	(no data)	(no data)	mean: 7.5%
Connectivity to the Internet: Costs for services (e.g., cost of internet service provider; telecommunications costs)	(no data)	(no data)	mean: 4.5%
Software and online resources (e.g., purchasing new software or additional copies or licenses for instructional or administrative uses)	(no data)	(no data)	mean: 16.1%
Distance learning (e.g., telecourses for students; Web-based professional development for teachers)	(no data)	(no data)	mean: 4.0%
Program administration and other activities related to program administration (e.g., to pay the salary of the Technology and/or Network Coordinator)	(no data)	(no data)	mean: 3.8%
Program evaluation	(no data)	(no data)	mean: 2.3%
Other. Please specify:	(no data)	(no data)	mean: 3.6%
		TOTAL	100%

5. Since July 1, 1997, to which technology-related uses has non-State, non-TLCF funding generally been directed? These funds include monetary and in-kind contributions to the State from foundations or other private sources.

Degree to which non-State, non-TLCF funding has been directed to the following technology-related uses:	Funds directed to this use?		If yes, please estimate what percentage of funds was directed to this use:
	YES	NO	
Professional development for teachers: Focus on technology use and skills (e.g., in computer basics, using multimedia, etc.)	(no data)	(no data)	mean: 5.5%
Professional development for teachers: Focus on integrating technology for instruction (e.g., teaching core academic subject areas, writing lesson plans and units that integrate computer activities with curriculum; developing computer-based activities; implementing research-based best practices)	(no data)	(no data)	mean: 11.0%
Technology maintenance and technical support (e.g., installing, troubleshooting, maintaining equipment, networks, operating systems and software)	(no data)	(no data)	mean: 3.8%
Computers and other educational technology hardware (e.g., purchasing more computers or peripherals, upgrading existing stock)	(no data)	(no data)	mean: 8.9%
Connectivity to the Internet: Wiring and infrastructure	(no data)	(no data)	mean: 9.4%
Connectivity to the Internet: Costs for services (e.g., cost of internet service provider; telecommunications costs)	(no data)	(no data)	mean: 7.6%
Software and online resources (e.g., purchasing new software or additional copies or licenses for instructional or administrative uses)	(no data)	(no data)	mean: 6.3%
Distance learning (e.g., telecourses for students; Web-based professional development for teachers)	(no data)	(no data)	mean: 2.4%
Program administration and other activities related to program administration (e.g., to pay the salary of the Technology and/or Network Coordinator)	(no data)	(no data)	mean: 1.5%
Program evaluation	(no data)	(no data)	mean: 0.9%
Other. Please specify:	(no data)	(no data)	mean: 2.4%
		TOTAL	**100%**

6. Were any of the following types of technical assistance offered to districts during the State TLCF competitions? (The number of states responding to these items was 44.)

Type of technical assistance offered:	FY 1997-1998		FY 1998-1999		FY 1999-2000	
	YES	NO	YES	NO	YES	NO
Personalized technical assistance						
State-wide conference or regional briefings to discuss competition requirements	38	6	40	4	39	5
Training sessions for grant writing	31	13	33	11	33	11
Training sessions for developing technology plans	33	11	32	12	30	14
Feedback on district technology plans	37	7	37	7	39	5
Assistance in developing plans for evaluating the use of educational technology	33	11	33	11	35	9
District visits	35	9	38	6	38	6
Telephone/email help lines	39	5	39	5	42	2
Information resources						
Web-based materials	32	12	36	8	38	6
E-mail distribution list or listserv	31	13	34	10	38	6
Sample technology plans	29	15	31	13	34	10
Sample successful proposals (whole or pieces of proposals)	28	16	35	9	35	9
Other. Please specify:						

7. How many of the TLCF applicants received the following types of technical assistance <u>and</u> received funding?

Type of technical assistance offered:	FY 1997-1998			FY 1998-1999			FY 1999-2000		
	Don't Know	Applicants NOT Funded	Funded Applicants	Don't Know	Applicants NOT Funded	Funded Applicants	Don't Know	Applicants NOT Funded	Funded Applicants
State-wide conference or regional briefings to discuss competition requirements	(no data)	mean: 17.7	mean: 40.1	(no data)	mean: 10.8	mean: 44.0	(no data)	mean: 9.5	mean: 44.5
Training sessions for grant writing	(no data)	17.7	42.3	(no data)	9.7	46.9	(no data)	9.1	45.7
Training sessions for developing technology plans	(no data)	17.7	40.1	(no data)	10.8	44.0	(no data)	9.5	40.5
Feedback on district technology plans	(no data)	13.3	38.4	(no data)	17.5	48.9	(no data)	19.4	49.3
Assistance in developing plans for evaluating the use of educational technology	(no data)	11.1	21.1	(no data)	14.9	29.6	(no data)	13.8	33.2
District visits	(no data)	9.6	20.8	(no data)	14.1	30.1	(no data)	12.5	24.0

