



POLICY AND PROGRAM STUDIES SERVICE

---

## **Federal Funding for Educational Technology and How It Is Used in the Classroom:**

### **A Summary of Findings from the Integrated Studies of Educational Technology**

**2003**

---

*U.S. DEPARTMENT OF EDUCATION    OFFICE OF THE UNDER SECRETARY*  
*Doc #*



**U.S. Department of Education**

Rod Paige  
*Secretary*

**Office of the Under Secretary**

Eugene Hickok  
*Under Secretary*

**Policy and Program Studies Service**

Alan L. Ginsburg  
*Director*

**Program and Analytic Studies**

David Goodwin  
*Director*

**October 2003**

---

This report is in the public domain. Authorization to produce it in whole or in part is granted. While permission to reprint this publication is not necessary, the citation should be: U.S. Department of Education, Office of the Under Secretary, Policy and Program Studies Service, *Federal Funding for Educational Technology and How It Is Used in the Classroom: A Summary of Findings from the Integrated Studies of Educational Technology*, Washington, D.C., 2003.

To order copies of this report, write

ED Pubs  
Editorial Publications Center  
U.S. Department of Education  
P.O. Box 1398  
Jessup, MD 20794-1398;

Via fax, dial (301) 470-1244;

Or via electronic mail, send your request to [edpubs@inet.ed.gov](mailto:edpubs@inet.ed.gov).

You may also call toll-free 1-877-433-7827 (1-877-4-ED-PUBS). If 877 service is not yet available in your area, call 1-800-872-5327 (1-800-USA-LEARN); those who use a telecommunications device for the deaf (TDD) or a teletypewriter (TTY) should call 8-800-437-0833.

To order online, point your Internet browser to [www.ed.gov/pubs/edpubs.html](http://www.ed.gov/pubs/edpubs.html).

On request, this publication is available in alternative formats, such as Braille, large print, audiotape, or computer diskette. For more information, please contact the Department's Alternate Format Center at (202) 260-9895 or (202) 205-8113.

# **Federal Funding for Educational Technology and How It Is Used in the Classroom:**

## **A Summary of Findings from the Integrated Studies of Educational Technology**

Technology is now considered by most educators and parents to be an integral part of providing a high-quality education. There is concern, however, that not all students, particularly students in rural schools or schools with a high percentage of minority or poor students, have equal access to educational technology, both in terms of the availability of equipment and the successful integration of technology into the classroom. To address these concerns, the federal government funds a number of programs designed to help encourage the effective use of technology in classrooms and eliminate differences in students' access to technology.

The U.S. Department of Education (ED) contracted with SRI International, the American Institutes for Research, and the Urban Institute to conduct the Integrated Studies of Educational Technology (ISET). ISET consisted of a nested set of state, district, school, and teacher surveys, designed to provide nationally representative information on federal funding for, and uses of, educational technology. This issue brief summarizes the major findings from the three final reports that ISET produced<sup>1</sup>.

### **Federal Role in Supporting Technology**

The vast majority of direct federal funding for educational technology comes from two sources, the E-Rate program and a state formula grant program operated by ED that is dedicated to educational technology. From fiscal years 1997 through 2001, the state formula grant program was known as the Technology Literacy Challenge Fund (TLCF) program; No Child Left Behind, the 2001 reauthorization of the Elementary and Secondary Education Act, replaced the TLCF with the new Educational Technology State Grants (also known as the Enhancing Education Through Technology or EETT) program. There are several major distinctions between the two programs. Under the EETT program, half of the funds received by states are awarded to districts by formula while the other half are awarded competitively as they were under the TLCF program.

---

<sup>1</sup> The three reports are:

(1) Professional Development and Teachers' Use of Technology: SRI International,  
([http://www.sri.com/policy/cep/mst/SRI\\_Professional\\_Development\\_Report\\_2002.pdf](http://www.sri.com/policy/cep/mst/SRI_Professional_Development_Report_2002.pdf))

(2) A Formative Evaluation of the E-Rate Program: The Urban Institute  
(<http://www.urban.org/url.cfm?ID=410579>)

(3) Implementing the Technology Literacy Challenge Fund Educational Technology State Grants Program:  
American Institutes for Research  
([http://www.air.org/program\\_areas/teched/teched-set.htm](http://www.air.org/program_areas/teched/teched-set.htm))

An additional E-Rate report (E-Rate and the Digital Divide: A Preliminary Analysis from the Integrated Studies of Educational Technology) was published as part of ISET, but did not rely on the survey data.

In addition, grantees under EETT are now required to spend at least 25 percent of their funds on professional development in the integration of technology into curriculum and instruction unless they are able to demonstrate to the state that they already provide such training. Funds are further targeted under the EETT program to high-need LEAs and students served by these LEAs. A “high-need local educational agency” is defined as being among those LEAs in the State with the highest numbers or percentages of children from families with incomes below the poverty line and LEAs that serve one or more schools identified for improvement or corrective action under section 1116 of the ESEA, or that have a substantial need for assistance in acquiring and using technology.

