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The Future of Universal Service Fund Support for Organizations: Schools, Libraries and Rural Health Care Providers

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Abstract

The Telecommunications Act of 1996 mandated discounts for high speed connectivity for schools, libraries, and rural health care centers. Innovative although somewhat complex mechanisms were developed to implement this mandate. This chapter identifies some of the key features of these programs and how they have been implemented, issues to be addressed, and recommendations for the future of the program.

1. The Context: Internet and Broadband Access in the U.S.

A decade ago, the Telecommunications Act expanded the definition of universal service to include schools, libraries, and rural health care facilities, and access to "advanced services." The goal was to provide opportunities for students and community residents to take advantage of these "advanced services" even if they were not yet available in their homes, i.e. to help to bridge what became called the "digital divide." Access to the Internet was a high priority.

Affordable access to services available over broadband is becoming increasingly recognized as an important contributor to social and economic development. A 2001 Brookings study by Crandall and Jackson estimated that widespread adoption of basic broadband in the U.S. could add $500 billion to the economy and produce 1.2 million new jobs. In 2004, Charles Ferguson argued that as much as $1 trillion could be lost over the next decade due to present constraints on broadband development.[1]

Yet despite U.S. global leadership in communication technologies and Internet services, broadband availability in the U.S. lags many other industrialized countries. (The U.S. currently ranks 12th among industrialized countries in broadband access per 100 inhabitants according to the OECD.[2]) Broadband costs in the U.S. also remain high. American consumers pay 10 to 25 times more per megabit than users in Japan. Also, average speed of broadband in the U.S. has not increased in the past five years; consumers in France and South Korea have residential broadband connections 10 to 20 times higher than in the U.S. Further, the official FCC definition of broadband (at least 200 kbps in one direction) is considered outdated and inadequate by many experts.

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American broadband adoption is also highly dependent on socio-economic status: almost 60 percent of households with annual incomes above $150,000 have broadband, compared to fewer than 10 percent of households with incomes below $25,000.[3] The gap between rural and urban access persists: broadband penetration in urban areas is almost double that in rural.[4] Rural subscribers with dial-up are much more likely than their urban counterparts to list lack of availability as the reason that they do not have higher speed Internet connection.[5]

Further, access is most limited in the poorest regions. Seven of the ten states with the fewest high speed lines per capita are also among the ten poorest states in the country (Alabama, Arkansas, Idaho, Kentucky, Mississippi, Montana, and West Virginia).[6] Six of these same states are among the ten with the fewest Internet users per 100 residents.[7]

2. Expansion of Universal Service

The Telecommunications Act of 1996 expanded the Universal Service Fund's original mandate to extend reasonably priced telephone services to rural and other underserved areas, to include support for the cost of telecommunications services for schools, libraries, and rural health care providers:

> "Elementary and secondary schools and classrooms, health care providers, and libraries should have access to advanced telecommunications services …. All telecommunications carriers serving a geographic area shall …provide such services to elementary schools, secondary schools, and libraries for educational purposes at rates less than the amounts charged for similar services to other parties."[8]

The Federal Communications Commission (FCC) sets the overall policy for the program, which is administered by a nonprofit entity, the Universal Services Administrative Company (USAC). Funds come from telecommunications carriers, which are required to contribute a set portion of their revenues to the USF. Carriers generally pass through these costs to customers through itemized charges on their telephone bills. USAC makes payments from this central fund to support the Schools and Libraries program, and Rural Health Care program as well other Universal Service programs (Low-Income and High-Cost).

3. Support for Schools and Libraries: The E-Rate Program

The E-rate (short for "education rate") was created by Section 254 (h) of the Act[9] to provide discounts on a wide variety of telecommunications, Internet access and internal connections products and services. All public and private nonprofit elementary and secondary schools are eligible (except those with an endowment of more than $50 million). Libraries are also eligible, subject to conditions that they meet the definition in the Library Services and Technology Act and have a budget completely separate from a K-16 school.

Up to $2.25 billion worth of discounts can be made available each year. First priority is given to requests for support for telecommunications services (services to communicate electronically between sites) and Internet access, while second priority services are internal connections (e.g. wiring, routers, wireless local area networks to connect classrooms) and maintenance of internal connections. Priority 1 services are funded first, and remaining funds for Priority 2 begin with the most economically disadvantaged schools and libraries.[10]

Schools may apply for all "commercially available telecommunications services" ranging from basic telephone services to T-1 and wireless connections, Internet access including e-mail services, and internal networking equipment. Discounts are not available for computers (except network servers), teacher training, and most software.[11] Approved costs are billed directly to USAC, up to the limit of the subsidy. Schools and libraries are responsible for the remainder, and must demonstrate that they can cover their portion of the costs.