8. What methods were used to evaluate the effectiveness of the technical assistance provided by the State to TLCF applicants? (The number of states responding to these items was 44.)

	FY1997-1998	FY1998-1999	FY1999-2000
No evaluation was done	25	22	21

Method of evaluation	**YES**	**NO**	**YES**	**NO**	**YES**	**NO**
Participant evaluations/feedback	17	0	20	0	21	0
Number of proposals submitted	15	2	18	2	18	3
Proportion of proposals submitted from districts that received technical assistance	9	8	12	8	12	9
Proportion of funded applications from districts receiving vs. not receiving technical assistance	6	11	9	11	10	11
Other. Please specify:						

9. What were the results of the evaluation(s)? What changes, if any, were made to the amount and/or type of technical assistance offered in subsequent competitions?

10. Have there been any barriers to the implementation of the TLCF in your State? If so, what have been the biggest barriers? Were the barriers at the State or district level?

Section IV. Evaluation of Educational Technology Initiatives

An important aspect of program implementation is evaluation of the program itself. Please tell us about the ways your State is assessing the impact of its technology initiatives.

1. Did the State conduct, or is the State planning to conduct, any evaluations of its educational technology initiatives? If so, why were State evaluations of educational technology conducted (or are planned to be conducted)? (The number of states responding to this item was 44.)

The State did not and is not planning to conduct any evaluations of educational technology.[47]	6

Reason for evaluation of technology:	**YES**	**NO**
Evaluations are a component of the State technology plan	28	10
For accountability purposes	37	1
For program improvement	38	0
To provide data to schools and districts	34	4
To collect information for use in State-level decision-making	38	0
Evaluations are a federal requirement	30	8
Evaluations are a State requirement	16	22
Evaluations are a requirement for private funding	7	31
Other. Please specify:		

2. Which one of the reasons above is the primary reason for evaluating educational technology?

[47] If no evaluations were collected the respondent will be brought to Q7 automatically.

3. What data does your State collect (or plan to collect) to evaluate the use of educational technology? Please include data gathered by the State itself and data obtained from a third party (e.g., federal government, commercial data provider). (The number of states responding to these items was 37, out of the 38 that were routed to this item.)

Educational technology data collected	Never been collected and no plans to collect	Collected, but not on a regular basis	Collected on a regular basis (at least EVERY 2 YEARS)	Collection is planned
Professional Development Related to the Use of Technology for Instruction				
Numbers of teachers receiving professional development	4	7	24	2
Duration of professional development for teachers	7	10	16	4
Content of professional development for teachers	3	8	21	5
Number of courses taken/continuing education credits earned	15	7	8	7
Technical Support for Teachers				
Amount of technical assistance for teachers (e.g., number of support requests fulfilled; number of support staff available)	12	8	14	3
Quality of technical assistance for teachers (e.g., response time to support requests; ratings of effectiveness of assistance given)	15	9	9	4
Availability of Modern Computers in the Classroom				
Hardware inventory (e.g., numbers of computers, peripherals)	1	4	31	1
Security procedures	15	7	13	2
Status of implementation (e.g., has the equipment been installed)	7	7	23	0
Student access to computers in instructional contexts (e.g., types of computers available, location of equipment)	2	4	30	1
Access to technology in high poverty schools	2	3	31	1
Use of technology in high poverty schools	6	5	20	6
Amount of time students use technology	9	8	11	9
Student **home** access to computers	17	5	5	10
Student **community** access to computers	14	4	7	12
Connectivity to the Internet				
Student **school** access to the Internet	2	2	30	3
Student **home** access to the Internet	17	7	4	9
Student **community** access to the Internet (e.g., in community centers or libraries)	16	8	4	9
Counts or percentages of classrooms and schools networked to a LAN or WAN	2	2	30	3
Student **home** access to the LAN or WAN	20	5	2	10
Student **community** access to the LAN or WAN	17	6	3	11
Making Software and Online Resources an Integral Part of Every School Curriculum				
Amount of software available (e.g., how many computers have a specific type of software installed)	19	10	5	3
Types of software available (e.g., word processing, graphics, skill exercises or practice programs)	11	10	13	3
Other. Please specify:				

4. What outcome data related to educational technology does your State collect or plan to collect? Please include data gathered by the State itself and data obtained from a third party (e.g., federal government, commercial data provider).[48] (The number of states responding to these items was 36, out of the 38 that were routed to this item.)