A great deal of money for educational technology also comes from the Title I program, as many local districts and schools choose to use their Title I allocations for technology-related expenditures. Other Department programs also provide considerable support for education technology, such as State Grants for Innovative Programs. ISET focused on the implementation of the two direct federal funding streams for technology—E-Rate and the TLCF program—while also analyzing the overall use of technology in the classroom, including activities and equipment funded through Title I or other sources.

**TLCF Program:** The TLCF program was designed to assist states in integrating educational technology into classrooms. Funds were distributed to states using a formula based on each state’s share of funds under Part A of Title I. School districts, either individually or as part of a consortium, then applied to the state for competitive subgrants, with states directed to target awards based on economic need or need for education technology. Under TLCF provisions, states had great flexibility both in choosing who would receive funding and for which activities those funds would be spent. The statute authorized grantees to use funds for, among other things, purchasing computers, improving Internet connections, providing professional development related to technology, and integrating technology into the classroom.

The nationally representative ISET survey of District Technology Coordinators found that 61 percent of districts applied for TLCF funding between 1997 and 2001, with more than two-thirds applying as individual districts and the remainder applying as part of a consortium. High poverty districts were much more likely to apply for funds (77 percent) than were other districts (54 percent). This pattern was likely due to the statutory directive to target TLCF funds to high need districts and the Department’s interpretation of those provisions. Among district technology coordinators, the most commonly reported reason for not applying was a lack of staff time to write the proposal (61 percent of districts that did not apply) followed by a lack of awareness of the program (56 percent of districts). Small districts were significantly more likely than large districts to report that their staff lacked time to write a proposal (76 percent versus 26 percent).

Overall, the TLCF program provided funding to about 12 percent of all school districts in 1997. This number increased to 21 percent in 2000 as program funding doubled. States exhibited wide variation in the number of subgrants awarded and, hence, the average size of each subgrant. Some states awarded a few, large subgrants while others made numerous smaller awards. For the most part, states tended to use the same strategy from year to year.

**Analyzing the targeting of the TLCF program reveals that the percent of funds going to high-poverty districts declined between 1997 and 2000.** Figure 1 presents an analysis of the distribution of TLF funds using a uniform measure of poverty across states based on Census data on the share of families in a district considered to be in poverty. Using the Census data, in 1997, the poorest quartile of districts received 55 percent of TLF funds and the poorest half received 80 percent. However, by 2000, according to the Census data, the targeting of funds to high-poverty districts had declined significantly, with the poorest quartile of districts receiving only 32 percent of TLF funds and the bottom half receiving funds just commensurate with their proportion of the population. Using state-defined measures of poverty (typically based on the share of students eligible for free or reduced-price lunch, although some states used other poverty measures), the percentage of TLF funds going to high-poverty districts did not decline nearly as much over the period, falling only from 78 to 70 percent between 1997 and 2000.

Figure 1. Proportion of district TLF subgrants awarded to high-poverty districts, 1997–2000

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

Other findings regarding the distribution of TLF funds to rural and smaller districts were:

- In 1997 and 1998, rural districts received a disproportionate share of TLF funds compared to their share of student enrollment. According to the 1997-98 Common Core of Data, rural districts enrolled 24 percent of students, yet they received 42 percent of TLF funds in 1997 and 39 percent in 1998. However, beginning in 1999, the distribution of TLF funds to rural and urban districts roughly matched their share of student enrollments.
- Average per-pupil awards were considerably higher for rural as compared to urban districts. In 2000, the per-pupil award for rural districts was \$29.39, while for urban districts it was \$10.48.
- Smaller districts (fewer than 1,675 students) also received higher per-pupil awards than did mid-sized districts (1,675 to 5,262 students) or large districts (more than 5,262 students). In 2000, the per-pupil award for smaller districts was \$121.12 compared to \$26.89 for mid-sized districts and \$11.32 for large districts.

Within districts, 39 percent of TLF subgrantees reported targeting funds to specific types of schools rather than distributing the funds uniformly across all schools. High-poverty districts were significantly more likely to report targeting their funds to specific school types than other districts (57 percent versus 24 percent), most often to elementary schools.

**TLCF funds were most commonly directed at hardware purchases and providing professional development. Nationwide, 54 percent of TLF subgrantees reported using at**

**least 25 percent of their TLCF funds for hardware, and 48 percent of districts spent 25 percent or more of their TLCF funds for professional development.** Other uses of funds, such as expenditures on connectivity, maintenance and technical support, and software and online resources were rarely reported (less than 15 percent of districts) as having constituted 25 percent or more of total TLCF funding. There was wide variation among states in the purpose for which subgrantees were reported to have used TLCF funds.

**E-Rate Program:** The E-Rate program is administered by the Federal Communications Commission<sup>2</sup> and seeks to improve access to digital technology by providing approved schools and libraries with discounts ranging from 20 to 90 percent on qualifying telecommunications services. Discount rates are based on the percentage of students eligible for participation in the National School Lunch program and on whether the school or library is located in a rural area. The program was first funded in 1998 and funding is subject to an annual cap of \$2.25 billion.