The applicable discount rate is based on a school's economic need and whether it is located in an urban or rural area. The proxy for economic need is the percentage of students who are eligible for free or reduced-priced lunches under the National School Lunch Program. The libraries' discount rate is based on the school district or districts in which they are located. Support for telecommunications services and Internet access is provided to all eligible applicants regardless of their level of need.

Table 1: Discounts Available for Schools[12]

Percentage of students who qualify for the National School Lunch Program	Discount for schools located in an urban area	Discount for schools located in a rural area
Less than 1%	20%	25%
1% to 19%	40%	50%
20% to 34%	50%	60%
35% to 49%	60%	70%
50% to 74%	80%	80%
75% to 100%	90%	90%

Decisions to seek E-rate support may be made at the school, library, school district or state level. In some instances, states submit applications on behalf of all the districts in the state. Schools must prepare a technology plan which must be approved by the state before they are eligible to apply for E-rate funds. The purpose of this requirement is to ensure that school staff consider issues such as sources of funding for other equipment and maintenance, training for teachers and students, and strategies for integrating use of computers and the Internet into the curriculum.

The process is rather complex, with a series of forms that must be completed and submitted according to set guidelines and deadlines concerning eligibility, discount categories, service and equipment requirements, allowable equipment and services, etc. Once the school's or library's application is approved, its requirements are posted on USAC's website (www.universalservice.org) for 28 days, following which it may select from competitive bids or negotiate with the carrier serving the area according to E-rate procurement rules and guidelines.

3. Who is Receiving E-Rate Funds?

Some $ 17.7 billion has been allocated since funds were first disbursed in 1998. The top 10 states in E-rate funds committed per capita include four of the poorest states, measured in Gross State Product per capita: Kentucky, Mississippi, Oklahoma, and South Carolina. Two other states have significant native American populations and isolated areas (Alaska and New Mexico), and two others have significant minority populations (DC and Texas).[13] See Table 2.

Table 2:

Top 10 States: **E-rate funds/capita**
DC
Alaska
New Mexico
New York
Mississippi
Oklahoma
South Carolina
Texas
Kentucky
Arizona

Of the total funds disbursed for the E-rate since 1998, 34.2 percent went to schools and libraries eligible for a 90 percent discount, while a total of 86.8 percent went to those eligible for discounts of 60 percent or more.[14]

4. Benefits of the E-Rate

Extending Access and Opportunities

In 1996, about two-thirds of public schools had Internet access. By 2003, virtually every public school could go online. *Education Week* notes: "Perhaps even more striking, high-poverty schools, as well as their low-poverty counterparts, could boast near-universal access to the Internet by that point." As noted above, more than one-third of E-

rate funds or more than $6 billion since inception went to the poorest schools, and a total of more than $15 billion went to schools eligible for a discount of 60 percent or more.[15]

There have been several studies on the benefits of E-rate support to schools. A report sponsored by the Education and Library Networks Coalition (EdLiNC) concluded that:

- The E-rate is an important tool for economic empowerment in underserved communities;
- The E-Rate is beginning to bring new learning opportunities to special education students;
- The E-Rate is transforming education in rural America;
- E-Rate-supported technical infrastructure in schools is vital to reaching student achievement goals in No Child Left Behind legislation;
- Schools and libraries are devoting significant resources in completing E-Rate applications.[16]

Case studies of Chicago, Cleveland, Detroit, and Milwaukee carried out for the Benton Foundation identified several benefits, but also new challenges resulting from E-rate support:

- Network infrastructure deployment has been accelerated, and Internet access improved dramatically.
- E-rate funding has enabled school districts to leverage existing financial resources.
- Professional development needs are increasing geometrically.
- School districts are highly dependent on e-rate funding.
- The E-rate has led to changes in school district planning practices, requiring new knowledge and new collaboration.
- The current E-rate process taxes relationships with vendors.
- The need for building upgrades (in wiring and other hardware, for example) can delay deployment of information technology.[17]

Beyond Access

As the studies above point out, effective utilization of the Internet for education requires not only connectivity, but also capability, content and appropriate context (sometimes called "the four C's). *Education Week*'*s* "Technology Counts 2006" study uses several criteria to evaluate technology on leadership in three core areas of technology policy and practice: access to technology, use of technology, and capacity to use technology.