Technology-related outcome data being collected	Never been collected and no plans to collect	Collected, but not on a regular basis	Collected on a regular basis (at least EVERY 2 YEARS)	Collection is planned
Teacher Outcomes				
Teacher technology proficiency	2	8	16	10
Teacher use of technology in preparing lessons	6	7	10	13
Teacher use of technology during instruction	4	9	15	8
Teacher use of computerized testing	22	4	2	8
Teacher use of student performance data to improve instruction	5	9	7	15
Teacher integration of technology into subject area lessons	3	7	15	11
Teacher collaboration using technology	8	7	11	10
Role of technology in classroom organization	15	6	8	7
Quality of teaching using technology	12	9	7	8
Teacher attitudes towards technology	5	13	9	9
Student Outcomes				
Student technology proficiency	11	6	7	12
Purposes for which students use technology	8	9	8	11
Impact of technology on student achievement on State or local assessments	11	5	5	15
Impact of technology on improving students' critical thinking strategies	12	6	5	13
Impact of technology on improving students' achievement in core subject areas	10	6	6	14
Students' attitudes towards technology	12	8	6	10
Impact of technology on other student-related outcomes such as educational aspirations, dropout rates or attendance. Please specify:	15	8	4	9
Parental Outcomes				
Impact of technology on parental satisfaction	27	2	1	6
Impact of technology on parental involvement	25	3	2	6
Parental attitudes towards technology	25	5	0	6
Impact of technology on communication with parents	22	5	1	8
Administrator Outcomes				
Impact of technology on administrative efficiency	6	7	6	17
Administrators' attitudes toward technology	7	8	4	17
Administrators' use of technology	4	8	6	18
Other Outcomes. Please specify:				

[48] In Q4, for any student or teacher outcome data reported as being collected, the Web-based version will ask in which grades and subject areas the outcome data are gathered.

5. If the State has evaluated the impact of educational technology on student achievement, which subject areas and grade levels were evaluated? (The number of states responding to these items was 27, out of the 38 that were routed to this item.)

	ELEMENTARY SCHOOL	MIDDLE SCHOOL	HIGH SCHOOL
Language Arts	9	7	6
Mathematics	9	8	5
Science	7	6	5
Social Studies	7	6	5
Non-core academic areas	3	4	3
Vocational education		2	4
Other. Please specify:			

6. Have the results of State evaluations of the use of educational technology in the State been reported? If so, who received the information? How was the information reported? (The number of states responding to this item was 36, out of the 38 that were routed to this item.)

Results of State evaluations of educational technology have not been reported	11

	YES	NO	DON'T KNOW
Who received the information:			
Legislators	20	2	3
Districts	22	1	2
Schools	19	3	3
Parents	9	6	10
Media	17	5	3
Other. Please specify:			
How information was reported:			
Meetings	20	4	1
Newsletters	10	13	2
Published report (e.g., technical report)	17	7	1
Web site	20	3	2
Press release	12	12	1
Other. Please specify:			
Is the report available electronically? If so, please list the URL:			

7. Did the State collect some or all of the TLCF sub-grant evaluations? How were these evaluations used? (The number of states responding to this item was 43.)

The State did not collect TLCF sub-grant evaluations.	4
The State collects TLCF sub-grant evaluations, but has not yet decided how to use this information.	19

Because of the results of the evaluation:	**YES**	**NO**
...quantity and/or type of technical assistance offered was changed	12	8
...the structure of sub-grant competitions was changed	10	10
...the way funds were targeted was changed	9	11
...allocation of State funds to districts was changed	6	14
Other. Please specify:		

8. What has been the most successful piece of TLCF implementation in your State? What would you want to share with other States as something that works?