The E-Rate program supports the acquisition of digital technology infrastructure, including telephone services (basic, long-distance, and wireless), Internet and web site services, and the purchase and installation of network equipment and services. Other components of educational technology such as computer hardware and software, staff training, and electrical upgrades are not covered under E-Rate. Through January 2000, the largest share of E-Rate discounts (58 percent) were used to support internal building connections, with the poorest districts receiving higher average discounts for this purpose. The remaining discounts were used for telecommunications services (34 percent) and Internet access (8 percent).

An analysis of all E-Rate applications and discount approvals through January 2000 indicates that public schools were the primary recipients of the program, receiving 84 percent of the discounts. This is in part due to the fact that they are much more likely to apply—more than 75 percent of public districts and schools applied for E-Rate discounts, compared to about 50 percent of public libraries and 15 percent of private schools. The program is well-targeted to the poorest communities, with per-student discounts to the most disadvantaged school districts almost 10 times higher than those given to the least disadvantaged districts.

In addition, analyzing school districts that received E-Rate discounts in school years 1998-99 and 1999-00 revealed statistically significant increases in the:

- Proportion of schools and classrooms connected to the Internet;
- Number of phones per student;
- Number of Internet-connected computers and Internet connections per student; and
- Speed of Internet connections.

**Effects of Federal Spending:** The gap in Internet access between high and low poverty schools has narrowed substantially, but significant differences remain in classroom access. While it is not possible to directly link federal funding with technology change in schools or classrooms, Figure 2 reveals that, coinciding with the growth in TLCF and E-Rate funding, the gap in Internet

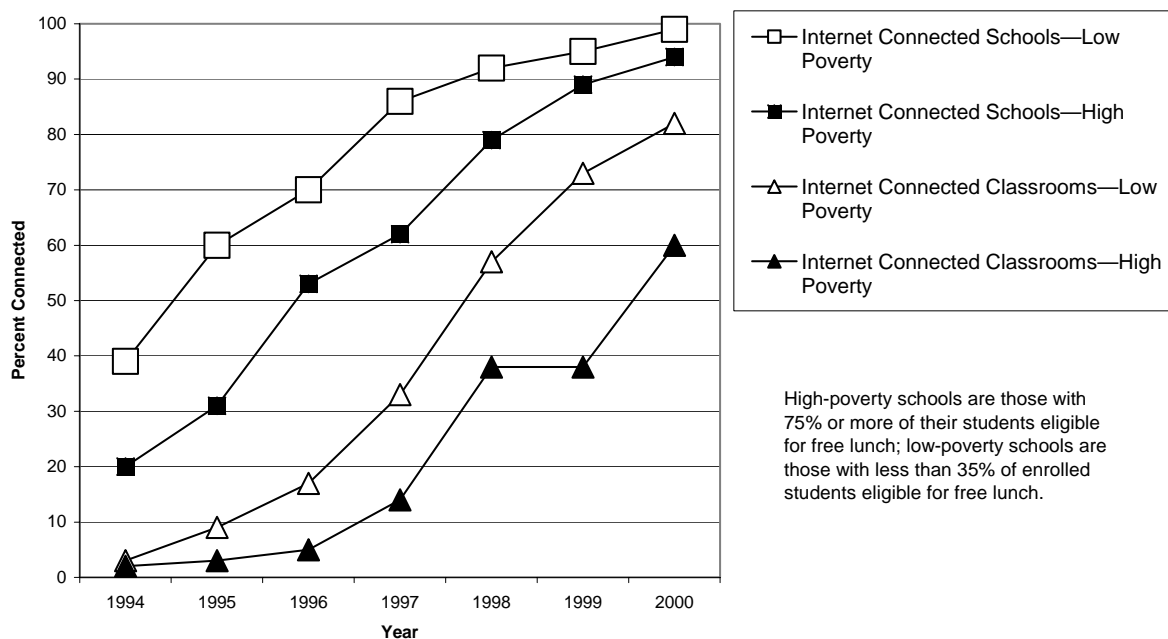
---

<sup>2</sup> More precisely, the program is administered by the Schools and Libraries Division of the Universal Service Administration Company on behalf of the FCC.

access between high poverty schools (those at which 75 percent or more of the students are eligible for free- or reduced-price lunch) and low-poverty schools (those at which less than 35 percent of the students are eligible for free or reduced-price lunch) has narrowed considerably, with few high-poverty schools lacking access to the Internet as of 2000. Gaps still exist, however, between high- and low-poverty schools in classroom access to the Internet, with 80 percent of classrooms in low-poverty schools being connected to the Internet in 2000 versus 60 percent in high-poverty schools.