Concerning Internet access, a teacher commented in Benton's 2002 study: "It's a great leash, but there's no dog."[18] Since 2002, the average level of computer access has hardly changed, remaining close to four students per instructional computer. In 2005, there were 3.9 students for every high speed Internet-connected computer in U.S. public schools. However, the number of students sharing a high speed Internet-connected

computer ranged from less than 2 (1.8 in South Dakota) to 5 or more (in Nevada, California and Utah).[19]

Education Week found that study respondents listed professional development and connectivity/networking as their two highest priorities for technology spending this school year. Nationwide, 15 percent of public schools reported that the majority of their teachers were at a "beginner" skill level in their use of technology. However, like computer access, teacher skill levels vary from state to state. At least one-third of schools in Mississippi and West Virginia reported a majority of teachers were beginners, compared to only 3 percent of schools in South Dakota.[20] Yet technology skills alone are not sufficient. A budget for technical support and maintenance is needed; otherwise, tech-savvy teachers may end up becoming "electronic janitors," just to keep the equipment running.[21]

Effective use of the technology also requires applications that can enrich curricula and extend learning. *Education Week* notes: "… states are taking steps to help expand the use of educational technology both through standards for students and via efforts to push the boundaries of conventional schooling."[22] Twenty-two states have established a state virtual school, and 16 states have at least one cyber charter school. About 19 percent of public schools offered their own distance-learning programs for students. Again, the introduction of distance learning varies, with Alaska having the greatest use, likely because of the limited teaching resources in its isolated village schools.

From Basic Connectivity to Broadband

Broadband in schools is important both to enable multiple users to be online, and to allow for data-rich applications such as multimedia web access and video conferencing. An Alaskan analysis of school bandwidth requirements states: "Dial-up connectivity does not allow for efficient data flow and usually will not allow such services as e-mail for group use. Normally, a school with dial-up will only transmit information, not being able to rely on downloading or browsing." It notes that "Less than T-1 [1.544 mbps] connectivity allows Internet use for data transfer, web searches, e-mail and web posting. Under normal circumstances, information flows at speeds allowing for group use, but may be overwhelmed. Video services can be used with some loss of picture and sound quality, but usually will require that other traffic, such as Internet use, be shut down."[23]

Also, as applications become more demanding of bandwidth, many K-12 schools have expressed an interest in an Internet 2 connection. A study by the Pennsylvania Department of Education states that full use of the applications provided by Internet 2 requires nearly 10 megabits per second.[24] Mark Cooper notes that at the time of the passage of the Communications Act of 1934, telephone penetration rates were about 40 percent -- similar to current rates with broadband. He states: "The vision that inspired a policy that brought telephone penetration above 90 percent must now be applied to high-speed Internet access."[25]

5. Rural Health Care

In section 254 of the Telecommunications Act of 1996, Congress sought to provide rural health care providers "an affordable rate for the services necessary for telemedicine and the instruction relating to such services." Specifically, Congress directed telecommunications carriers "to provide telecommunications services which are necessary to health care provision in a State, including instruction relating to such services, to any public or nonprofit health care provider that serves persons who reside in rural areas of that State, at rates that are reasonably comparable to rates charged for similar services in urban areas of that State."[26]

The Rural Health Care Division of USAC administers a program that provides up to $400 million annually so that rural health care providers pay no more than their urban counterparts pay for the same or similar telecommunication services. To qualify for universal service support, a health care provider (HCP) must be a public or not-for-profit organization located in a rural area. In addition, not-for-profit HCPs, in both rural and urban areas, may qualify for Internet access assistance if they are unable to access the Internet via a toll-free or local call, and must therefore dial into the Internet via a toll (long distance) call.

The HCP may seek support for eligible services, which include mileage-related charges, various types of connectivity from leased telephone lines to frame relay, integrated services digital network (ISDN) or T1 circuits, mileage charges, and one-time installation charges. End user equipment such as computers, telephones, fax machines, as well as maintenance charges, are not eligible for support.[27] All telecommunications common carriers may participate, including interexchange carriers (IXCs), wireless carriers, and competitive local exchange carriers.