9. Do you have any advice or suggestions for the U.S. Department of Education for improvement of the TLCF program? What would you do differently? Other than "more funding" what changes would you like to see?

Section V. Thank You!

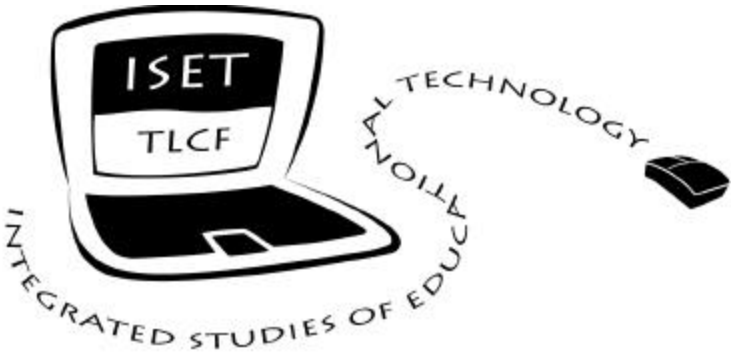
We are very grateful for your contributions to this project.

Please use the space below to share with us any comments you have regarding this survey as a whole.

If you have any questions about this survey, please contact Teresa García at tgarcia@air.org, or call toll-free, 1-888-944-5001 (select Option 3). All study participants will be notified of the availability of the final report once it is completed.

APPENDIX D

District Survey with Frequencies (Weighted to District Population)



INTEGRATED STUDIES OF EDUCATIONAL TECHNOLOGY

SURVEY OF DISTRICT TECHNOLOGY COORDINATORS

A project of the
U.S. Department of Education
Planning and Evaluation Services

PLEASE NOTE:
THE ONLINE VERSION OF THIS SURVEY IMPLEMENTS SKIP PATTERNS THAT GUIDE THE RESPONDENT TO THE APPROPRIATE SERIES OF QUESTIONS.
BECAUSE OF THIS AND OTHER PROGRAMMING CONSIDERATIONS, THE ONLINE VERSION WILL *LOOK DIFFERENT* FROM THIS HARD COPY OF THE DISTRICT SURVEY, BUT WILL HAVE THE SAME CONTENT.

If you would like to complete this survey online, your district's login information is:

[label with login information
will be pasted in]

If you prefer to complete this survey by hand, please return the survey in the prepaid FedEx mailer to:

Integrated Studies for Educational Technology (ISET/TLCF)
American Institutes for Research
1000 Thomas Jefferson Street, NW
Suite 400
Washington, DC 20007
1-888-944-5001 (Select Option 3)

Additional information about the ISET/TLCF initiative may be found online at http://www.ed.gov/technology/iset.html

A project ofthe Department of Education, Planning and Evaluation Services.

This project is being conducted under Title III of PL 103-382 and the Telecommunications Act of 1996. While you are not required to respond, your cooperation is needed to make the results of the study comprehensive, accurate and timely. The information you provide is being collected for research purposes only and will be kept strictly confidential.

O.M.B. NO. 1875-0179 ? Approval Expires 06/30/2001

SECTION I. THE ROLE OF TECHNOLOGY IN THE DISTRICT: TECHNOLOGY PLANNING

1. Does your district have a technology plan? Please select one.

93.6% Yes, we have a single district technology plan
4.6% Yes, we have multiple technology plans (e.g., district technology plan; E-Rate technology plan)
1.8% No, but the district is in the process of developing one.
0.0% No, and the district does not currently have plans to develop one at this time.

2. What are the major goals of your district's technology initiatives and reforms? How much progress has been made toward achieving each goal?

Are any of the technology goals related to:	YES	NO	IF YES, HOW MUCH PROGRESS HAS BEEN MADE?		
			None, or too early to tell	Some Progress	A Great Deal of Progress
...professional development for teachers on the use of technology E.g., To improve teacher technology proficiency; to help teachers meet technology proficiency standards (formal or informal)	96.6%	3.4%	2.2%	49.8%	48.1%
...professional development for teachers on integrating technology into instruction E.g., To help teachers write lesson plans and units that integrate computer activities with curriculum; developing computer-based activities; training teachers how to implement data-driven instructional policies	97.9%	2.1%	4.5%	74.2%	21.3%
...using technology to provide professional development for teachers E.g., Providing access to distance learning opportunities	66.6%	33.4%	13.2%	55.7%	31.1%
...technical support for teachers E.g., To make available support personnel with expertise in computer, video or network technologies; to make available instructional support personnel with expertise in applying computer and network technologies in subject-matter curricula	86.6%	13.4%	0.8%	47.0%	52.2%
...the availability of modern computers in the classroom E.g., Providing enough computers to achieve a specific computer-to-student ratio; Making available a computer for each teacher's individual use in the classroom	92.4%	7.6%	0.8%	29.2%	70.1%
...connectivity to the Internet E.g., Providing connections to the Internet to allow teachers and students to: acquire information from the World Wide Web (WWW); communicate with others outside of school; publish their work on the WWW	97.3%	2.7%	0.4%	14.4%	85.1%