Another indicator of the narrowing gap between high and low poverty schools is the ratio between the number of students and the number of computers with Internet access. In high poverty schools, the student to instructional computer with Internet access ratio was 17 to 1 in both 1998 and in 1999, and 9 to 1 in 2000<sup>3</sup>, ratios that are well above the recommended ratio of 5 to 1. The corresponding percentages in not-high poverty schools were 11 to 1 in 1998, 8 to 1 in 1999, and 6 to 1 in 2000.

Figure 2: Changes in School and Classroom Internet Access, 1994-2000 (NCES)



The next section of this report addresses the use of technology in the classroom and professional development, findings are presented on whether there was a significant difference found in a number of different areas relating to educational technology between districts receiving TLCF funds and those that did not. It should be emphasized that these differences, or the lack thereof, cannot be attributed to the presence or absence of TLCF funding since it is not possible to isolate the effect of TLCF funding from the numerous other potential factors affecting a district's actions relating to educational technology.

<sup>3</sup> National Center for Education Statistics (2001). *Internet access in U.S. Public Schools and Classrooms: 1994-2000*. U.S. Department of Education, NCES 2001-071.

## Use of Technology in the Classroom

One of the main purposes of ISET was to describe the use of technology in classroom settings, regardless of the funding source. Questions were asked to determine the availability of computers, the use of technology for instructional and professional activities, and perceived barriers to the use of technology.

**Computer Availability:** A key factor affecting the use of technology in the classroom is the availability of computers. In ISET, computer availability was categorized into the following three levels based on teacher reports:

- *High availability:* Having two or more computers in the classroom *and* having access to a computer laboratory with 25 or more computers. This situation was reported by 30 percent of teachers.
- *Medium availability:* Having two or more computers in the classroom *or* having access to a computer laboratory with 25 or more computers. This situation was reported by 51 percent of teachers.
- *Low availability:* *Not* having two or more computers in the classroom *and not* having access to a computer laboratory with 25 or more computers. This situation was reported by 19 percent of teachers.

Teachers in rural districts were less likely to report that their schools met the criteria for the high-availability category; otherwise there were no significant differences in computer availability by school type (elementary versus secondary), poverty, or receipt of TLCF funding.

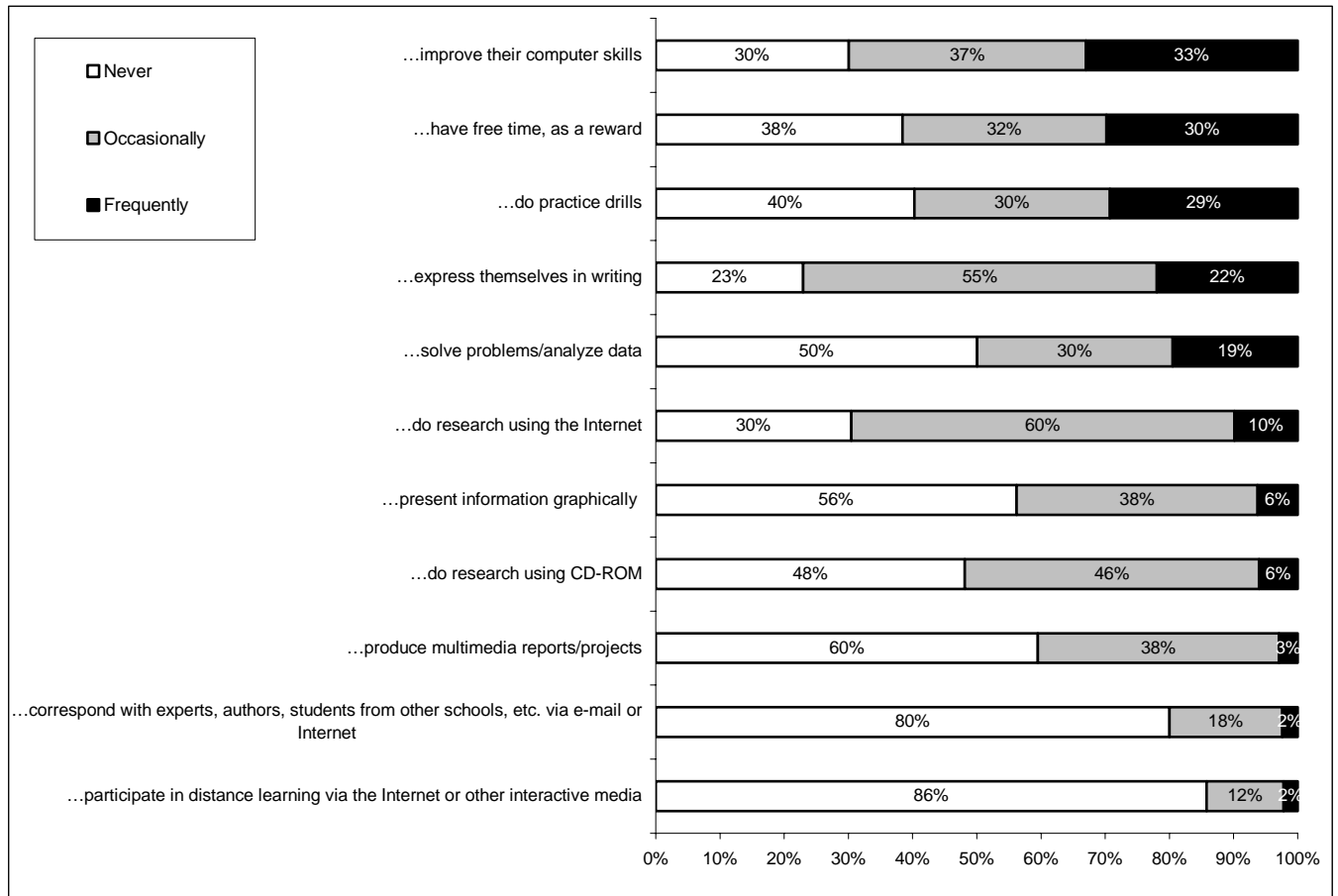
**Instructional Use of Technology:** The above data suggest that the great majority of teachers have some access to computers that could be used for instructional purposes. **Overall, more than half (55 percent) of teachers reported being frequent users of technology for instructional purposes (defined as engaging in at least one computer-related activity a week), with 37 percent of teachers reporting infrequent use of technology for this purpose, and 8 percent reporting no use.** Frequent use of computers for any instructional activity was significantly more common among elementary teachers than secondary teachers (69 percent versus 43 percent). Teachers in high-poverty schools were also more likely than other teachers to report frequent instructional use of computers (64 percent versus 54 percent). However, technology use did not vary significantly by school location or TLCF funding status.