Each eligible HCP requests bids for telecommunications services to be used for provision of health care through postings on the USAC website. Requests for bids must be posted on the USAC website for 28 days before the HCP can enter into an agreement to purchase services from a carrier. The HCP must consider all bids received and select most cost-effective method to meets its health care communication needs. [28]

By 2003, only 1194 of 8300 potential applicants had received support, and the fund disbursed only $30.25 million in first five years out of a potentially available $200 million. Therefore, the FCC implemented several changes to eligibility requirements and comparative pricing guidelines designed to make the USF discount more widely available and simpler to implement.[29] For example, eligible health care providers could receive 25 percent discounts off the cost of monthly Internet access[30], and rural health care providers in states considered to be entirely rural can receive support equal to 50 percent of the monthly cost of advanced telecommunications and information services.[31]

Despite these modifications, the program continued to be underutilized; the FCC notes: "…in each of the past 10 years, the program generally has disbursed less than 10 percent of the authorized funds."[32] According to USAC data, a total of $168.5 million

was disbursed for Rural Health Care from 1998 to 2005 inclusive.[33] Some $97.4 million or 58 percent of the funds during that period went to Alaska, primarily to link village clinics to regional hospitals, and to link the hospitals to medical centers in Anchorage, under the AFHCAN initiative. [34]

The FCC therefore authorized a two-year pilot program in September 2006 that could allocate up to $100 million in RHC funds for construction of dedicated broadband networks to connect health providers in a state or region, and to support the cost of connecting these networks to Internet2. The purpose of the pilot program is also to provide information that could guide revision of the current RHC rules. The objective would also be to contribute to increasing broadband connectivity for many purposes: "If successful, increasing broadband connectivity among health care providers at the national, state and local levels would also provide vital links for disaster preparedness and emergency response and would likely facilitate the President's goal of implementing electronic medical records nationwide."[35]

6. Key Issues

6.1. Should these Programs remain under the FCC?

Some federal officials have proposed that the E-rate should be merged with other Department of Education technology programs. However, because of its direct role as a key component of universal service policy, the E-rate should remain independent of other government departments and under the administration of the FCC. As Senator Jay Rockefeller (D-WVa) states, consolidating the E-rate would be breaking a deal cut as part of the 1996 Telecommunications Act:

> "The telecommunications companies wanted more competition and the ability to expand. In exchange, we insisted on a strong, continued commitment by the telecommunications companies to "preserve and advance" universal service including access to advanced telecommunication services for schools, rural health care providers and libraries."[36]

6.2. Should E-Rate Funds support Capability and Content?

Some educators advocate expanding E-rate funding beyond connectivity to support training, technical support, and content. However, given the pressures on the funding base and ongoing requirements for connectivity subsidies, E-rate funds should be limited to supporting connectivity, while other sources should be tapped for these additional important needs.

Several alternatives have been proposed to fund additional activities in technical training and support and content development. One approach is to provide support from other government agencies, such as the federal Department of Education. For example, the Enhancing Education Through Technology (EETT) program, which was authorized

as Title II-D of the No Child Left Behind Act (NCLB), enables schools to address core teaching and learning needs through technology, including:

- access to courses online that are otherwise unavailable;
- delivering professional development programs so that teachers have the skills and knowledge to take advantage of new and emerging technology tools;
- providing students with technology skills and tools to compete in a competitive, technology-intensive labor market.[37]

States distribute funds to school districts with 50 percent allocated by a poverty-weighted formula and 50percent by competition. EETT gives schools broad discretion to use program resources for technology-related acquisition, enrichment, professional development and integration purposes aimed at improving student achievement and student technology access.[38]

However, although the EETT was authorized in the NCLB legislation at $1 billion per year, it was funded at about $690 million for its first three years in Fiscal Years 2002-2004, and was reduced to $496 million in FY2005 and to $272 million in FY2006.[39] Clearly, additional funds are needed to enable this program to achieve educational technology goals and to complement the support for connectivity through the E-rate.

