Evaluation of
The Appalachian Regional Commission's Telecommunications Projects: 1994–2000

Study conducted by Westat
for the Appalachian Regional Commission

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Executive Summary

Telecommunications technology has become an integral part of daily life for much of the United States. Yet, as pervasive as it is, there are still whole regions of the country that have not been exposed to the full range of applications of these technological advancements (Federal Communiation Commission 2000). When these regions continue to operate with traditional, less efficient modes of business, governance, and education, they fall behind, resulting in what has been called "the digital divide." There have been several federal initiatives aimed at reducing the digital divide, but despite these efforts, the region of Appalachia has yet to fully benefit from the telecommunications revolution. Aiming to address the disparities, the Appalachian Regional Commission (ARC) instituted its Telecommuniations Regional Initiative in 1995-1998, which was later expanded into the Information Age Appalachia Program in 2001. The program's goal is to stimulate economic growth and improve the overall standard of living in the region by funding individual projects that focus on building access to telecommunications infrastructure, infusing telecommunications technology into the business sector, and cultivating the skills and knowledge of the region's citizens to use the technology effectively. This report summarizes findings from an evaluation study of the 70 completed telecommunications projects funded by ARC between 1994 and 2000.

Study Overview

At the time this study was initiated, there had been no systematic assessment of whether ARC's telecommunications projects had lived up to their promise and potential, what problems they encountered, and what ways of operating led to their successes and shortcomings. It was also not known whether projects were able to sustain themselves beyond the period of ARC funding, and for those that were, how they were able to expand and evolve, given available resources, community and stakeholder buy-in, and careful decisionmaking. The following report addresses these issues, and aims to serve as both an extensive description of all completed telecommunications projects funded by ARC between 1994 and 2000, as well as an exploratory analysis of best practices. The study set out to address the following questions:

- What are the characteristics of communities and individuals that benefited from the projects?
- What problems or limitations were projects designed to address?
- What approaches did projects use to ameliorate these problems or limitations? To what extent were the approaches multifaceted?
- To what extent were projects serving multiple community stakeholders?
- What outcomes were projects designed to achieve?
- To what extent have projects accomplished their objectives?
- What factors influenced projects' ability to implement their approaches and achieve their objectives?
- How are projects sustaining themselves?
- To what extent are projects enhancing access to telecommunications services and improving the utilization of information services?

The evaluation employed both quantitative and qualitative methods to address the study's outcome and process questions. The approach included four integrated activities:

- An extensive review of project files to gain a better understanding of the purpose, scope, and goals/objectives of the 70 projects in the study.

- A literature review to gauge the extent of research on topics relating to access to telecommunications infrastructure and applications in the Appalachian region, as well as federal initiatives to promote infrastructure in the nation.

- A telephone survey to collect broad-based data on the implementation and impact of the 70 telecommunications projects funded by ARC.

- Case study site visits to 16 of the 70 projects to obtain more detailed information about project-related implementation experiences, accomplishments, and impacts.

PROJECT CONTEXT

The 70 projects examined in this study reflect the diversity of constituencies served and the broader range of social, economic, and infrastructural contexts in Appalachia. Given ARC's emphasis on creating access to infrastructure, and the fact that rural areas tend to lag behind cities in this respect, it is not surprising that most (91 percent) of the telecommunications projects funded by ARC were located in whole or in part within nonmetropolitan areas. Across the 70 projects, 40 (57 percent) were operating in areas that included economically distressed counties, compared to 30 (43 percent) that included no distressed counties.

ARC telecommunications projects were encouraged to serve at least two sectors in their communities. Sixty-one of the 70 respondents (87 percent) reported that their project was intended to serve more than one sector. The majority (73 percent) of projects were intended to serve the education sector, with 49 projects (70 percent) serving the economic development sector, and 43 projects (61 percent) serving the government sector. Over half were also intended to serve business or the private sector (56 percent) and community or social services sectors (56 percent).

Survey findings indicate that the 70 telecommunications projects funded by ARC were overseen by a range of organization types. Almost half (47 percent) of the organizations receiving ARC telecommunications grants were educational organizations, and 26 percent were government organizations. In most cases, grant recipient organizations were preexisting entities that carried out a wide range of activities not necessarily limited to telecommunications technology. However, in some cases, grant recipient organizations were specifically geared toward the advancement of telecommunications technology within their regions.

While the overall purpose of ARC-funded telecommunications projects is to infuse communities with telecommunications infrastructure along with the accompanying technical skills and knowledge, projects were quite varied in nature and had a wide range of goals. According to survey results:

- Projects were most frequently designed to improve skills training and educational opportunities (87 percent), and to enhance economic development (74 percent).

- Nearly two-thirds of the 70 projects aimed to enhance community development, long-term telecommunications capabilities, and/or the coordination of community-wide information (66 percent for each).

- Forty-two of the 70 projects (60 percent) aimed to improve delivery of and access to government services, and 35 projects (50 percent) aimed to enhance employment opportunities.

PROJECT IMPLEMENTATION

While the ARC-funded telecommunications projects were diverse in make-up and purpose, they shared certain features in terms of the activities that they carried out, the kinds of equipment purchased, the kinds of training

conducted, and the ways in which their approach was planned and promoted. The most frequently conducted activity was providing onsite education and training (84 percent). In addition, 81 percent of the projects in the study facilitated communications between various regions or organizations, while 71 percent provided training specifically in the use of telecommunications technologies and 64 percent established new computer or telecommunications access centers. The survey revealed that most projects employed multiple activities as part of their approach, and the case studies lend credence to this conclusion.

Telecommunications devices that were most likely to be made available to project participants included personal computers (61 percent), network computers (57 percent), and videoconferencing units (51 percent). Among the 48 projects that helped participants gain access to the Internet, the most common type of Internet service provider (ISP) was a commercial ISP (60 percent), followed by university or college networks (42 percent), K-12 school networks (40 percent), and state or local government networks (35 percent).

PROJECT ACCOMPLISHMENTS AND IMPACT

Survey findings and site visit interviews suggest that the ARC-funded telecommunications projects left an imprint on the communities in which they operated, and in many cases set into motion further changes of import to the ways in which business, governance, and education are carried out. Most projects reported fulfilling their goals to the same or greater extent as expected. For example, of the 61 respondents who reported that improving skills training and educational opportunities was a goal for their project, 69 percent indicated that their success was the same as expected, 23 percent indicated that it was more than expected, and 8 percent reported that it was less than expected. Of the 52 projects that were designed to enhance economic development, 71 percent reported their success to be the same as expected, 14 percent indicated that it was more than expected, and 15 percent indicated that it was less than expected.

Results of the telephone survey reveal that many of the 70 telecommunications projects would never have existed, or would have been seriously impaired, without ARC support. The case study sites affirmed that ARC-funded telecommunications projects had a substantial impact in many communities, increasing access to telecommunications infrastructure, as well as knowledge about its applications. In addition, the infusion of telecommunications technology triggered important new connections within communities among institutions, agencies, businesses, and individuals.

Besides the tangible impacts of projects, it should be noted that some ARC-funded telecommunications projects had intangible, but no less significant, impacts on communities. The case studies found that projects often had the effect of exposing their staff and others to the potential of telecommunications technologies. The educational value of these projects should therefore not be underestimated, since it made apparent new possibilities and instigated thought on how these technologies could be applied in creative ways for the advancement of individuals and communities.

PROJECT PERFORMANCE MEASUREMENT

In the current environment of enhanced accountability, federal grant projects must be able to demonstrate that their activities led (or at least contributed) to tangible and measurable outcomes. In order to assess the quality of the outputs and outcomes anticipated by the ARC telecommunications projects, we conducted a systematic review of the proposals submitted by the 16 case study sites. The purpose of the review was to evaluate the content, clarity, and measurability of the original outcomes proposed by these 16 projects, as well as to assess the extent to which these projects achieved their anticipated outcomes.[i] For the purposes of the

[i] Since the remaining 54 ARC telecommunications projects were not included in this analysis, it is not possible to conclude whether the findings in this section pertain to the entire study sample.

analysis, *outcomes* included statements that referred to benefits to individuals, organizations, or communities. Other statements that referred to the means to these ends were treated as *outputs*.

Among the 16 case study projects, 73 outputs and outcomes were culled from proposals and ARC memorandums. Of these 73 statements, 36 (49.3 percent) were classified as outcomes, and 37 (50.7 percent) were classified as outputs. Ten of the 16 case studies had at least one numeric benchmark, although it should be noted that the six without any number benchmarks all began before 1998, the year in which ARC revised its application and reporting guidelines. Many of the output and outcome statements identified across these 16 projects were vague and imprecise—and an analysis of the final reports revealed that many projects did not provide adequate information or data supporting their claims that these outcomes had been met.

Project Implementation Barriers

Fifty-seven of the 70 projects (81 percent) indicated that all of their proposed activities had been implemented. Of the 13 projects with activities that were not fully or successfully implemented, the most common factor was either a lack of demand for services or lack of participation in activities.

The majority of ARC telecommunications projects encountered at least one implementation barrier as they carried out their various approaches. Specifically, 77 percent of projects reported at least one barrier on the survey with respect to administration and planning or implementation. The three most commonly cited problems among projects were underestimating the time or effort needed (41 percent), participants not fully utilizing services (40 percent), and changes in key personnel (37 percent).

The case study sites, while largely successful, encountered and addressed a number of challenging and often interrelated barriers, such as lack of technology infrastructure, equipment obsolescence, underutilization of equipment, staff turnover or lack of expertise, and inadequate marketing, among others. While some of these problems were experienced by a majority of projects (e.g., delays due to worse-than-anticipated technology infrastructures), others were unique to a given approach or locality.

Project Sustainability and Expansion

An important measure of the success of an ARC project is its sustainability and ability to evolve in ways that reflect current demand and changes in technology. Of the 70 projects, 36 percent were reported to be in operation at the time of the telephone survey and serving a function about the same as that outlined in the original proposal, while 43 percent were reported be in operation and to have expanded in function. Nine (13 percent) of the projects were operating at a reduced function, either serving fewer participants or providing fewer services. Six projects (9 percent) were no longer in operation, although these projects may have been terminal in nature and thus not meant to last beyond the first year of funding.

Among the 30 respondents who reported in the telephone survey that their projects had expanded, 28 (93 percent) said they were serving more individuals and 24 (80 percent) reported that the project was providing more services. Twenty-one (70 percent) reported that they had expanded in some other way, including expansions in the quantity and sophistication of the technologies available to users, additions of different industries and sectors, and becoming community leaders in encouraging the use of telecommunications technologies.