Are any of the technology goals related to:	YES	NO	IF YES, HOW MUCH PROGRESS HAS BEEN MADE?		
			None, or too early to tell	Some Progress	A Great Deal of Progress
…making software and online resources an integral part of every school curriculum E.g., Making available a large variety of drills, games and tutorial software for the full range of subjects taught; Making available software for storing and retrieving student work placed in electronic portfolios, for use in long-term assessment	85.2%	14.8%	8.1%	61.9%	30.0%
…student outcomes E.g., Improve students' technology proficiency; narrow the digital divide (decrease the gap between poor and/or minority students' lower levels of technology access and use, relative to other students)	93.9%	6.1%	10.4%	64.4%	25.2%
…parent outcomes E.g., Increase parental involvement; improve communication with parents (e.g., making available on the Internet school calendars, emergency closures, school test scores, etc.)	69.0%	31.0%	36.2%	46.0%	17.8%
…administrative outcomes E.g., Using technology to provide leadership; improve administrators' attitudes towards technology	75.2%	24.8%	9.0%	55.3%	35.7%
Other. Please specify:		17.1%	10.6%	63.2%	9.1%
Other. Please specify:		19.3%	12.4%	57.4%	10.9%
Other. Please specify:		27.8%	11.9%	49.7%	10.6%
Other. Please specify:		33.5%	26.2%	35.6%	4.7%

Section II. The Role of Technology in the District: TLCF Funding

The TLCF is a formula grant program that provides money to the 50 States, the District of Columbia, the territories, and the Bureau of Indian Affairs to accelerate the implementation of Statewide technology plans. Funds are allocated to States proportionate to their share under Part A of Title I of ESEA—that is, proportionate to the number of students in poverty—but with a minimum allocation to any state of one-half of one percent of the amount appropriated. Upon award of a grant, each State distributes sub-grants to LEAs on a competitive basis.

Please note: in Texas, TLCF awards were distributed as Technology in Education (TIE) grants.

3. Has your district ever applied for TLCF funding?

61.1% Yes (check all that apply below) Ü **PLEASE GO TO Q5**
- 71.1% as an individual applicant
- 16.5% as the fiscal agent of a consortium
- 34.8% as a member of a consortium (not as the fiscal agent)

25.7% No Ü **PLEASE GO TO Q4**

13.2% Don't Know Ü **PLEASE GO TO Q8**

4. Why has the district not applied for TLCF funding?

Reason why district has not applied for TLCF funding	YES	NO
The district was not aware of this source of funding for educational technology	55.6%	44.4%
The district does not have personnel with the expertise or experience to write a proposal	35.9%	64.1%
District personnel do not have the time to write a proposal	60.7%	39.3%
The district does not have the monetary resources	39.6%	60.4%
The district does not see the need for TLCF funding	5.5%	94.5%
The district did not have an approved technology plan	3.8%	96.2%
The district was not eligible to apply (e.g., funds were restricted to districts of a certain poverty level and the district did not meet poverty restrictions)	32.2%	67.8%
Restrictions on uses of funds were not compatible with district priorities or needs (e.g., funds were limited to connectivity but district has priority and/or need for professional development)	10.7%	89.3%
Other. Please specify:		

Ü **AFTER ANSWERING Q4 PLEASE GO TO Q6**

5. Please tell us about your experience in general with applying for TLCF funds. What type of technical assistance was available to your district from the State? If your district obtained technical assistance, how would you rate the effectiveness of the assistance?