Another source of federal funds could be the proceeds from FCC spectrum auctions. Digital Promise proposes establishment of a nonprofit nongovernmental Digital Opportunity Investment Trust (DO IT) "designed to meet the urgent need to transform learning in the 21st century." It states that "libraries, archives, museums, school systems, community colleges, universities, arts and cultural centers, public broadcasting stations, and other such institutions need to make innovative use of advanced information technologies to continue to serve their essential public purposes."[40]

The trust would use FCC spectrum auction funds for learning software and tools to make use of Internet and for information and communication technologies for education. The proponents draw parallels to the historic use of revenues from the sale of public lands "which helped finance public education in every new state and created the great system of land-grant colleges voted by Congress and signed by President Lincoln during the darkest days of the Civil War."[41]

6.3. Why should Key Elements of the E-rate Process be Retained?

The E-rate funds allocation process has several unique features that should be retained:

- **Awards to the user:** The E-rate funds are awarded to the user (school or library) rather than directly to the carrier or vendor. This approach serves to empower the schools and libraries as customers of the carriers, rather than supplicants. In some cases, schools and libraries have become "anchor tenants" for these carriers, encouraging them to bring broadband into previously unserved communities.

- **Competitive bids:** The E-rate process requires competitive bids for approved services through the USAC website. This approach not only creates incentives to minimize costs, but also encourages new entrants in addition to incumbents and large vendors to provide equipment and services for schools.

These approaches differ from the models used in most other countries, where subsidies go directly to carriers, and incumbents may be required to provide discounted or free service to schools. In these other models, carriers have no incentive to provide high quality of service to schools if they see no revenue potential. Further, if they receive direct government subsidies to provide the service, they may have no incentive to minimize costs. The incentive-based E-rate model, while not perfect, is far superior.

6.4. How Can the E-Rate Process be Improved?

Waste, Fraud and Abuse:

The E-Rate Program has been subject to allegations of waste, fraud and abuse. Some school districts have purchased equipment that was unnecessary, too costly or beyond their capability to manage. Equipment vendors have been accused of fraud and price-rigging.[42] In 2003, USAC, with support from the FCC, convened a task force to recommend steps to strengthen and improve E-rate compliance procedures and protections from waste, fraud and abuse.[43] In December, 2003, the House Committee on Energy and Commerce requested the Government Accountability Office (GAO) to prepare a report on the FCC's management and oversight of the E-Rate Program. The GAO found evidence of some mismanagement of E-rate funds, bureaucratic delays in disbursing funds, and some waste of E-rate resources. Its report called for the FCC to strengthen its management and oversight by determining comprehensively which federal accountability requirements apply to the E-rate, establishing E-rate performance goals and measures, and taking steps to reduce beneficiary appeals.[44] In March 2005, the House Committee held hearings on the GAO report.[45]

USAC and the FCC have taken significant steps to rectify these problems. They are also being addressed through the FCC in its Notice of Proposed Rulemaking (NPRM) on USF management, administration and oversight.[46]

At the Federal Level:

Although there are strengths in the E-rate allocation process, the program has proved difficult to implement and administer. Some educators and librarians have found that it places a heavy burden on them in terms of time, effort and expertise. The application process is demanding, and requires careful monitoring and attention to detailed specifications and submissions.

The required technology plan was intended to force schools to think through how they would address the "other C's" including teacher competency and relevant content, as

well as how they would fund ongoing technical support and maintenance. Yet some schools have simply outsourced the preparation of the technology plan, or used a "cookie cutter" model that satisfies the requirement but not the intended benefit of preparing the plan.

At the State and Local Level:

States and school districts themselves could work to improve the process and the funding available to their schools. While the preponderance of E-rate funds is going to poor and disadvantaged states and school districts, there are still eligible schools that remain unfunded. Some have secured funding from their state or from local sources. But other schools that could use the funds have not applied. One strategy that the school districts and state coordinators could use more effectively is mentoring. A resource person who can provide advice, critique draft submissions, and trouble-shoot the process can make a major difference. One explanation for Alaska's significant success in obtaining E-rate funds was the assignment of a state librarian as state E-rate coordinator to help the schools and libraries prepare applications and navigate the E-rate labyrinth. She provides advice, explains the requirements, and assists in completing the forms and tracking their progress.[47]

Some educators and librarians are already organized to take advantage of state technology initiatives such as the Texas Infrastructure Fund (TIF). State officials in Vermont, on the other hand, noted that their school districts are very small, and may not have the staff time or expertise to get through the process.[48]

Many school districts state that they would have difficulty finding funds to pay for connectivity if E-rate funds and discounts were discontinued. While this claim demonstrates the value of the E-rate subsidy to the schools, it also shows that school districts need to examine how they allocate their available technology dollars, and whether they can diversify their funding sources or include connectivity costs in their annual budgets.