Case study projects that were able to sustain and expand their efforts beyond the ARC grant period have employed a number of different strategies. Many grant recipients have the internal capacity to support their projects' development or have established partnerships to ensure access to the requisite expertise in technology and project

management. In other cases, projects have transferred responsibility of certain aspects of the project to another organization that was able to take the project to a new level.

RECOMMENDATIONS

Taken as a whole, study findings suggest that ARC's telecommunications projects made significant progress toward fulfilling the Commission's goals of (1) building access to infrastructure, (2) infusing telecommunications technology into the business sector, and (3) cultivating the skills and knowledge of the region's citizens to use technology effectively. However, over three-quarters (77 percent) of the projects in the study encountered at least one implementation barrier as they carried out their various approaches. This was often due to the complex nature of the telecommunications activities that projects were carrying out—and the inherent difficulty of creating and implementing technology projects in communities with limited access to the information infrastructure. While these barriers were generally not severe enough to prevent individual projects from achieving their goals, they did hinder the efficiency with which some of these goals were achieved.

The following recommendations reflect suggestions made by representatives from the 16 case study projects, our own observations from the site visits, and our review of best practices in other federal technology programs. In addition, they are designed to build upon ARC's existing grant management structure and reinforce practices described in several ARC publications—most notably *Information Age Appalachia*, *Preparing a Grant Proposal: Five Steps in the Proposal Writing Process* (an ARC guide for preparing successful grant proposals), and *Best Practices in Telecommunications* (a description of innovative telecommunications activities that have been conducted with ARC support).

Recommendations for Reinforcing ARC's Application and Reporting Guidelines. The following recommendations identify specific steps that ARC might take to further enhance the application and reporting guidelines for its telecommunications projects.

- **Provide more feedback to projects during the application review process.** Findings from the 16 case study sites suggest several areas where ARC project coordinators could use the review process to counsel projects about potential improvements to their proposed approach. For example, ARC project coordinators might take a proactive role in assessing the quality of the outputs and outcomes proposed by future telecommunications projects. Project coordinators could also use the review process to help applicants consider the feasibility of their proposed approach. Addressing these issues during the review process might help some projects avoid some of the implementation barriers that were encountered by the case study sites.

- **Reinforce the ARC application materials provided to telecommunications applicants.** The Commission has developed a wide range of materials designed to provide prospective applicants with generic guidance on what constitutes a successful proposal, as well as specific examples of the types of telecommunications activities it is looking to support. To reinforce the general blueprint set forth in these publications, we recommend that ARC develop specific examples that are tailored to telecommunica-tions projects. The purpose would be to compel applicants to think ahead about steps they might take to avoid common implementation barriers, measure project success, and maximize their likelihood of long-term sustainability.

- **Provide prospective applicants with examples of telecommunications outputs and outcomes.** We recommend that the ARC prepare supplemental materials that demonstrate the range of outputs and outcomes that might be attributed to a generic telecommunication project. We further recommend that telecommunications applicants be required to specify (1) which

community goal(s) their projects are designed to address, (2) a numeric benchmark against which their progress can be assessed, (3) a description of the timeframe within which this benchmark will be achieved, (4) a description of the methodology that will be used to assess whether the numeric benchmark was achieved, and (5) a description of how and when the data will be reported to ARC.

- **Encourage applicants to describe how technology will affect residents and organizations in participating communities.** These statements provide projects an important opportunity to describe how their efforts might eventually improve the efficiency and quality of activities performed by individuals and organizations.

- **Reinforce ARC's reporting structure.** If ARC is to be in a position to identify innovative and successful telecommunications practices, its staff will need to be able to systematically access more detailed information about the implementation and impact of its projects. The use of a more formalized reporting structure would likely enhance project coordinators' ability to obtain consistent data that can be used to assess project—and program—success.

- **Continue to disseminate information about innovative telecommunications practices to prospective grantees.** ARC currently uses a variety of methods to disseminate ideas about innovative technology applications. We suggest that the Commission continue to add new information to its web site about creative telecommunications projects and links to other useful technology-related web sites. We further recommend that ARC carry out the full range of technical assistance activities outlined in *Information Age Appalachia*—e.g., technical assistance and consultations, an online "Yellow Pages" directory of regionally based technology resources, workshops (via teleconference and traditional means), outreach to identify new public and private partners, the development of an advisory board, and liaison with other federal agencies.

- **Provide projects with written materials on high-quality evaluation practices.** Most of the 16 case study sites did not appear to be emphasizing the collection of data or use of evaluation methods to assess whether their outcomes had been achieved. In light of this finding, ARC might provide applicants and grant recipients with written materials that describe suitable evaluation practices. Workshops might also be used to cover such topics as selecting evaluators, budgeting for project evaluations, devising meaningful study questions, determining appropriate methodologies for assessing whether a particular objective has been achieved, working with external evaluators, displaying data in a meaningful and useful manner, interpreting and using data, and preparing effective evaluation reports.

Issues to Address with ARC Telecommunications Projects. The following recommendations address some of the significant barriers that hindered the implementation and impact of some case study sites. ARC might use the framework described in the previous section to help future telecommunications projects anticipate and, if possible, avoid these barriers.

- **Assessing end user needs.** ARC has traditionally funded a range of strategic telecommunications planning activities. In addition to these formal efforts, we recommend that the Commission encourage that all of its technology projects invest the time and energy required to determine whether end users need (or will use) a particular approach (and, if so, under what conditions). In most cases, this inquiry can be accomplished through early discussions with prospective end users and other community stakeholders about (1) the scope of the problem, (2) the range of desired outcomes—for both end users and the overall community, (3) the full range of acceptable strategies that might be used to bring about these desired outcomes, (4) the likelihood that

end users will make use of new technology, and (5) the type of training that will be needed to maximize end users' knowledge of how to integrate telecommunications technology into their work, school, or home environments. While such an assessment will not assure project success, it will likely help grant recipients develop a framework for documenting and addressing the technology needs of their end users.

- **Assessing project feasibility.** We recommend that ARC intensify its efforts to assure that telecommunications projects assess the feasibility of their proposed approach—either before submitting an application to ARC or as part of their initial planning process. This assessment could be used to identify technical barriers (e.g., poor quality of the existing telecommunications infrastructure), organizational barriers (e.g., lack of strong commitment among some influential stakeholders), and management issues (e.g., need to hire technical staff with the requisite skills) that should be addressed before the implementation phase. It could also be used to delineate the range of technical skills that will be needed to fully implement the proposed approach—and the strategy that will be used to assure that these skills are accessible throughout the duration of the project. It may not be necessary for all telecommunications projects to conduct a comprehensive feasibility study. Smaller projects may only need to hold ongoing meetings with their partners to identify likely hurdles before they arise.

- **Staff turnover.** Study findings suggest that rural telecommunications projects are especially vulnerable to losing their technical staff to organizations that can offer higher wages, benefits, and career/educational advancement opportunities. While it may not be possible for rural projects to avoid such problems, they can be encouraged to use their applications to describe their plans for hiring and maintaining knowledgeable staff with the requisite technical expertise. If this issue is not adequately addressed in the proposal, ARC project coordinators might ask projects about their staffing plans during the review process.

- **Staff expertise.** Several case study sites indicated that they lacked access to knowledgeable technology staff. One option would be for ARC to encourage grant recipients that lack the requisite expertise to include funding in their proposals for outside technology consultants. When such consultants are not available in the immediate community, ARC might suggest other resources (e.g., nearby colleges and universities) that projects can gain access to for help in dealing with specific issues. Another option would be for ARC to develop guidelines that delineate the range of staff skills that are commonly associated with successful technology projects.

- **Training for end users.** The study uncovered evidence that without appropriate training, end users may lack the requisite skills to fully utilize their new tools. Project staff and end users in the case study sites provided numerous recommendations as to how ARC's telecommunications initiatives can enhance their training component, including (1) solicit input from end users as to the content and format of training, (2) anticipate the need to provide some end users with training in such basic computer skills as keyboard functions, (3) develop training exercises that demonstrate how the technology fits into the workplace and embed training in the actual duties staff will be performing, (4) provide trainees with written materials that they can share with others and/or refer back to at a later date, (5) tailor training to the skills and needs of specific categories of end users, and (6) provide follow-up training to end users.

- **Project sustainability.** Some survey respondents considered their projects to be operational (i.e., end users were still making use of project resources) even though site visits revealed that project-related activities had ceased and there had been no sustained effort to provide end users with ongoing training or technical support. We therefore

recommend that ARC use its review process to promote a more operative definition of project sustainability for its telecommunications projects. For example, applicants might be directed to describe their plans for sustaining the training and technical assistance components of their projects beyond the ARC grant. ARC project coordinators might then use the review process to assess whether projects have adequately considered the range of strategies that might be used to maintain the functional elements of their proposed approach.

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I. Introduction

Telecommunications technology has become an integral part of daily life for much of the United States. It allows for the transfer of information in ways never conceived before the latter part of the 20th century, and has become an established part of the workplace, schools, and home. Its influence is pervasive and far-reaching, and there is growing consensus that telecommunications technology strengthens economies and improves the lives of human beings.

Yet, as pervasive as it has become, there are still whole regions of the country that have not been exposed to the full range of applications of these technological advancements (Federal Communication Commission 2000). Many of these regions are geographically isolated, and/or impoverished, and have not been able to procure the infrastructure necessary for "linking up." When these regions continue to operate with traditional, less efficient modes of business, governance, and education, they fall behind, resulting in what has been called "the digital divide."

In response to these disparities, there have been several federal initiatives aimed at reducing the digital divide. These include Federal Universal Service programs, such as the *E-Rate Program* and the *Rural Health Program*, as well as other smaller federal programs geared toward improving telecommunications connectivity and capacity, such as the *Technology Opportunities Program*, the *Community Technology Centers Initiative*, and the *Neighborhood Networks Program* (see exhibit 1-1 for a summary of these programs). All are trying to facilitate the infusion of technology into places that need it for economic development and education.

Despite these federal initiatives, the region of Appalachia has yet to fully benefit from the telecommunications revolution. According to the report *Links to the Future: The Role of Information and Telecommunications Technology in Appalachian Economic Development* (Oden and Strover 2002, i), while digital technology and its applications grew rapidly during the 1990s in Appalachia, "the telecommunications infra-structure in the Appalachian Region is less developed than that in other parts of the country, and compares negatively to national averages on various broadband indicators." Although some Appalachian communities are well on the way toward incorporating telecommunications technologies into their businesses, schools, and homes, many still lack the infrastructure and know-how needed to close the divide.