As shown in Figure 3, the computer-related activities in which teachers reported most often engaging their students were as follows: expressing themselves in writing, improving their computer skills, doing research using the Internet, using computers as a free-time or reward activity, and doing practice drills. Significant differences between elementary and secondary teachers in the percentage using technology frequently (at least once per week) were found for the use of technology to improve students' computer skills (46 percent versus 19 percent), as a



free-time or reward activity (44 percent versus 15 percent), and for practice drills (40 percent versus 17 percent). Patterns of technology use were similar in high-poverty and other schools, except that teachers in high-poverty schools were significantly more likely to report the frequent use of technology for practice drills (42 percent versus 25 percent) and as a free-time or reward activity (42 percent versus 26 percent).

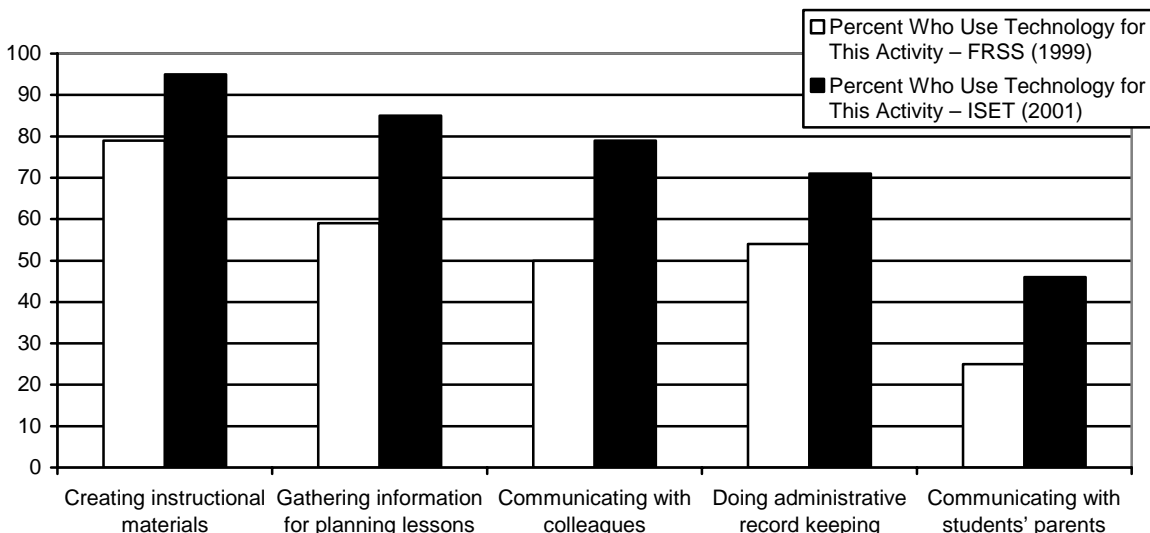
Figure 3. Teacher use of technology with students for different instructional purposes



**Professional Use of Technology:** Figure 4 presents data on teachers’ use of technology relating to professional practices. **The data indicated fairly widespread use of technology for common professional practices, with use growing in each area between 1999<sup>4</sup> and 2001. However, the percentage of teachers indicating they used technology for professional practices frequently (at least once a week) was much lower.**

<sup>4</sup> The 1999 data come from the Fast Response Survey System (FRSS) survey, “Public School Teachers Use of Computers and the Internet” presented in the report *Teachers’ Tools for the 21<sup>st</sup> Century* (2000).