6.5. Should the Rural Health Care (RHC) Program be continued?

Should a program that has disbursed less than 10 percent of its authorized funds since 1998 be continued? The answer is not as simple as it would appear. First, the amount of $400 million per year was a very rough estimate without much foundation. Second, there has been very limited publicity about the program. Third, its application procedures have been very complex, and until recently, the discount for high speed connectivity in many rural areas was minimal.

The FCC has now changed the formulas for calculating the discounts, and included discounts for Internet access. It has also now announced a two-year pilot program to support investment in broadband infrastructure to link health providers and to provide guidance for the future of the program. The RHC should be allowed to continue

at least through the next two years, subject to findings from the pilot program, which should include independent evaluation.

6.6. Should the USF fund infrastructure?

The RHC pilot program includes funding for broadband infrastructure. In addition to linking health facilities, these networks, as the FCC points out, could also provide vital links for disaster preparedness and emergency response and facilitate the goal of implementing electronic medical records nationwide. Extension of broadband networks to connect schools and libraries has also brought broadband to neighborhoods and rural communities that previously lacked access. The FCC should continue to explore how USF funding for schools, libraries and rural health care can contribute to the national goal of providing universal access to broadband.

7. Recommendations

While not flawless, the Universal Service Programs for schools, libraries and rural health care have provided significant benefits to students in enabling them to use the Internet and other electronic services for education, to community residents in providing access to the Internet in libraries, and to people dependent on rural health care services.

Based on the above analysis, the following are recommended policies for the future of these programs:

1. Continue the Universal Service Fund organizational programs for schools, libraries and rural health care as a permanent component of universal service.

2. Keep responsibility for the Universal Service Fund programs for schools, libraries, and rural health care at the FCC, but establish advisory committees with membership from the Departments of Education and Health and Human Services as well as from professional educational, library and health care organizations, and experts on utilization of information and communication technologies (ICTs) in these fields and evaluation of ICT programs and impacts.

3. Continue the following E-rate policies:

    a. Limit funding to connectivity and related facilities
    b. Maintain discounts based on poverty and rurality
    c. Maintain competitive bidding process for vendors.

4. Require a triennial review of FCC and USAC administrative, application and oversight procedures to improve efficiency, effectiveness and transparency of funds disbursement.

5. Require that a small percentage of USF funds be used for outreach to make more educators, librarians and rural health care providers aware of the programs and how to

participate, and for evaluation to update and analyze data on program utilization and to assess impacts of USF support.

6. Identify sources of federal funds to support the other factors critical to effective utilization of ICTs: capacity-building for teachers and others in using ICTs, development and exchange of effective content for education and other development applications, and contextual applications (based on factors such as language, culture, ethnicity, disabilities).

NOTES

[1] Cited in Bleha, Thomas. "Down to the Wire." *Foreign Affairs*, May/June 2005.

[2] Source: www.oecd.org/sti/ict/broadband, data from December 2005.

[3] Turner, S. Derek. "Broadband Reality Check," Free Press, August 2005.

[4] Turner, S. Derek. "Broadband Reality Check," Free Press, August 2005.

[5] "A Nation Online: Entering the Broadband Age." National Telecommunications and Information Administration, September 2004.

[6] Measured in Gross State Product per capita. (New Mexico, also in the bottom 10 in high speed lines per capita, is the 11th poorest state measured by GSP per capita.) Source: FCC, as of June 30, 2005, and US Census Bureau, October 2005.

[7] Alabama, Arkansas, Mississippi, Oklahoma, South Carolina, and West Virginia. Source: "Computer and Internet Use in the United States: 2003", US Census Bureau, October 2005.

[8] Telecommunications Act of 1996, Public Law No. 104-104, 110 Stat. 56 (1996).

[9] Also known as the Snowe-Rockefeller-Exon-Kerrey amendment.

[10] See http://www.universalservice.org/sl/tools/reference/eligserv_framework.asp. Starting 2005, eligible entities are able to receive support for Internal Connections in two of every five funding years.

[11] For details, see www.sl.universalservice.org/Reference/eligible.asp.

[12] Source: FCC E-rate Fact Sheet.

[13] Source: www.universalservice.org.

[14] Derived from cumulative annual commitment data available at www.universalservice.org.

[15] Derived from cumulative annual commitment data available at www.universalservice.org.

[16] EdLiNC, "E-Rate: A Vision of Opportunity and Innovation." Education and Library Networks Coalition, 2003.