Aiming to address the disparities, the Appalachian Regional Commission (ARC) instituted its Telecommunications Regional Initiative in 1995-1998, which was later expanded into the Information Age Appalachia Program in 2001. The program's goal is to stimulate economic growth and improve the overall standard of living in the region by funding projects that focus on building access to infrastructure, infusing telecommunications technology into the business sector, and cultivating the skills and knowledge of the region's citizens to use the technology effectively.

The Information Age Appalachia program has a unique fit within the field of telecommunications initiatives, since it is designed to support projects that are less likely to find funding from federal programs. In some cases, the grant amounts are too small to be funded by other programs. In other cases, Appalachian communities may have

Exhibit 1-1. Federal initiatives to enhance access to telecommunications technology

The federal government, through various agencies, has implemented a series of programs designed to directly address the lack of access to telecommunications technology in rural and other underserved areas in the nation. While some of these programs, outlined below, differ in their approaches or foci, all share one common goal—allowing those separated by the "digital divide" to access telecommunications services and, ultimately, to share in the economic, educational, and other benefits that traditionally occur as a result.

Universal Service Fund for Schools and Libraries. The Federal Communications Commission's *Universal Service Fund for Schools and Libraries*, or the *E-rate*, provides discounts on the costs of telecommunications services and equipment to all public and private schools and libraries. Eligible services range from basic local and long-distance phone services and Internet access services to the acquisition and installation of equipment to provide network wiring within school and library buildings. Discounts range from 20 percent to 90 percent, depending on economic need and rural location. This program recognizes that while the United States is at the forefront of both the technological and telecommunications revolutions, there are segments of the population for which access to computers and the Internet is significantly lower.

Community Technology Centers Initiative. The U.S. Department of Education's *Community Technology Centers (CTC) Initiative* intends to help bridge the telecommunications divide in a similar manner by supporting Community Technology Center start-ups and/or expansions in distressed urban and rural communities. CTCs provide computer and Internet access as well as educational services using information technology. Moreover, these centers provide people who are already socially or economically disadvantaged with opportunities to gain access to telecommunications services and/or engage with a range of technologies in a community setting.

Technology Opportunities Program. The U.S. Department of Commerce's *Technology Opportunities Program* (TOP), formerly the *Telecommunications and Information Infrastructure Assistance Program* (TIIAP), promotes increased availability and use of digital network technologies in both the public and nonprofit sectors.* TOP, administered since 1994 by the National Telecommunications and Information Administration (NTIA), is a highly competitive, merit-based grant program that aims to bring the benefits of digital network technologies to communities throughout the entire country. It provides matching grants to fund projects that demonstrate how digital networks support lifelong learning for all Americans, help public safety officials protect the public, assist in the delivery of health care and public health services, and foster communication, resource sharing, and economic development within rural and urban communities. In short, TOP projects are intended to be nationally significant demonstrations of how digital network technologies can be used to extend and improve the delivery of valuable services and opportunities to all Americans. Furthermore, the benefits of TOP's grants are broadly distributed across the country, especially in rural and underserved communities.

Rural Utilities Service. The *Rural Utilities Service* (RUS), administered by the U.S. Department of Agriculture, works with cooperatives, nonprofit associations, public bodies, and for-profit utilities to help rural utilities expand and keep their technology up to date. RUS grants seek to establish new and vital services, such as distance learning and telemedicine, through the use of telecommunications technology.

Other Federal Programs. Two other, more narrowly focused federal programs include the National Science Foundation's *Connections to the Internet* and the National Institutes of Health (NIH) *Internet Connection Grants*. The former is aimed exclusively at helping to provide advanced telecommunications capabilities to educational institutions and consists of three parts: 1) connections for K-12 institutions, libraries, and museums that use innovative technologies for Internet access; 2) connections for higher education institutions (these awards are limited to connections for research or educational uses); and 3) connections for research and education institutions and facilities that have meritorious applications with special network requirements.

Internet Connections Grants, provided by the National Library of Medicine of NIH, consist of grants to health-related institutions that wish to provide Internet access to the professionals and clients of their organization, thereby intending to benefit health professionals, scientists, and citizens. The program was created in recognition that many health-related organizations, particularly smaller ones and those in rural or urban underserved areas, lack resources to initiate Internet access or to enhance low-bandwidth dial-up connectivity.

*The President's recently released federal budget proposes to eliminate the *Technology Opportunities Program* in fiscal year 2003. The proposal to eliminate the program, if enacted, would not affect grants awarded in FY 2002 or projects implemented prior to FY 2002.

difficulty winning competitive grants. This is because many of the federal programs prefer to fund the latest, most innovative technologies, and many Appalachian communities lack access to even the most basic telecommunications technologies. Also, ARC's Information Age Appalachia program is more focused on addressing the specific, local needs of communities. The Information Age Appalachia program focuses on four main areas:

- *Access and infrastructure*—Broadening the availability of advanced telecommunications services by promoting increased infrastructure investments from both private sector and government sources.

- *Education and training*—Ensuring that the region is supporting today's workforce as well as developing the workforce of tomorrow by integrating technology into K-12 and continuing education programs, plus expanding community awareness and training programs.

- *E-commerce*—Improving the competitiveness of businesses in the region by increasing the adoption of e-commerce practices.

- *Technology sector job creation*—Increasing employment in the technology sector for producer and user industries through investment and entrepreneurship support.

The projects funded by ARC fall roughly into these four categories, although in practice there is considerable overlap between them.[1] This report summarizes findings from an evaluation study of the 70 telecommunications projects funded by ARC between 1994 and 2000.[2]

[1] The four categories described in the publication *Information Age Appalachia* were not in use during the period 1994-2000. They are employed in this report as a tool for organizing and distinguishing projects by type. For the purposes of this report, e-commerce and technology sector job creation were collapsed into a single category (called "e-commerce/technology sector job creation"), because the case study projects related to business development did not fall neatly into either of these two categories.

[2] All of the 70 projects were closed (i.e., no longer receiving ARC funding) at the time of the study.

THE APPALACHIAN REGIONAL COMMISSION

The Appalachian Regional Commission was created in 1965 to promote economic and social development in the region. It is a federal-state partnership designed to foster self-sustaining economic development and improved quality of life. As such, it is an agency that functions as a catalyst, drawing upon the resources of the federal government, the participating states, and local resources. Although considerable progress has been made in its more than three decades of support, the ARC Strategic Plan: 1997-2002 identifies five key areas of need:

- Developing a knowledgeable and skilled population;

- Supporting the region's physical infrastructure;

- Building local and regional capacity;

- Creating a dynamic economic base; and

- Fostering healthy people.

To accomplish these five strategic goals, ARC provides financial and technical support to local, regional, and multistate projects through its Area Development Programs. The process for awarding these grants reflects the underlying partnership between the Commission and participating states, as well as the need to give local communities a voice in determining how ARC funds are to be allocated. As such, most of the projects included in the study originated at the local or state level.

Each year, the 13 states of Appalachia prepare individual annual strategy statements and spending plans. These documents contain state-level goals (which are aligned with ARC's five strategic goals) and corresponding proposals for each of the specific projects that are being recommended for funding. In some states, these

initiatives are developed to reflect state and/or local priorities. In others, applicants submit proposals based on needs identified in their local communities.

Once approved by the state's development agency, a state's recommendations for project funding are submitted to ARC. Each proposed project is then reviewed by ARC project coordinators and, in most cases, approved by the federal co-chair. Project coordinators can negotiate changes to the proposed project with state program managers. In most cases, adjustments are made to timetables and budgets. More recently, a limited number of projects originate and are funded each year directly through the Commission and ARC set-asides. These projects are subject to the same policies and procedures as those funded through individual states.

Access to Telecommunications Technology in Appalachia

Research indicates that increases in access to telecommunications services lead to significant improvements in local and regional economies and contribute to more rapid economic development (Oden and Strover 2002, 5-7; U.S. Department of Commerce 1999). However, telecommunications services tend to be deployed less frequently and/or to a lesser extent in rural areas, namely, those areas in which development is most needed. This, in turn, has an enormous impact on Appalachia, considering that 42 percent of the region's population is rural, compared with 20 percent nationwide. The combination of these factors has contributed to disproportionately low rates of access to telecommunications technology for the residents of Appalachia. For some, in fact, there is virtually no access.

This lack of access, however, has not gone unnoticed. Partly in response to these conditions, the Telecommunications Act of 1996, the first major overhaul of telecommunications law in over 60 years, was enacted. The goal of this new law was to facilitate access to communications business, and to allow any communications business to compete in any market. Perhaps more importantly, the act was designed to allow larger numbers of people, including those in traditionally underserved and rural areas, to gain access to local and long distance telephone service, cable programming and other video services, broadcast services, and services provided to schools. Nevertheless, after more than five years, an abundance of data reveals that access to telecommunications technology, as well as the benefits that ordinarily result, lag in rural areas behind that of the nation as a whole (Oden and Strover 2002).

For example, in 2000, only 47 percent of the zip codes in Appalachia had one or more high-speed service subscribers, compared to 59 percent of those nationwide. Of the 13 states in the region, 12 had rates lower than the nationwide average with respect to high-speed Internet access. With the exception of South Carolina, at 59 percent, all states in the region were at least 5 percentage points below the national average. Several states had significantly lower rates, such as Kentucky and Mississippi, with 13 and 32 percent, respectively (Oden and Strover 2002, 29).[3]

Furthermore, neither digital subscriber lines (DSL) nor cable modem service, two of the most extensively utilized broadband services, were widely available in rural areas or in Appalachia in particular. Access to these services was especially sparse in Kentucky, Ohio, Virginia, and West Virginia. Generally speaking, the likelihood of receiving one or both of these services declined with decreased population density. In towns with 500,000 to 1 million residents, over 73 percent of residents had access to cable modems. In towns of 50,000 to 100,000, only 26 percent were served; and in towns of 5,000 to 10,000, 5 percent had such access. In fact, in 2000, most counties in Appalachia had no

[3] This is compounded by the fact that large businesses, which often have their own high-speed lines, may compose all or a significant portion of high-speed subscribers within a particular zip code, thereby artificially inflating these numbers. In such cases, a particular zip code may indeed have at least one high-speed subscriber, yet this does not necessarily mean there are wider community benefits.

cable modem service, and when they did, the providers were generally located in larger cities or towns and metropolitan areas (Stroden and Oden 2001, 4).