Figure 4. Teachers' Use of Technology for Professional-Practice Activities

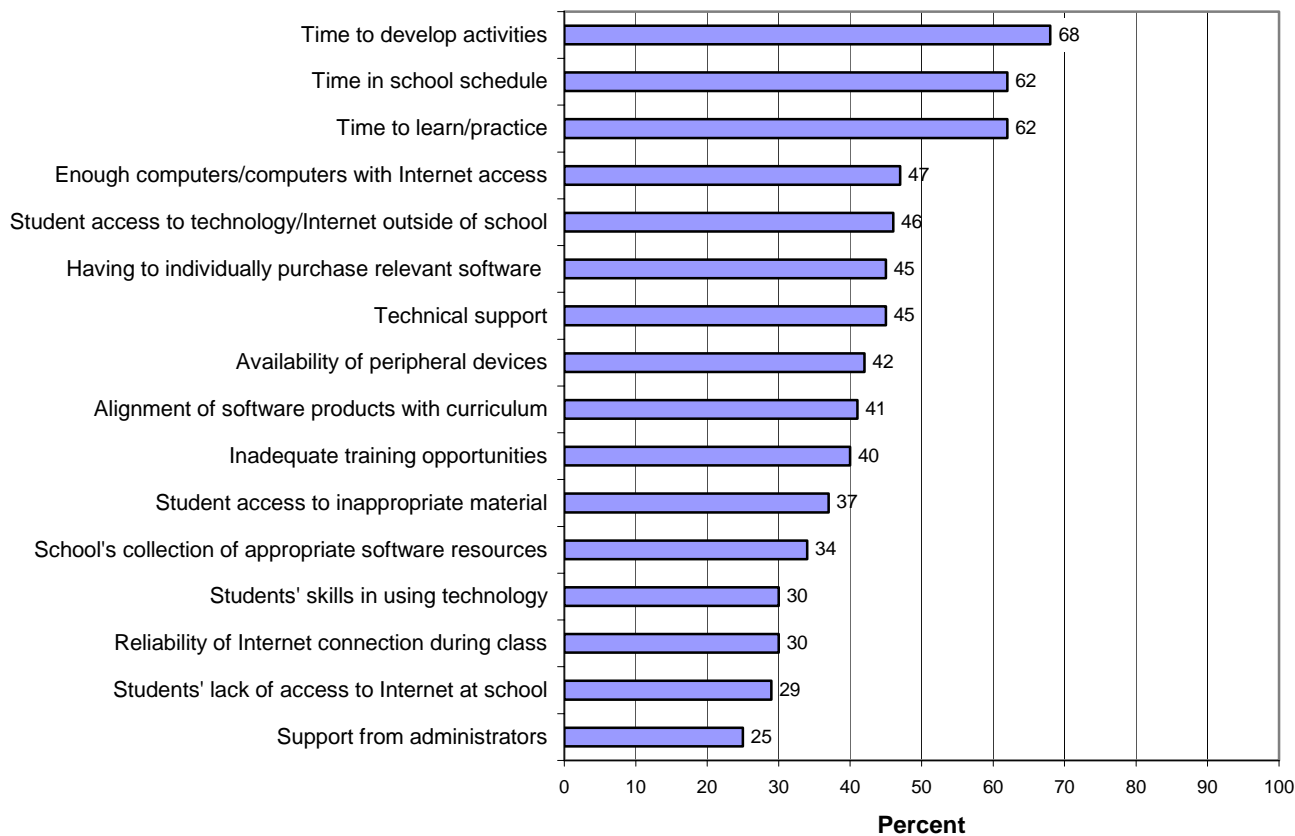


Dividing teachers into two categories depending upon whether their use of technology for professional practices was above or below the median revealed:

- Secondary school teachers were significantly more likely to be in the Higher Professional Use category than were elementary school teachers (68 percent versus 42 percent).
- Secondary teachers in high-poverty schools were significantly less likely to be in the Higher Professional Use category than were secondary teachers in other schools (47 percent versus 73 percent). The use of technology for professional practices was similar between elementary teachers in high-poverty and other schools.
- Teachers in rural schools were significantly more likely to be in the Higher Professional Use category than were urban teachers (60 percent versus 46 percent). Teachers in suburban schools fell in-between, with 56 percent classified in the Higher Professional Use group.
- There was no significant difference in the use of technology for professional practices between teachers in TLCF and non-TLCF participating districts.

**Barriers to the Use of Technology:** ISET also asked teachers about a variety of potential barriers to their use of educational technology. As shown in Figure 5, the three areas that teachers most often indicated as being a moderate to great barrier all had to do with time limitations: limited time to develop new activities that incorporate technology, limited time in the school schedule to conduct activities, and limited time to practice technology skills.