TYPE OF TECHNICAL ASSISTANCE FROM THE STATE	WAS THIS FORM OF ASSISTANCE AVAILABLE?			IF OBTAINED: HOW USEFUL WAS THE ASSISTANCE?			IF NOT OBTAINED:
	Yes	No	Don't Know	Not at All Useful	Somewhat Useful	Very Useful	I would like to have this type of TA available in the future
State-wide conference or regional briefings to discuss competition requirements	7.0%	0.8%	22.0%	13.6%	30.4%	22.0%	4.3%
Training sessions for grant writing	7.1%	1.9%	19.2%	14.4%	28.5%	12.3%	16.7%
Training sessions for developing technology plans	7.3%	1.2%	25.1%	13.3%	26.1%	15.0%	12.1%
Feedback on district technology plans	0.9%	2.2%	25.6%	15.5%	26.9%	20.5%	8.4%
Assistance in developing plans for evaluating the use of educational technology	4.5%	2.9%	27.5%	14.6%	26.6%	8.3%	15.6%

TYPE OF TECHNICAL ASSISTANCE FROM THE STATE	WAS THIS FORM OF ASSISTANCE AVAILABLE?			IF OBTAINED: HOW USEFUL WAS THE ASSISTANCE?			IF NOT OBTAINED:
	Yes	No	Don't Know	Not at All Useful	Somewhat Useful	Very Useful	I would like to have this type of TA available in the future
District visits	9.0%	18.1%	28.4%	4.0%	8.6%	6.7%	25.3%
Telephone/email help lines	5.3%	3.1%	19.9%	4.6%	22.4%	24.0%	20.6%
Web-based materials	3.8%	4.6%	19.8%	7.3%	21.1%	23.5%	19.8%
E-mail distribution list or listserv	4.8%	2.2%	23.2%	5.5%	26.1%	19.2%	19.0%
Sample technology plans	2.7%	3.9%	20.3%	1.0%	26.2%	23.7%	22.1%
Sample successful proposals (whole or pieces of proposals)	4.1%	4.3%	28.2%	1.3%	24.3%	11.0%	26.8%
Other. Please specify:							

Section III. Technology Resources: Use of Funds for Educational Technology

Please note: in Texas, TLCF awards were distributed as Technology in Education (TIE) grants.

6. Were TLCF funds targeted to specific types of schools?

38.9% Yes
61.1% No (TLCF funds did not go to schools directly or were used for all the schools in the district)
Ü **PLEASE GO TO Q8**

7. To what type of <u>schools</u> was TLCF funding directed during the 1999-2000 school year?

In my district, TLCF funding supported activities targeted to:	YES	NO
Schools that showed initiative in application process	29.4%	70.6%
Schools receiving Title I funds	62.4%	37.6%
Schools with a large number of LEP students	54.1%	45.9%
Schools with a large number of students with disabilities	56.3%	43.7%
Low performing schools	28.9%	71.1%
High performing schools	13.4%	86.6%
Elementary schools	72.1%	27.9%
Middle/Junior High schools	66.3%	33.7%
High schools	59.5%	40.5%
High poverty schools	64.2%	35.8%
Schools demonstrating high technology need	71.5%	28.5%
Other. Please specify:	9.7%	90.3%

Section IV. Technology and Instruction: Professional Development and Technical Support

8. Does your district have technology standards for teachers and/or administrators (e.g., standards regarding proficiencies, training, uses of technology)?

Our district has technology standards for:	YES	NO
Teachers	52.9%	47.1%
Administrators	41.3%	58.7%

9. Please tell us about what your district is doing to increase teachers' ability to make effective use of educational technology. If you are using a particular method, please indicate how much of a factor it is in the district's efforts to provide professional development specific to technology during the past year (July 1999 – June 2000):

Method used in the district for increasing teachers' ability to effectively use educational technology:	HOW MUCH OF A FACTOR IS THIS METHOD IN YOUR DISTRICT'S EFFORTS TO PROVIDE TECHNOLOGY-RELATED PROFESSIONAL DEVELOPMENT?		
	NOT USED	MINOR FACTOR	MAJOR FACTOR
Partnering with another district	63.9%	29.4%	6.7%
Partnering with an institution of higher education	51.2%	35.3%	13.5%
Contracting with a software vendor or other for-profit company that provides professional development in the use of technology in instruction. Please specify vendor_____	48.7%	37.7%	13.6%
Providing teachers with the opportunity to participate in courses about the use of technology in instruction via the Internet, video conferencing, or other form of distance learning strategy	22.1%	48.8%	29.1%
Sending teachers or technology leaders to technology-related training with the expectation that they will return to their schools and train other teachers ("train the trainer" approach)	13.2%	18.4%	68.4%
Having teachers or teacher teams develop new curriculum units that incorporate technology	14.1%	41.0%	44.9%
Hiring building level technology coordinators to work with teachers on incorporating technology into teaching	28.8%	39.4%	31.8%
Sending teachers to workshops, conferences or summer institutes	1.8%	31.7%	66.5%
Other. Please specify:			