Like cable modem service, DSL deployment has for the most part occurred in cities of 10,000 or more, and most localities with DSL have populations of 25,000 or higher (Oden and Strover 2002, 27-28). While deployment has occurred in towns with relatively small populations, it tends to occur in affluent localities. What makes access to DSL and similar services especially important is that there is a statistically significant relationship between the presence of DSL and the economic vitality of a county.

The number of households with computers in Appalachia also fell below the national averages. In 2000, 51 percent of households in the nation had computers. However, with the exceptions of Maryland and Virginia, states in Appalachia fell below this number.[4] In Mississippi, for example, just over one-third (37.2 percent) of households had a computer (Oden and Strover 2002, 24). The same can be said for the number of households with Internet access. Again, with the exceptions of Maryland and Virginia, states in the region fell well below the national average of 41.5 percent; of the 11 remaining states, 5 were at 35 percent or below, with the lowest, Mississippi, at only 26.3 percent.

Another indication of the general lack of access to telecommunications technology is the dearth of competitive local exchange carriers (CLEC) operating in Appalachia. Most of the states within the region have fairly low numbers of CLECs (with the exception of New York, Georgia, and Pennsylvania). The numbers of CLECs are especially low in Kentucky and Mississippi (Oden and Strover 2002, 30-33). Overall, competition in the region is sparse and concentrated in metropolitan areas. The implications of this include a lack of telephone competition and a subsequent lack of market incentives for CLECs to deploy advanced telecommunications services such as those described above.

Study Overview

At the time this study was initiated, there had been no systematic assessment of whether ARC's telecommunications projects had lived up to their promise and potential, what problems they encountered, and what ways of operating led to their successes and shortcomings. It was also not known whether projects were able to sustain themselves beyond the period of ARC funding. For those that were still operational, there were no data on how they were able to expand and evolve, given available resources, community and stakeholder buy-in, and careful decisionmaking.

The following report addresses these issues, and aims to serve as both an extensive description of the implementation and impact of all completed telecommunications projects funded by ARC between 1994 and 2000, as well as an exploratory analysis of best practices. This report also points to ways in which future projects funded (in part or in whole) by ARC's telecommunications initiative can maximize the effectiveness of their activities, and avoid the pitfalls that can hinder or derail their mission.

[4] The exception of Maryland and Virginia may be due to the fact that both states have urban and suburban areas, outside of Appalachia, that have high concentrations of home computers.

Research Questions and Study Methodology

The study set out to address the following questions:

- What are the characteristics of communities and individuals that benefited from the projects?
- What problems or limitations were projects designed to address?
- What approaches did projects use to ameliorate these problems or limitations? To what extent were the approaches multifaceted?
- To what extent were projects serving multiple community stakeholders?
- What outcomes were projects designed to achieve?
- To what extent have projects accomplished their objectives?
- What factors influenced projects' ability to implement their approaches and achieve their objectives?
- How are projects sustaining themselves?
- To what extent are projects enhancing access to telecommunications services and improving the utilization of information services?

The evaluation employed both quantitative and qualitative methods to address the study's outcome and process questions. The approach included four integrated activities:

- An extensive review of project files to gain a better understanding of the purpose, scope, and goals/objectives of the 70 projects in the study. The document review was also used to guide the construction of the questionnaire and the design and site selection of the case studies.
- A literature review to gauge the extent of research on topics relating to access to telecommunications infrastructure and applications in the Appalachian region, as well as federal initiatives to promote infrastructure in the nation.
- A telephone survey to collect broad-based data on the implementation and impact of the 70 telecommunications projects funded by ARC. The survey was designed to collect a set of data regarding project characteristics, implementation practices, outcomes, equipment, and current status. It also obtained narrative information on the extent to which a project's original outcomes were achieved.
- Case study site visits to 16 of the 70 projects to obtain more detailed information about project-related implementation experiences, accomplishments, and impacts. The case studies allowed us to explore in greater detail the experiences of projects that have implemented potentially promising practices, to verify project outcomes, and to gain an understanding of best practices.

Appendix A describes the case study methodology, findings, and lessons learned. Appendix B provides further information on the other study methodologies, including the telephone survey.

Site visit findings reflect a purposefully selected segment of the study universe. By conducting the telephone survey first, findings could be used to inform the selection of case study sites. The final pool of case study sites had achieved at least some of their intended outcomes and appeared to have sustained themselves over time. As such, any conclusions drawn from the site visits may not be representative of the overall study sample. However, the case studies do shed light on the best practices of telecommunications projects, as well as the range of obstacles encountered. Findings from the telephone survey and the case studies complement one another, and are interwoven throughout the substantive chapters of this report. Generalizations drawn from the case

studies may be based on observations from several, but not necessarily all, sites.

Structure of the Report

The remainder of this report presents the evaluation's substantive findings. Chapter 2 portrays the various contexts in which the telecommunications projects were embedded, including characteristics such as economic status, metropolitan status (urban, rural, both), sectors served, and intended beneficiaries, as well as including features of the grants and the grant recipients. Chapter 3 presents findings from the survey and case studies on project implementation. Chapter 4 addresses project achievement and impact, and chapter 5 describes and critiques ARC's system of measuring project achievement and impact. Chapter 6 illustrates problems encountered in project implementation. Chapter 7 addresses whether projects were able to continue beyond the period of ARC funding, with an analysis of why some projects evolved and expanded over time. The final chapter presents a summary of the findings and recommendations for ARC and its future telecommunication projects. Appendix A discusses case study methods, findings and lessons learned, and appendix B addresses issues involving the technical approach of the study, with emphasis on the telephone survey.

II. Project Context

To redress the disparities of the digital divide, ARC and the 13 states that compose Appalachia fund projects geared toward developing the telecommunications infrastructure of communities in the region and fortifying the knowledge and skills of residents, so that they can make effective use of the technologies. This chapter describes the contexts within which 70 telecommunications projects funded by ARC between 1994 and 2000 were implemented, including features of the communities in which they operated, grant and grant recipient characteristics, and project origins.

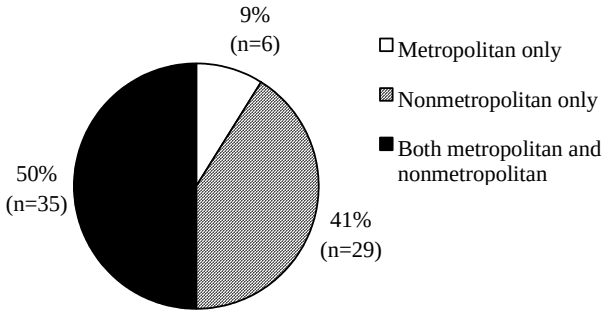
COMMUNITY CHARACTERISTICS

ARC telecommunications projects were funded in and across a wide variety of communities in Appalachia. This section reports on the characteristics of these communities, such as metropolitan status, economic status, the groups within communities that received services, and the geographic distribution of direct and indirect beneficiaries. Given the complementary nature of the telephone survey and case studies, findings from both are presented in tandem. Appendix A discusses case study site selection and the extent to which the sites were representative of the universe of closed ARC telecommunications projects.

Metropolitan Status

ARC funds for telecommunications technology went to a wide range of community types—most were rural, but some were urban, or a mix of urban and rural. Given ARC's emphasis on creating access to infrastructure, and the fact that rural areas tend to lag behind cities in this respect, it is not surprising that most of the telecommunications projects funded by ARC were located in whole or in part within nonmetropolitan areas (91 percent). Twenty-nine (41 percent) of the 70 projects were operating exclusively in nonmetropolitan areas, and 35 (50 percent) were operating in regions that included both metropolitan and nonmetropolitan areas (figure 2-1). The remaining 6 projects (9 percent) were located exclusively in metropolitan areas.

Figure 2-1
Percent of projects by metropolitan status (n=70)



SOURCE: ARC database.

Many of the case study projects were operating in isolated, rural communities. Site visitors to several such projects reported the following:

- *Jackson County Distance Learning*: "Generally speaking, Scottsboro residents feel somewhat 'isolated' from the world around them. Jackson County is one of the largest counties in Alabama in terms of square miles and has a widely dispersed population. This makes it difficult for residents to communicate with others and for the county and city to deliver many basic services. Scottsboro is also nearly 100 miles

away from any major metropolitan area, such as Huntsville or Birmingham, which makes it difficult for residents to gain access to much-needed opportunities, such as higher education. Although there is a two-year junior college located in Jackson County, those wishing to pursue a bachelor's or graduate degree must travel over 90 minutes outside of Scottsboro to the nearest four-year university." (Scottsboro, Alabama)

- *RESA Regional Telecommunication Special Initiative*: "The community served by this project is comprised of the three westernmost counties in Maryland, including Allegany, Garrett, and Washington counties. Two of the three counties are rural, relatively underdeveloped, and are relatively small in population when compared to other counties within the state. All three counties also have above average rates of unemployment, and the citizens of these counties are below average in terms of education level and per capita income. This project was designed to address the traditional disparities in access to telecommunications technology that occur in rural or underdeveloped areas, namely the lack of access to telecommunications services and the benefits (increased efficiency, etc.) that often occur as a result of such access." (Cumberland, Maryland)

- *Alleghany High School Cyber Campus*: "Alleghany County is comprised of 235 square miles in the Blue Ridge Mountains of northwestern North Carolina. According to the 2000 Census, the county has a population of approximately 10,677 people, 1,817 of whom reside in Sparta, the county's only municipality. Sparta's geographical isolation and significant distance from interstate highways weaken its appeal as a site for prospective businesses." (Sparta, North Carolina)

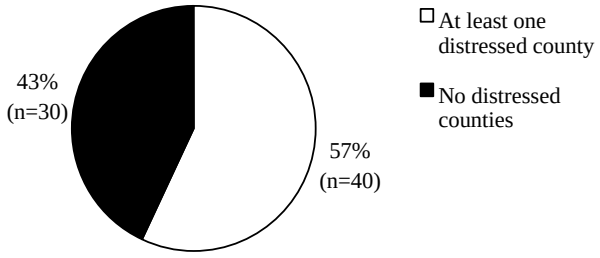
As a result of their isolation, many of these communities have historically lacked access to critical resources (e.g., industry, transportation). This geographical isolation prevents many new businesses and industries from entering these areas. Among many of these communities, telecommunications technology is viewed as a viable means of overcoming geographical isolation and reaching out to once apprehensive businesses and industries.