Figure 5. Barriers to Use of Educational Technology: Teachers' Reports of Moderate or Great Obstacles



Examination of teachers' ratings of barriers to the use of technology by school poverty level revealed significant differences for three barriers:

- 77 percent of teachers in high-poverty schools cited students' lack of access to technology or the Internet outside of school as a barrier, compared to 37 percent of teachers in other schools.
- 38 percent of teachers in high-poverty schools cited students' lack of skills in using technology as a barrier, compared to 25 percent of teachers in other schools.
- 38 percent of teachers in high-poverty schools cited students' lack of access to the Internet at school as a barrier, compared to 26 percent of teachers in other schools.

Interestingly, fewer teachers in high-poverty schools in TLCF districts rated the barrier of limited time to develop activities/lessons that use technology as moderate to great, compared with teachers in high-poverty schools in districts not receiving TLCF funds. While this difference cannot be directly attributed to the presence of TLCF funding, it is a phenomenon that will be investigated in upcoming surveys related to the EETT program.

**The lack of home access to computers and the Internet for students at high-poverty schools affected how teachers in these schools employed technology, with far fewer having students use the computer or the Internet to complete assignments outside the classroom (34 percent of teachers in high-poverty schools versus 54 percent in other schools).**

Another potential barrier affecting how teachers use technology in the classroom is the availability of technology support. Nearly all teachers (97 percent) reported that support for education technology use in the areas of hardware, software, and networking were available to them as well as help with integration of computer activities into instruction (83 percent).

**However, only 50 percent of teachers reported that their needs for technical support in the integration of computer activities with curriculum were being met fairly or extremely well.**

Teachers most often indicated (38 percent) that a full-time, paid school technology coordinator was the individual primarily responsible for technology support. **However, full-time, paid school technology coordinators were significantly less likely to be found in high-poverty schools (34 percent versus 52 percent for other schools).** Ratings of the availability and quality of technology support did not differ significantly by district TLCF participation, school size, or school grade level.

### **Professional Development**

As described above, one of the two main uses of TLCF funds was providing professional development for teachers, with approximately half the districts spending 25 percent or more of their funds on this activity. ISET investigated a number of issues related to professional development, including how teachers learn to use technology, the amount and types of professional development received by teachers, characteristics of the professional development received, and the relationship between professional development and technology usage.

**How Teachers Learn to Use Technology:** As shown in Figure 6, formal professional development in the form of courses, workshops, or institutes sponsored by the district is a very common way in which teachers report learning to use technology. Not surprisingly, age played a big factor in the extent to which teachers reported learning to use technology through courses taken as part of their undergraduate or graduate training, with younger teachers significantly more likely to cite their preservice preparation—65 percent of teachers under 30 compared to less than 40 percent for any of the older age groups.

Figure 6. How Teachers Learned to Use Technology

| Method of Learning   | Percentage |
|--|------------|
| Teaching themselves to use it  | 95         |
| From other teachers at the school  | 88         |
| From technology courses, workshops, or institutes sponsored by the district                        | 84         |
| From family/friends  | 78         |
| From students at my school*  | 50         |
| From technology courses offered by a local college or organization other than your school district | 44         |
| From courses offered in your undergraduate or graduate training*                                   | 37         |
| From your own K-12 schooling*  | 13         |

Note: Differences between adjacent rows are not always statistically significant.

\* Item response rates for these four items ranged from 76 percent to 86 percent. This report restricts attention to items for which item response rates were 90 percent or above. For the items designated with an asterisk, although the exact percentages may be unreliable, the data are retained because non-response bias would not substantively change the interpretation of the findings.

Even though teachers felt fairly comfortable in their preparation for using technology for classroom instruction—almost 85 percent said they were at least somewhat well-prepared—they almost unanimously indicated a need for and willingness to obtain additional technology-related professional development. **Teachers reported that professional development to integrate technology into instruction was their greatest need.** When asked specifically in which of 13 areas they needed professional development, the areas most often cited (by over 80 percent of teachers) related to how to integrate technology into instruction—not learning basic computer skills, which was cited by only 37 percent of teachers.

Another indication of the demand for professional development is that over 90 percent of teachers reported being willing to undertake additional professional development in educational technology, with almost two-thirds willing to take 10 or more hours. **Teachers in high-poverty schools seemed particularly willing to engage in more professional development related to educational technology, with 27 percent indicating a willingness to participate in 30 or more hours, compared to 13 percent of teachers in other schools.** Teachers in high-poverty schools were also more likely to report a high need for professional development in how to use technology to help students improve basic academic skills (53 percent versus 39 percent). Otherwise, responses about willingness and need for technology-related professional development were similar regardless of school poverty level, urbanicity, whether the teacher was an elementary or secondary teacher, or whether the teacher was in a district that received a TLCF subgrant.

**Participation in Professional Development: In the past year, approximately three-quarters of teachers had participated in at least one type of formal technology-related professional development activity, with 20 percent of teachers participating in more than two activity types.** The most common form of activity was the within-district workshop, with two-thirds of teachers participating. The next most common activities—out-of-district workshops or conferences; courses for college credit; or committees, task forces, or study groups—were much less common, with only one-fifth of teachers indicating participation in each of these activities. The total number of formal technology-related professional development activities teachers

reported engaging in did not differ depending on the level of the school, location, poverty status, or whether the district received TCLF funds.