10. Please consider all of the forms of professional development provided or paid for by the district from July 1999 – June 2000. How much professional development was supplied by the following individuals or groups?

The amount of professional development provided by:	NONE (0%)	SOME (1-25%)	A MODERATE AMOUNT (26-50%)	MOST (51-75%)	ALL OR ALMOST ALL (76-100%)
The technology coordinator (formally assigned)	13.1%	44.1%	16.1%	15.9%	10.9%
Librarian/Media specialist	35.2%	45.2%	15.1%	3.4%	1.2%
District office technology coordination staff	30.6%	30.7%	15.3%	16.1%	7.2%
Expert teachers or school administrators from within your district	7.0%	52.1%	27.7%	10.3%	2.8%
Expert teachers or school administrators from outside your district	46.2%	42.4%	9.8%	1.4%	0.2%
Faculty or staff from institutions of higher education	71.2%	20.8%	6.6%	1.3%	0.1%
Business partners	86.8%	10.7%	2.3%	0.1%	0.0%
Independent consultants	59.2%	33.4%	5.1%	2.1%	0.1%
For-profit vendors	69.3%	25.9%	4.2%	0.6%	0.1%
State, regional, or county technical assistance or resource center	42.3%	35.0%	14.6%	7.0%	1.1%
Representatives from a volunteer organization	89.0%	9.5%	0.7%	0.8%	0.0%
An online professional development community or other online resource	75.8%	21.1%	3.0%	0.1%	0.0%
Students	67.2%	27.3%	4.4%	0.6%	0.5%
Other. Please specify:					

11. As a whole, how well is your district able to meet the need for technology-related teacher professional development?

21.9% Not very well
58.8% Fairly well
19.3% Very well

12. What forms of technology support does your district provide?

Type of technical support	YES	NO
Installing equipment and networks	90.4%	9.6%
Troubleshooting and maintaining equipment and networks	95.9%	4.1%
Installing operating systems and software	96.5%	3.5%
Troubleshooting and maintaining operating systems and software	95.4%	4.6%
Helping teachers to integrate computer activities with curriculum (e.g., help in preparing lesson plans)	77.3%	22.7%
Selecting and acquiring computer-related hardware, software and support materials for schools	93.1%	6.9%
Other. Please specify:		

Section V. Technology and Instruction: Equipment Use

13. To what degree have the following been barriers to the expanded use of educational technology?

	NOT A BARRIER	MINOR BARRIER	MAJOR BARRIER
Hardware Resources			
Insufficient number of computers	21.1%	37.8%	41.1%
Insufficient number of peripheral devices	28.0%	52.7%	19.3%
Insufficient number of other types of technology hardware (e.g., graphing calculators, TVs)	31.0%	50.3%	18.7%
Internet Resource Quality			
Internet connections aren't fast or reliable enough for use during instruction	56.3%	26.4%	17.2%
A lack of age-appropriate or educationally-relevant Web sites for students	51.2%	43.7%	5.1%
Software Resources			
A lack of age-appropriate or educationally-relevant software resources	36.4%	47.4%	16.2%
A lack of software products aligned with State standards	25.5%	49.2%	25.4%
Logistical/Other Barriers			
Lack of trained technical staff available for:			
…product and service acquisition	29.8%	43.0%	27.1%
…installation	36.7%	36.2%	27.1%
…equipment maintenance	33.8%	33.5%	32.7%
School building electric power supply and wiring	35.5%	34.9%	29.6%
School building HVAC (heating, ventilation, air conditioning)	44.4%	34.6%	21.0%
School building security	62.7%	33.3%	4.0%
Lack of space in school buildings	24.9%	41.4%	33.7%
Lack of adequately trained administrators	24.5%	49.2%	26.3%
Lack of adequately trained teachers and other instructional staff	9.6%	57.5%	32.9%
Other. Please specify:	81.2%	4.3%	14.5%

Section VI. Technology and Instruction: Use of Software and Online Resources in the Curriculum

14. Does your district have technology standards for students (e.g., standards regarding proficiencies, uses of technology)?