It should be noted that not all of the rural areas visited during this study were economically distressed. For example, in Lewisburg, Pennsylvania, the communities that benefited from the Info-Structure Technology Assistance Center (ITAC) and the PA SourceNet projects were located in the 11 counties that compose the Susquehanna region of central Pennsylvania. Nine of those counties are classified as "transitional," one is "competitive," and one has achieved "attainment" status. These counties comprise dozens of small towns, many with populations only in the hundreds. Although the project is located in what is for the most part a rural area, there are numerous industries.

Other case study projects were located (at least in part) in more heavily populated, less rural regions. While still lacking in telecommunications infrastructure in important respects, some of these areas profited from healthy local economies and greater access to resources. For example, as South Carolina's most populous county with more than 350,900 residents, Greenville, site of the SC-Upstate-Info (SCUI) telecommunications project, is situated in the northwestern corner of the state and is part of one of the nation's fastest growing areas, the I-85 corridor. Three of the six counties in the upstate region of the state—Spartanburg, Greenville, and Anderson—make up one metropolitan statistical area (MSA) and contribute to one-third of the economic growth in the state.

Other case study projects located in metropolitan regions suffered less from geographic isolation than the economic stagnation resulting from the loss of industry and employment. For example, one project is located in a community where the economy is relatively stagnant, having reached its peak during the 1930s and 1940s. Since few jobs are available outside of the steel industry, many young people have left in search of employment elsewhere. However, according to respondents, there is some resistance to the establishment of new business and industry in and around this community, since these might detract from the steel industry. This ARC-funded telecommunications project was faced with these political, economic, and social barriers.

Figure 2-2
Percent of projects by economic status (n=70)



SOURCE: ARC database.

Economic Status

Telecommunications infrastructure in economically depressed communities lags behind the access available in more affluent communities.[5] Across the 70 projects, 40 (57 percent) were operating in areas that included economically distressed counties,[6] compared to 30 (43 percent) that included no distressed counties (figure 2-2).

The sites selected for the case studies were fairly representative of the economic status of the 70 telecommunications projects funded by ARC. Of the 16 sites, 6 were located in areas that included distressed counties. Many of the site visit communities suffered from a variety of problems due to chronic unemployment, low wages, and endemic poverty. Some communities that had traditionally relied heavily on a particular industry (e.g., steel, textiles, coal) were not able to fill the void after that industry had collapsed or moved elsewhere. For example, MIRA's (Managing Information with Rural America) focus was on counties in the southeastern part of Ohio, where coal mining brought both initial prosperity and subsequent decline to many communities. Sparsely populated, the area is plagued with high unemployment and high poverty rates. Many of the counties in this area were reliant on the coal industry and have been unable to develop other economic opportunities to replace the void that the collapse of coal mining has created. Some of these economically distressed communities are caught in a scenario in which the lack of opportunity leads talented young people away in search of employment elsewhere, which scares off new businesses that are reluctant to move in because of the lack of a skilled labor force.

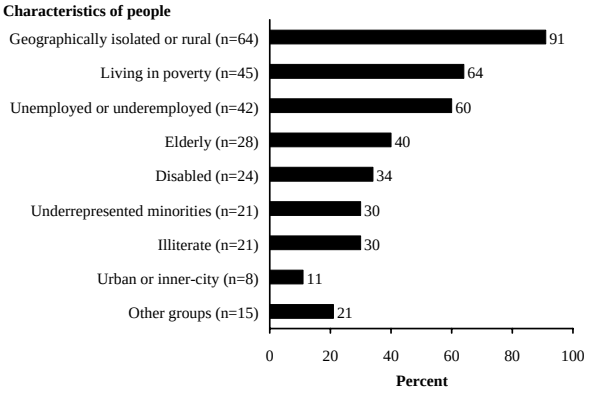
Other projects were located in nondistressed communities. For example, in Painted Post, New York, the region profits from a vigorous economy fueled by high technology manufacturing as well as retail trade and service sectors. Still other

[5] The Distressed Counties Program, begun in 1983, was designed to provide a mechanism for setting aside funds for the region's most impoverished communities. Every year, each of the 406 counties in the region is designated as one of four economic categories based upon a number of available indicators. Distressed counties are eligible for additional funding and lower matching requirements: 20 percent of total project cost, compared to 50 percent for transitional counties and 80 percent for competitive counties. Attainment counties are not eligible to receive ARC funding.

[6] All project counties need not have been considered distressed for the project to be placed in this category.

projects were located in regions that included both distressed and nondistressed communities. For instance, Clermont County, in Bethel, Ohio, has been one of the fastest growing counties in the state, both in population and employment. However, the county comprises two very different areas. The western section, which includes a suburb of Cincinnati, is a booming area with population growth and accompanying commercial and industrial expansion. The eastern section, in which the U.S. Grant Joint Vocational School District is located, is characterized by high unemployment, slow development, and a higher percentage of poverty. Despite the relative wealth of the western side of the county, Clermont still has a very serious problem with school dropouts and poverty, ranking well above the state average in both respects.

Figure 2-3
Percent of ARC projects designed to provide services, resources, or other assistance to various groups (n=70)



NOTE: Projects may be serving multiple groups. Groups may overlap.
SOURCE: 2002 telephone survey of ARC grantees.

Characteristics of Groups Receiving Services

Many ARC projects are designed to provide services to typically underserved populations. Sixty-four of the 70 survey respondents reported that their projects were designed to provide direct services, resources, or other assistance to people living in geographically isolated or rural areas (91 percent) (figure 2-3). In addition, the majority of projects served people living in poverty (64 percent) and those who were unemployed or underemployed (60 percent). Fewer projects were designed to provide direct services, resources, or other assistance to the elderly (40 percent), the disabled (34 percent), underrepresented minorities (30 percent), illiterate people (30 percent), people living in urban or inner-city areas (11 percent), or other groups (21 percent).

While survey responses indicate that projects were designed to address the needs of various underserved populations in Appalachian communities, site visit findings appear to mitigate the implication that projects actually provided such services in a systematic and comprehensive manner across these subgroups. For example, 7 of the 16 case study sites reported in the telephone survey that their projects were designed to serve the elderly. However, of these seven projects, elderly people were served only tangentially in practice, if at all. It is possible that the survey question stem "designed to provide direct services, resources, or other assistance to people who…" was rather loosely interpreted by some respondents to mean "designed to possibly affect (directly or indirectly) any people who…." Thus, the survey findings in figure 2-3 must be considered with some caution.

The case studies suggest that not all projects were designed to serve end users directly, but rather to affect change at the organizational or regional levels. For example, the Advantage Valley project in West Virginia aimed to create and foster a regional entity to promote economic development. For this project, one could not point to individual beneficiaries. Similarly, the

Susquehanna Economic Development Association-Council of Governments (SEDA-COG) Info-Structure Technology Assistance Center in Pennsylvania was designed to serve municipal and county governments.

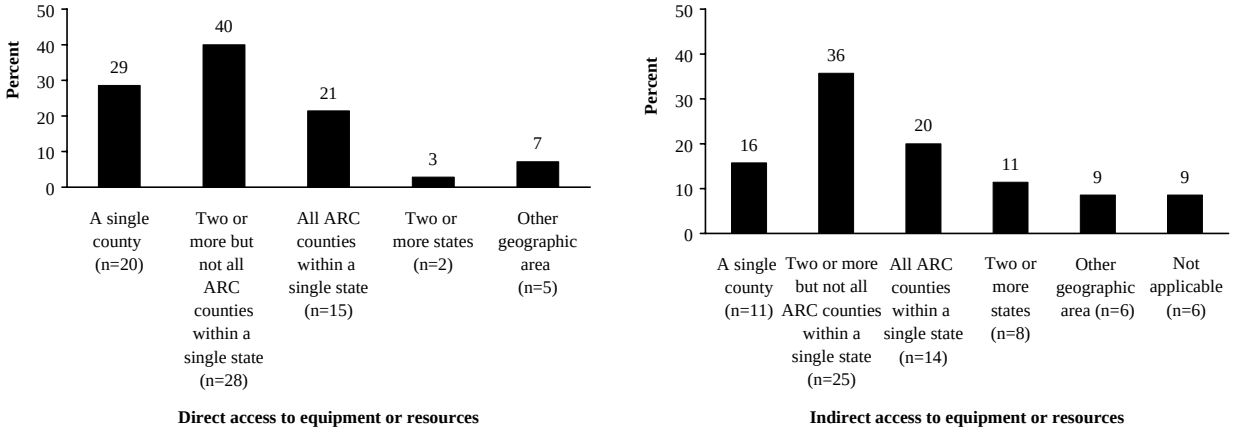
Geographic Distribution of Participants

Survey respondents were asked to describe the geographic distribution of the individuals who were expected to benefit both directly and indirectly from their ARC grants. Findings show that projects typically served people in two or more but not all ARC counties within a single state. Specifically, 28 of the 70 respondents (40 percent) reported that direct beneficiaries (i.e., those with direct access to project resources or equipment) were in two or more but not all ARC counties within a single state (figure 2-4). In addition, 20 projects (29 percent) were directly serving people in a single county, and 15 projects (21 percent) were directly serving all ARC counties in a single state.

Twenty-five of the 70 projects (36 percent) reported that indirect beneficiaries (i.e., people who did not have direct access to project resources or equipment) were in two or more but not all ARC counties within a single state. Eleven of the 70 projects (16 percent) had indirect beneficiaries who were in a single county, and 14 projects (20 percent) had indirect beneficiaries who were in all ARC counties in a single state.

These findings indicate that ARC-funded telecommunications projects varied considerably in scope with respect to the geographical distribution of direct and indirect beneficiaries.

Figure 2-4
Geographic distribution of direct and indirect beneficiaries of ARC telecommunications projects (n=70)

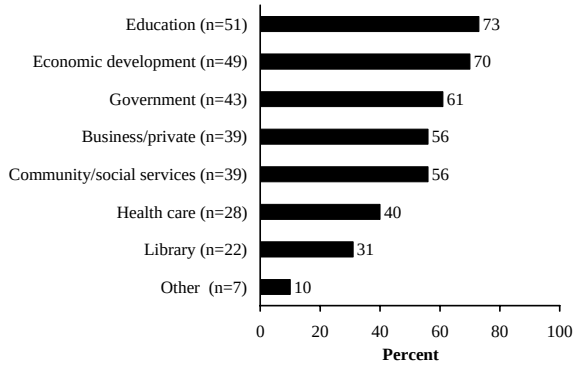


NOTE: Percents may not sum to 100 due to rounding.
SOURCE: 2002 telephone survey of ARC grantees.