[17] Carvin, Andy, ed. "The E-Rate in America: A Tale of Four Cities." Washington, DC, Benton Foundation, 2000, pp. 16-17.

[18] Quoted in Dickard, Norris, ed. "Great Expectations: Leveraging America's Investment in Educational Technology" Benton Foundation and Education Development Center, 2002, p. 20.

[19] Swanson, Christopher B., "Tracking U.S. Trends," *Education Week*, May 4, 2006.

[20] Swanson, Christopher B., "Tracking U.S. Trends," *Education Week*, May 4, 2006.

[21] Dickard, Norris, ed. "Great Expectations: Leveraging America's Investment in Educational Technology" Benton Foundation and Education Development Center, 2002, p. 23.

[22] Swanson, Christopher B., "Tracking U.S. Trends," *Education Week*, May 4, 2006.

[23] Matthis, Della. "E-Rate in Alaska: Telecommunications – Expanding Education and Library Service," June 2006. Available at http://library.state.ak.us/usf/Bandwidthreport5-06.doc.

[24] Matthis, Della. "E-Rate in Alaska: Telecommunications – Expanding Education and Library Service," June 2006. Available at http://library.state.ak.us/usf/Bandwidthreport5-06.doc

[25] Cooper, Mark. Testimony before the US House of Representatives Committee on Energy and Commerce regarding Universal Service, June 21, 2006, p. 4.

[26] Public Law 104-104, the Telecommunications Act of 1996. See 47 U.S.C. (h)(2)(A)

[27] For details, see www.rhc.universalservice.org/eligibility/services.asp.

[28] The Federal Communications Commission (FCC) defines "most cost effective method" as "the method of least cost after consideration of the features, quality of transmission, reliability, and other factors relevant to choosing a method of providing the required services." See www.rhc.universalservice.org.

[29] Federal Communications Commission, Report and Order, Order on Reconsideration, and Notice of Proposed Rulemaking in the Matter of Rural Health Care Support Mechanism, November 13, 2003.

[30] Federal Communications Commission. *2003 Rural Health Care Report and Order and FNPRM*.

[31] Federal Communications Commission. *2004 Rural Health Care Report and Order and FNPRM*.

[32] Federal Communications Commission. "In the Matter of Rural Health Care Support Mechanism," WC Docket No. 02-60, adopted September 26, 2006, p. 3.

[33] Analysis by the author of annual commitment data provided at http://www.rhc.universalservice.org/funding/asc/

[34] See www.afhcan.org and Hudson, Heather "Rural Telemedicine: Lessons from Alaska for Developing Regions," Proceedings of Med-e-Tel 2006, Luxembourg, April 2006.

[35] Federal Communications Commission. "In the Matter of Rural Health Care Support Mechanism," WC Docket No. 02-60, adopted September 26, 2006, pp. 1-2.

[36] Senator Jay Rockefeller (D-WVA) quoted in Dickard, Norris, ed. "Great Expectations: Leveraging America's Investment in Educational Technology" Benton Foundation and Education Development Center, 2002.

[37] Other uses include computer-based testing, and disaggregating and reporting of student data.

[38] Coalition on School Networking: www.cosn.org/about/press/071906.cfm.

[39] Coalition on School Networking: www.cosn.org/about/press/071906.cfm.

[40] Source: www.digitalpromise.org.

[41] Source: www.digitalpromise.org.

[42] See, for example, Dotinga, Randy. "Fraud charges cloud plan for 'wired' classrooms" The *Christian Science Monitor*, June 17, 2004.

[43] Recommendations of the Task Force on Prevention of Waste, Fraud and Abuse, September 2003.

[44] United States Government Accountability Office (GAO). "Telecommunications: Greater Involvement Needed by FCC in the Management and Oversight of the E-Rate Program. Report to the Chairman, Committee on Energy and Commerce, House of Representatives, February 2005.

[45] "Problems with The E-Rate Program: GAO Review Of FCC Management And Oversight." Hearing Before The Subcommittee On Oversight And Investigations Of The Committee On Energy And Commerce, House Of Representatives, March 16, 2005

[46] Federal Communications Commission, Notice of Proposed Rulemaking: "Comprehensive Review of Universal Service Fund Management, Administration, and Oversight." WC Docket No. 05-195, released July 20, 2005.

[47] Personal interviews with Della Matthis, Alaska E-rate coordinator.

[48] Personal interviews with Vermont officials, April 2004.