62.1% Yes, our district has technology standards for students
37.9% No, our district does not have technology standards for students

15. How is the district promoting various types of student use of computers? To what extent does the district use the following strategies/policies?

The district promotes student use of computers by:	NOT AT ALL	SOMEWHAT	A GREAT DEAL
Providing the appropriate software to schools (through district purchasing or by giving schools funds earmarked for educational software)	1.7%	39.7%	58.8%
Recommending the use during the course of professional development activities	3.4%	49.8%	46.9%
Including the use in the curriculum (as "good practice" or in model lessons given to teachers)	6.5%	59.0%	34.5%
Ensuring that the use is included in other district documents as a good example of integration technology in the curriculum	9.2%	55.6%	35.3%
Implementing a policy that building-level technical assistance is available at all schools	20.5%	43.7%	35.9%
Requiring educational technology training	27.1%	45.4%	27.6%
Offering optional educational technology training	7.1%	48.9%	44.0%
Providing mentor follow-ups to training	33.6%	47.2%	19.2%
Providing within-district trainers	17.1%	45.2%	37.7%
Providing outside-district trainers	32.0%	47.3%	20.6%
Providing online support	45.7%	37.1%	15.1%
Partnering with institutions of higher education	56.2%	37.1%	6.7%
Offering demonstrations	12.0%	63.6%	24.4%
Other. Please specify:			

16. Are there written district policies regarding the appropriate use of computers and the Internet by students and/or teachers?

Our district has written policies regarding appropriate use of computers and the Internet for:	YES	NO
Teachers	86.2%	13.8%
Students	98.4%	1.6%

Ü **IF THE ANSWER TO Q16 WAS "NO" FOR BOTH TEACHERS AND STUDENTS, PLEASE GO TO Q18**

17. What types of policies and/or procedures does your district use to ensure appropriate use of computers?

District computer use policy	YES	NO
Students must sign a "contract" agreeing to use computers for appropriate purposes	93.7%	6.3%
Teachers and librarians/media specialists use classroom management techniques to monitor use and instruct students on appropriate use	97.7%	2.3%
Teachers and librarians/media specialists receive professional development on the appropriate use of the Internet in their classrooms	77.0%	23.0%
Filters (i.e., a mechanism to limit Internet access to certain forms of information) are installed on computers	79.0%	21.0%
Other. Please specify:		

Section VII. Evaluation of Technology Initiatives

18. Did the district conduct, or is the district planning to conduct any evaluations of its educational technology initiatives?

84.1% Yes, the district has conducted or is planning to conduct evaluations of educational technology.
15.9% No, the district did not and is not planning to conduct any evaluations of educational technology.

19. Does the district evaluate its technology-related professional development activities?

22.4% No.
58.3% Yes, but the results of the evaluation are not available.
19.3% Yes, the results of the evaluation are available.

Section VIII. Respondent Background and Final Thoughts

20. Which of the following most closely describes your job title? Check as many as apply.

16.0% District Superintendent
5.0% Assistant Superintendent
80.6% Technology Coordinator/Director
13.7% Division Director (e.g., Director of Curriculum)
3.7% Principal/Assistant Principal
8.8% Teacher
13.9% Researcher/Evaluator
9.5% Professional Development Specialist
Other. Please specify: _____

21. How long have you been in your current (or similar) position?

7.1%	less than one year
33.9%	1-3 years
25.8%	4-6 years
10.3%	7-9 years
22.9%	10 years or more

22. How long have you been employed within your current district?

5.7%	less than one year
20.2%	1-3 years
19.9%	4-6 years
12.2%	7-9 years
42.0%	10 years or more

23. Please provide your email address so we may send you your Amazon.com $40 gift certificate as quickly as possible.

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THANK YOU!
WE ARE VERY GRATEFUL FOR YOUR CONTRIBUTIONS TO THIS PROJECT.

If you have any questions about this survey, please contact Teresa García at tgarcia@air.org, or call toll-free, at 1-888-944-5001 (select Option 3). All study participants will be notified of the availability of the final report once it is completed. Please use the space below to share any comments or thoughts you have about this survey. Thank you very much for your time.