Sectors Served

ARC telecommunications projects were encouraged to serve at least two sectors in their communities, since this promotes the development of partnerships, commitment at the local level, and the leveraging of matching funds. According to survey findings, of the 70 projects, 61 were intended to serve more than one sector. The remaining nine respondents reported that their project was intended to serve only one sector. The majority of projects were intended to serve the education sector (73 percent), with 70 percent serving the economic development sector, and 61 percent serving the government sector (figure 2-5). Over half were also intended to serve principally business development purposes (56 percent) and community or social services sectors (56 percent). Seven projects also were intended to serve the tourism and recreation sector ("other").

Figure 2-5
Percent of projects serving various sectors (n=70)



SOURCE: 2002 telephone survey of ARC grantees.

The case studies reveal that in practice, projects tended to focus heavily on a single sector, to the exclusion of other sectors. For example, one project that reported working with two sectors (i.e., the government and education sectors) aimed to work with county government units to help them select the most appropriate telecommunications equipment for their needs and then train them in the use of that equipment. It is not clear, however, how this project served the education sector (as reported in the survey). Another project aimed to promote economic development by way of a marketing campaign to establish a regional economic entity. Although this project was reported to serve all of the sectors listed in the survey, in practice these sectors were served only in a very indirect way (in that what benefits the region economically benefits all of its sectors). These findings suggest that some projects have difficulty integrating the two-sector requirement into project practice, especially in cases where project aims are very narrowly or broadly defined.

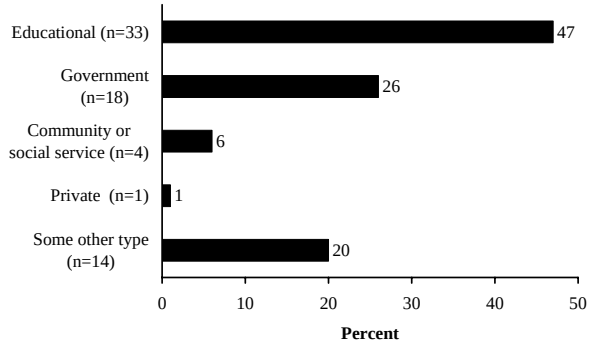
GRANTS AND GRANT RECIPIENT CHARACTERISTICS

This section provides information about the organizations responsible for overseeing and implementing ARC grants, the most recent year of their grant funding, the sources and amounts of ARC funding received, and overall goals of the grants.

Grant Recipient Organizations

Survey findings indicate that the 70 telecommunications projects funded by ARC were overseen by a range of organization types. Almost half (47 percent) of the organizations receiving ARC telecommunications grants were educational organizations, 26 percent were government organizations, and 20 percent identified themselves as other types of organizations (figure 2-6). Other types included public/private partnerships, libraries, not-for-profit organizations, and Local Development Districts.

Figure 2-6
Percent of ARC projects, by type of grant recipient organization (n=70)



SOURCE: 2002 telephone survey of ARC grantees.

Among the case study projects, seven were overseen by educational organizations, four by government organizations, two by community or social services organizations, and three by other types of organizations. Some examples follow:

- *SEDA-COG Info-Structure Technology Assistance Center*: SEDA-COG (Susquehanna Economic Development Association-Council of Governments) is a regional, multi-county development agency that, under the guidance of a public policy board, provides leadership, expertise, and services to communities, businesses, institutions, and residents. Recipients of SEDA-COG services fall into three broad categories—business, communities, and county and municipal governments. The organization helps central Pennsylvania's communities address issues in such areas as housing, recreation, downtown revitalization, and public infrastructure. Business services include financing, sales to the government, and assistance with exporting. Graphics, printing, and electronic mapping are among services available to the region's county and local governments. Additional services include rail freight assistance, weatherization, and help for nonprofit organizations. (Lewisburg, Pennsylvania)

- *Medical and Government Internet Coalition Network (MAGICnet)*: MAGICnet was created by a partnership between the College of Osteopathic Medicine (COM) at Ohio University and the Institute for Local Government Administration and Rural Development (ILGARD). COM's primary mission is to train physicians for practice in underserved regions in Ohio. ILGARD provides applied research and technical assistance to government and development organizations in Southeast Ohio and the rest of the state. (Athens, Ohio)

- *Big Sandy Telecommunications Center*. In 1994, the Kentucky Science & Technology Corporation (KSTC) was seeking to develop two rural telecommunications centers—one in eastern and one in western Kentucky. The communities of Pikeville and Elizabethtown emerged from a competitive selection process to partner with the Council in exploring rural telecommunications alternatives. In response to this competition, local community leaders established Big Sandy Telecommuting Services, Inc. (BSTSI), a nonprofit community-based corporation that was designed to obtain funding and operate the telecommunications center. The mission of BSTSI is to "anticipate emerging technologies and their applications to the region, thereby assuring a competitive equal footing on the information-community driven global economy." As such, the Corporation was established to (1) facilitate regionwide access to other Commonwealth, national, and global communities via telecommunications; (2) facilitate community-wide telecommunications literacy; (3) plan and develop a regional telecommunications center at Pikeville; and (4) serve as a regional telecommunications-interest network mana-ger, and provide information and brokering support to individuals, community groups, and members of the business community interested in and/or involved in telecommunications. (Pikeville, Kentucky)

- *Tompkins County Collaborative Communications Project*: The Human Services

> Coalition of Tompkins County, Inc., is the human service planning body for Tompkins County and coordinates the overall planning of human service programs and activities in the county. It is a private nonprofit corporation, which was formed as an umbrella agency in 1975 as an offshoot of another organization. The mission of HSC is to "encourage cooperation among providers to develop well-organized service delivery systems and provide links to local, regional, and national decisionmakers, including recommendations for action." The three areas within HSC are Information and Referral (I&R), the Health Planning Council, and Human Service Planning. The ARC telecommunications project fell under the I&R unit. The three programs of the HSC work together to enhance consumer access to services, to facilitate cooperation among service providers, and to advise community funders. (Ithaca, New York)

In most cases, grant recipient organizations were preexisting entities that carried out a wide range of activities not necessarily limited to telecommunications technology. However, in some cases, grant recipient organizations were specifically geared toward the advancement of telecommunications technology within their regions.

Source of Funding

The 70 telecommunications projects were distributed across all 13 states of Appalachia. Ohio was home to nearly one-fifth of the projects (19 percent) (table 2-1). In addition, Virginia (11 percent), New York (10 percent), and West Virginia (10 percent) had more projects than other states. The Commission itself directly funded 8 projects (11 percent), mostly through its Regional Initiatives program. The case studies were also distributed across a range of states.

Table 2-1

Number and percent of projects by source of ARC funding (n=70)

Source of funding	Number	Percent
Alabama	4	6
Georgia	1	1
Kentucky	3	4
Maryland	3	4
Mississippi	2	3
North Carolina	5	7
New York	7	10
Ohio	13	19
Pennsylvania	4	6
South Carolina	3	4
Tennessee	2	3
Virginia	8	11
West Virginia	7	10
Commission	8	11

NOTE: Percents may not sum to 100 due to rounding.
SOURCE: ARC database.

Funding Amounts

ARC funds telecommunications projects at a variety of levels, commensurate with the proposed project tasks and technologies employed. The average ARC funding amount per project was $165,276. ARC project funding amounts ranged from a low of $10,000 to highs of $898,990 and $1,293,000.[7] Funding levels were relatively evenly spread across the range, with 26 projects (37 percent) receiving $50,000 or less, 16 projects (23 percent) receiving $50,001 to $100,000, 12 projects (17 percent) receiving $100,001 to $200,000, and 16 projects (23 percent) receiving more than $200,000 (table 2-2). In total, ARC provided over 11.5 million dollars in funding to the 70 telecommunications projects included in this study.

[7] Funding amounts presented are according to the ARC database.

Table 2-2
Number and percent of projects by ARC funding amounts and matching funds (n=70)

Funding level	Number	Percent
ARC funding amount		
$50,000 or less	26	37
$50,001–$100,000	16	23
$100,001–$200,000	12	17
More than $200,000	16	23
Matching funds		
$50,000 or less	42	60
$50,001–$100,000	9	13
$100,001–$200,000	9	13
More than $200,000	10	14

SOURCE: ARC database.

Projects were able to leverage considerable local funding. Matching funds varied widely, from nothing to a high of $1,272,000.[8] Forty-two projects (60 percent) had $50,000 or less in matching funds, 9 projects (13 percent) had from $50,001 to $100,000, 9 projects (13 percent) had from $100,001 to $200,000, and 10 projects (14 percent) had more than $200,000.

The ARC database also revealed the following:

- The average ARC funding amount for projects in nonmetropolitan areas was $142,000. The average was $124,000 for projects in metropolitan areas, and $192,000 for projects that were in both metropolitan and nonmetropolitan areas (not shown in tables).

- The average ARC funding amount for projects in communities categorized as distressed was $176,000, compared to $150,000 for projects in nondistressed communities (not shown in tables).

- The average ARC funding amount was $121,000 educational organizations, $186,000 for government organizations, $19,000 for private sector organizations, $183,000 for community or social service organizations, and $249,000 for other organization types (not shown in tables).

- Given the case study selection criteria, the sites for case studies on average had larger funding amounts than the average project in the study universe. The average ARC funding amount of the case studies was $294,000 (not shown in tables).

[8] In addition to funds received from ARC and local matching funds, projects may have received funds from other sources.

Project Goals

Appalachian communities are becoming aware of the utility of telecommunications technology in their own economic development. While it is not viewed as a panacea for all the economic difficulties experienced in communities across Appalachia, it appears that communities are increasingly recognizing telecommunications technology as an important tool for addressing their economic woes.

The overall purpose of ARC-funded tele-communications projects is to infuse communities with telecommunications infra-structure along with the accompanying technical skills and knowledge. Nonetheless, projects were quite varied in nature and had a wide range of goals. According to survey results, projects were most frequently designed to improve skills training and educational opportunities (reported by 61 of the 70 projects, 87 percent), and to enhance economic development (74 percent) (table 2-3). Nearly two-thirds of the projects aimed to enhance community development, long-term telecommunications capabilities, and/or the coordination of community-wide information (66 percent for each). Forty-two of the 70 projects (60 percent) aimed to improve delivery of and access to government services, and 35 projects (50 percent) aimed to enhance employment opportunities.