Analysis of questions regarding the types of formal technology-related professional development activities engaged in revealed the following:

- The most commonly covered software applications were e-mail, word processing, Internet browsers, and desktop publishing or presentation programs, which were training topics for more than half of the teachers. The least frequently covered topic was the use of integrated learning systems, with only one-quarter of teachers having training in this type of application.
- Integrating technology into instruction was also a common topic of formal professional development—57 percent of teachers had training in using technology to teach basic skills, 59 percent to promote active learning, and 68 percent to teach in their primary content area. This is consistent with the previously reported finding that the vast majority of teachers indicated a need for professional development in integrating technology into instruction. However, only about 40 percent of teachers had training in using technology related to assessment.
- Teachers in high-poverty schools were significantly more likely to report having covered the use of technology to teach basic skills and facts through drills, tutorials, and learning games (70 percent) than were other teachers (54 percent). Elementary school teachers were also significantly more likely to emphasize basics skills practice than were secondary school teachers (57 percent versus 37 percent). Teachers in districts that received TLCF funds were not more likely to report professional development in the use of technology to teach basic skills, however.

In addition, ISET asked teachers questions concerning the presence of a number of key features in their professional development activities. As shown in Figure 7, the majority of teachers reported that most of the key features were present at least to some extent in their professional development. As was the case with barriers to using educational technology, a lack of time appeared to be a major impediment to the effectiveness of the professional development received, with 75 percent of teachers indicating a lack of time to implement new practices in the classroom.

Figure 7. Teacher Ratings of Formal Educational-Technology-Related Professional Development Activities: Characteristics Present “To Some Extent” or “A Great Deal”

| Characteristic   | Percentage |
|--|------------|
| Appropriate to teachers' varying levels of knowledge, skills, and interests              | 82         |
| An opportunity for you to meaningfully engage with colleagues and materials              | 69         |
| Planned or delivered with input from teachers in your district                           | 64         |
| Over multiple sessions, not a one-time experience  | 63         |
| Directly related to the content you teach  | 61         |
| For a substantial amount of time   | 60         |
| Accessible during evening/weekend hours  | 53         |
| Accessible during school hours (i.e., substitutes were provided for you to attend)       | 38         |
| Followed by planning time during the workday to implement new practices in the classroom | 25         |

Note: Differences between adjacent rows are not always statistically significant.

Besides formal professional development activities, 78 percent of teachers also reported engaging in a number of informal professional development activities over the prior year. Most often, these consisted of reading journals or other publications, going to Web sites to get information or materials about educational technology, or informally working with peers or others. Almost 40 percent of teachers reported engaging in three or more informal professional development activities. As with formal professional development, there was no significant difference in participation in informal professional development activities by school type, location, poverty status, or TLCF funding. Combining formal and informal activities, only 10 percent of teachers engaged in no professional development and 65 percent engaged in three or more activities over the past year.

**Relationship Between Professional Development and the Use of Educational Technology:**

One of the issues analyzed in ISET was whether there was a relationship between professional development and the use of educational technology. While a causal relationship could not be estimated, there were several indications of a positive association between the amount and type of professional development teachers received and their increased use of educational technology.

- The greater the number of technology-related professional development activities teachers engaged in, the more likely they were to be frequent users of technology for instructional purposes (even after controlling for a variety of other factors that predict technology use such as teacher age, computer availability, several school characteristics, etc.). The same result also held for professional (non-instructional) uses of technology.
- The majority of teachers indicated that the professional development activities they engaged in prepared them to use educational technology in teaching. Among teachers engaging in within-district workshops, the most common formal professional development activity, only 5 percent said the activity did not prepare them at all to use educational technology in teaching and 64 percent said it prepared them to a moderate or great extent.
- Little difference was detected between formal and informal professional development in terms of their relationship to the use of educational technology. For example, when teachers were asked whether the ability to develop computer-based activities was due to professional

development, their responses were almost identical for formal as compared to informal professional development (due to formal professional development: 39% - not at all or very little, 45% - to some extent, and 17% - a great deal; due to informal professional development: 36% - not at all or very little, 47% - to some extent, and 17% - a great deal).

- Based on teachers' characterizations of their professional development experiences and a list of the key features of professional development identified in the literature, the study concluded that the presence of more key features in teachers' professional development activities increased the likelihood that the teachers would be more frequent users of technology for instructional purposes (even after controlling for a variety of other factors that predict technology use such as teacher age, the number of professional development activities, computer availability, several school characteristics, etc.).
- Teachers whose professional development was more focused on integration into instruction were significantly more likely to report being more frequent users of technology for instructional purposes, even after controlling for a variety of other factors that predict technology use (e.g., teacher age, the number of professional development activities, computer availability, several school characteristics, etc.).