Table 2-3
Number and percent of projects reporting various goals (n=70)

Goal	Number of projects with various goals	Percent of projects with various goals
Improve skills training and education opportunities	61	87%
Enhance economic development	52	74
Enhance community development	46	66
Enhance long-term telecommunications needs	46	66
Enhance coordination of community-wide information and communication services	46	66
Improve delivery of and access to government services	42	60
Enhance employment opportunities	35	50
Improve delivery of and access to social services	22	31
Improve consumers' access to quality health care	17	24
Something else	8	11

SOURCE: 2002 telephone survey of ARC grantees.

Of the 70 projects, 15 (21 percent) were reported to have from one to three of the goals listed in the survey, 30 (43 percent) had from four to six of the goals listed, and 25 (36 percent) had from seven to nine (not shown in tables). That so many of the projects reported a number of different goals is not surprising—with respect to the infusion of telecommunications technology, education, economics, communities, governance, and technology are linked in a complicated web of interrelationships. Goals in one of these domains are commonly related to goals in others. According to the survey results, the goals of the 16 case study sites were aligned with those of the other ARC-funded telecommunications projects.

SUMMARY

The characteristics of the 70 ARC-funded telecommunications projects were as diverse as the communities in which they were situated. Many were located in rural, economically distressed areas, just where one might expect the digital divide to be most pronounced. Grant recipients varied as well, and included government agencies, educational institutions, regional economic development agencies, community and social services organizations, and libraries. Projects varied in geographical scope, and beneficiaries of project activities included a wide range of underserved groups. Given this extensive variation in project context, it is not surprising that project approaches and activities were diverse as well. This topic is discussed in the next chapter.

III. Project Implementation

While the ARC-funded telecommunications projects were diverse in make-up and purpose, they shared certain features in terms of the activities that they carried out, the kinds of equipment purchased, the kinds of training conducted, and the ways in which projects were planned and promoted. This chapter examines features of the project activities, including discussion of issues related to equipment, training, planning, and promotion.

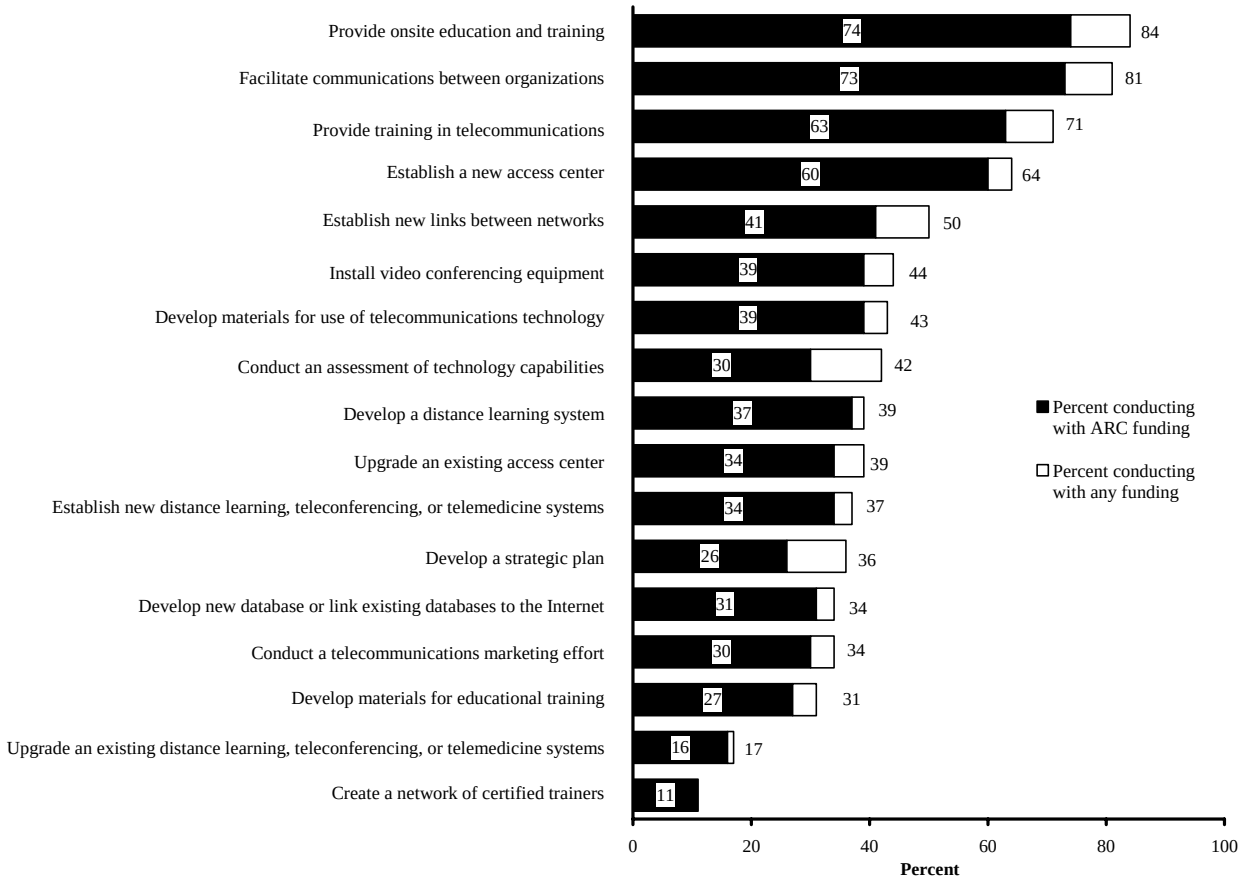
PROJECT ACTIVITIES

The telephone survey was designed to gather information about the types of activities conducted by each of the telecommunications projects. The most frequently cited activity on the survey was providing onsite education and training (59 projects, 84 percent) (figure 3-1). Fifty-seven of the 70 projects (81 percent) were designed to facilitate communications between various regions or organizations, and 71 percent provided training specifically in the use of telecommunications technology. Forty-five of the 70 projects (64 percent) established new computer or telecommunications access centers, and 50 percent established new links between existing networks.

Most projects employed multiple activities as part of their approach. According to survey findings, projects conducted an average of 8 of the 16 total activities listed in the survey. Twenty-three of the projects (33 percent) reported from 1 to 5 activities, 30 projects (43 percent) conducted from 6 to 10 activities, and the remaining 17 projects (24 percent) reported from 11 to 16 of the activities listed in the survey (not shown in tables).

The case studies lend credence to the finding that projects were multifaceted in their activities and approaches (exhibit 3-1). Most of the case study projects employed a variety of activities that were geared toward the establishment (i.e., the installation, maintenance, or upgrade) and/or application of infrastructure. Many projects also arranged training and education in how to employ specific technologies. Activities included provision of Internet service; purchase and installation of computers, videoconferencing equipment, and software; establishment of connections between organizations; web site design; technical assistance; and marketing. Exhibits 3-2 through 3-6 provide detailed examples of the activities carried out by a subset of the case studies.

Figure 3-1
Percent of projects conducting activities and percent conducting activities with ARC funding, by activity type (n=70)



NOTE: Projects could report multiple activities.
SOURCE: 2002 telephone survey of ARC grantees.

Exhibit 3-1. Project activities	
Project Name	**Activities**
Access to Information Infrastructure	
Big Sandy Telecommunications Center (Pikeville, KY)	Serve as an Internet service provider; provide training to businesses and residents in the use of the Internet and specific software packages; provide novice businesses and other entities (e.g., schools, doctors) with technical support in using computers and the Internet; obtain land, purchase equipment, and build a telecommunications access site that could serve the region's distance learning and teleconferencing. In practice, much of the effort focused on establishing and maintaining the community's only Internet service provider (ISP).
Golden Triangle Telecommunications Network System (Starkville, MS)	Connect the seven county governments with one another; connect agencies within each county with one another; create web pages for each county; purchase videoconferencing equipment; provide technical assistance for the seven county governments that compose the Golden Triangle Planning and Development District.
Medical and Government Internet Coalition Network (MAGICnet) (Athens, OH)	Create a community-based network with access to bulletin boards, e-mail, and information databases; provide training and technical assistance to project participants; assist local ISPs in expanding their service to underserved areas of southeast Ohio.
SEDA-COG Info-Structure Technology Assistance Center (Lewisburg, PA)	Provide basic and advanced telecommunications services, including access to e-mail, the Internet, word processing, and database services, in order to assure self-sufficient, rapid, integrated access to data essential for daily governmental operations.
Southern Tier Central Telecommunications Initiative (Painted Post, NY)	Purchase and install telecommunications equipment; provide training in the use of the telecommunications equipment and computer programs.
Sunday Creek Associates/ARC Managing Information with Rural America (Shawnee, OH)	Expand organizational capacity through the upgrade of computers, the purchase of a copier machine, and the pursuit of other funding opportunities; strengthen its ability to continue its support of local initiatives, participate in collaborations, and provide technical and project assistance to emerging Community Teams.
Tompkins County Collaborative Communications (Ithaca, NY)	Primary focus to get all of the participating county agencies up to a minimum standard of equipment and accessibility in order to increase communication methods and capability; to be accomplished through a combination of equipment purchases, training, assistance in developing web sites, and technological support.
Education, Training, and Workforce Development	
Alleghany High School Cyber Campus (Sparta, NC)	Purchase and install equipment for distance learning, Internet courses, and enrichment lessons; institute an internship program; establish a Community Technology Learning Center/Computer Lab.
Grant Career Center Conference/Computer Center (Bethel, OH)	Establish a video teleconferencing center and a computer center.
Jackson County Distance Learning (Scottsboro, AL)	In 1998, the 21st Century Council received an ARC matching grant for Phase I of the Jackson County Distance Learning project and placed video teleconferencing (VTC) equipment at the career center, at Scottsboro High School, and at the Earnest Pruett Center of Technology. With a second ARC matching grant in 2001, Phase II added five additional sites to the network.
Jefferson Community College Computer Labs (Steubenville, OH)	Install a computations lab in which computer science courses could be taught; upgrade the computer-aided design (CAD) laboratory, including installation of equipment and software that made possible the most currently available computer-based design capabilities.

Exhibit 3-1. Project activities (continued)	
Project Name	**Activities**
Education, Training, and Workforce Development (continued)	
RESA Regional Telecommunication Special Initiative (Cumberland, MD)	Establish and operate a help desk at Frostburg State University; develop web pages for various businesses, organizations, government agencies, and other entities in the Western Maryland region.
E-Commerce Readiness/Tech Sector Employment	
Advantage Valley (Huntington, WV)	Develop and maintain a web site to promote regionalization; market the region to businesses and other organizations at the local and national level.
SC-Upstate-Info (SCUI) (Greenville, SC)	Create a community web site that would provide information on the six counties of the upstate region of South Carolina and offer links to local resources; provide training (mostly in web design) so that local government, libraries, etc., could create and maintain their own web pages.
PA SourceNet (Lewisburg, PA)	Devise an Internet software-based program (PA SourceNet) to allow anyone to search for Pennsylvania businesses using a variety of methods (by industry, by location, by company size, etc.), and to allow companies to search for potential suppliers, distributors, and customers.
Technology 2020 (Oak Ridge, TN)	Provide services such as business consultation and facilities to help market new products at low cost to incubating companies; set up facilities for meetings and seminars that included videoconferencing and other presentation materials; provide demonstrations on the uses and abilities of e-commerce.

Exhibit 3-2. Alleghany High School Cyber Campus activities

Distance learning, Internet courses, and enrichment lessons. Through collaboration with Wilkes Community College, juniors and seniors can enroll in college courses taught through the cyber campus. Tuition for these college courses is free due to the Huskin's Bill, and students receive both high school and college credit. Students can take courses offered over the Internet as well, and the North Carolina School of Science and Math offers enrichment lessons that supplement regular courses taught by teachers at the high school (e.g. a DNA unit for a biology class).

Internship program. The cyber campus instituted an internship program, which offers programs in video, graphics, business applications, and computer hardware. Interns learn various software packages such as Microsoft Excel, Publisher, PhotoShop, and Corel Draw, and use these skills to assist teachers and fellow students with technology applications, as well as to work on community projects like web page design for nonprofit organizations.

Professional development and continuing education. Teachers are offered courses in technology, subject matter, and end-of-course and end-of-grade tests. They can gain recertification credits, earn master's degrees, complete courses for their doctorate, and collaborate with other teachers across the state in disciplines like physics and astronomy. Professional groups have also taken advantage of the cyber campus for similar activities.

Community Technology Learning Center/Computer Lab. Part of the center's mission is to provide public access to computers and the Internet. The lab is open 6 days a week, and community members can make use of the software, set up e-mail accounts, and receive technical assistance and training. Classes are taught by interns from the cyber campus and include Introduction to Computers, Introduction to the Internet, and Microsoft Publisher. There is also a class taught for Spanish-speaking members of the community by a bilingual student at the high school.

Technology in the classrooms. Teachers have multimedia computers in their classrooms and can post course syllabi and homework assignments online. Although used infrequently, teachers have the ability to administer their tests online. Additionally, this past school year was the first time students were required to incorporate technology into their senior projects, using PowerPoint, video, music, or some combination of these. Students then presented their projects in the Cybertorium, formerly the band room, which was converted into a fully equipped, technologically rich auditorium.

Exhibit 3-3. Info-Structure Technology Assistance Center (ITAC) activities

The Info-Structure Technology Assistance Center (ITAC), located in Lewisburg, Pennsylvania, aimed to strengthen the region's information infrastructure by integrating community networks and thus facilitate communications between various government agencies. The project conducted its activities as part of a multistage process.

Needs assessment. The first stage consisted of finding out which capabilities or services were most needed by each county. The standard approach taken by project staff was to contact government personnel directly and inquire about what types of assistance they needed to perform their duties and functions more effectively and efficiently.

Equipment purchase. The second stage involved determining what types of equipment would best serve the needs specified and assisting in the acquisition process (e.g., negotiating with software vendors).

Equipment installation. The third stage involved installing or providing telecommunications equipment and/or equipping buildings and individual offices with the physical infrastructure (e.g., wiring) needed to utilize such equipment.

Training. The fourth and final stage involved training government personnel in how to utilize this equipment in performing their routine administrative functions and other functions that had previously been unavailable, as well as providing subsequent technical assistance as needed.

Exhibit 3-4.
RESA Regional Telecommunication Special Initiative activities

Telecommunications capacity. In earlier stages of the project, ARC funds were used for equipment and technical assistance to be provided to local school systems, government agencies and institutions, and higher education institutions to develop or increase telecommunications capacity. Most of these efforts were carried out in the mid-1990s, when Internet access and other technologies were available primarily in higher income, heavily populated areas of the state and the country. For example, these efforts provided both Frostburg State University and Allegany College with their first Internet capabilities.

Help desk. The most recent activity of the Regional Education Service Agency (RESA) Regional Telecommunication Special Initiative, located in Cumberland, Maryland, was the establishment and operation of a help desk at Frostburg State University. This help desk was staffed mainly by students, who provided basic computer assistance to students, faculty, and administration. These student interns from Frostburg State also developed web pages for various businesses, organizations, government agencies, and other entities in the Western Maryland region. Student interns from four of the region's higher education institutions, including Allegany College, Frostburg State University, Garrett Community College, and Hagerstown Junior College, were assigned to work with 15 major agencies to develop and maintain their telecommunications systems and to help with training in the use of telecommunications technology.

Exhibit 3-5. Advantage Valley activities

Web site. The aim of the Advantage Valley project in Huntington, West Virginia, was to foster economic regionalization of the tri-state corner of West Virginia, Ohio, and Kentucky. A key component of this campaign was the establishment of an Advantage Valley web site. The web site would be instrumental in linking area businesses, and would provide community information for community members as well as for prospective employers interested in learning about the region (its transportation, schools, shopping, safety, etc.). The web site would showcase, under one umbrella, all that was offered and available in the region in a dynamic, nonstatic manner.

Marketing. A second major activity component of the project was its marketing campaign. This campaign, the centerpiece of the effort to unify the region under the name of Advantage Valley, consisted of live demonstrations to local businesses on the web and its capabilities; popularization and internalization of the name Advantage Valley within the region; posting Advantage Valley advertisements in *Site Magazine* (dedicated to news sites for businesses), other national magazines, and local newspapers; the creation of an Advantage Valley video; wining and dining of local executives; and annual Advantage Valley dinners that included local businesses, which promoted the achievements of community members and businesses.

Training. A third project activity was training seminars to educate businesses about web design. These were held early on at Marshall University and locations in Ashland, Kentucky. Staff to assist in the training were provided by participating companies. The seminars were free and were open to anyone with an interest in web for business applications.

Exhibit 3-6. Tompkins County Collaborative Communications activities

Identifying needs. Prior to applying for the ARC grant, the Human Services Coalition (HSC) of Tompkins County, Inc., conducted a survey of county agencies. This survey was designed to assess agency interest in participating in a project that would be designed to purchase computer equipment and upgrade staff capacity to make use of technology in the workplace.

A technology consultant worked with individual agencies to identify the computer and training needs of individual staff. (A number of these human service agencies had no existing access to computers or the Internet.) These consultations helped assure that agency staff would make optimal use of the equipment and training provided through the ARC grant. It also enabled HSC to tailor its equipment and training to the needs of each participating agency.

Equipment purchase and training. HSC purchased various types of equipment for the agencies, including laptop and desktop computers, servers, memory, scanners, drives, printers, and modems. The grant also funded Internet access, networking, and the purchase of software packages. Finally, based upon the training needs identified through the county agency surveys, HSC arranged for beginner and intermediate level training in e-mail, the Internet, Word, Excel, and Access.

EXTENT OF ARC FUNDING OF ACTIVITIES

The telephone survey collected information about the extent to which specific project activities were funded by ARC.[9] According to survey results, 44 of the 59 projects (74 percent) that provided onsite education and training did so with ARC funds (see figure 3-1). Forty-two of the 57 projects (74 percent) that were designed to facilitate communications between various regions or organizations used ARC funds to do so. Thirty-two of the 50 projects (64 percent) that provided training specifically in the use of telecommunications technology and 27 of the 45 (60 percent) that established new computer or telecommunications access centers did so with ARC funds.

Projects most often reported that ARC funded a portion of a given activity. The activity most likely to be funded entirely by ARC was providing onsite education and training (reported by 8 of the 59 projects that conducted this activity, 14 percent) (not shown in tables). The two activities least likely to receive any funding from ARC were developing a strategic plan for long-term telecommunications needs, and conducting an assessment of technology capabilities. Six of the 25 projects that reported developing a strategic plan (24 percent), and 7 of the 29 projects that reported conducting an assessment of technology capabilities (24 percent) indicated that no ARC funds were involved for these activities.

PROJECT EQUIPMENT

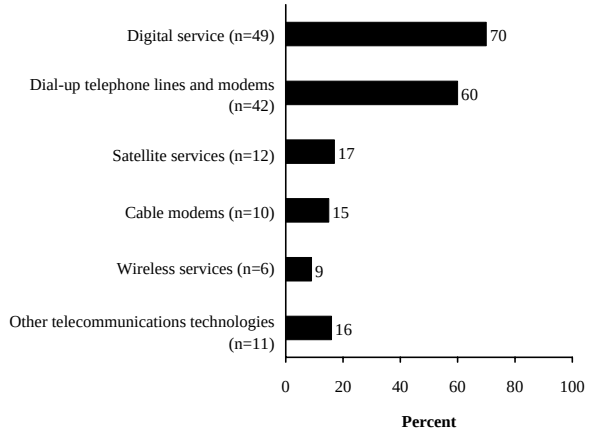
Throughout the country, computers and technology have become an integral component of conducting business and educational activities. Telecommunications technology, whether through desktop computers or videoconferencing equipment, permits greater and richer opportunities for government and business relationships to prosper. In addition, educational institutions are linking together to share instructional resources via telecommuting technologies, enriching the education of students nationally and worldwide. Despite their potential, however, these technologies are constantly evolving, and their infusion into communities presents significant challenges. The 70 ARC-funded telecommunications projects were implemented at a time of rapid technological change, and were therefore faced with critical decisions regarding equipment purchase.

[9] ARC-funded activities include those activities for which respondents indicated that ARC provided some or all of the funding.

Types of Equipment Obtained by ARC Telecommunications Projects

Survey respondents most commonly reported one of two types of telecommunications connection technologies: digital services, such as ISDN, DSL, and T1 (70 percent), and dial-up telephone lines and modems (60 percent) (figure 3-2). Satellite services (12 projects, 17 percent), cable modems (14 percent), wireless services (9 percent), and other telecommunications technologies (16 percent) were used considerably less often, most likely because these services are simply not available in many rural areas. Respondents could have reported more than one type of telecommunications connection technology. Survey results indicate that 60 percent of the projects made use of more than one type of connection technology, whereas 40 percent used only one type.[10]

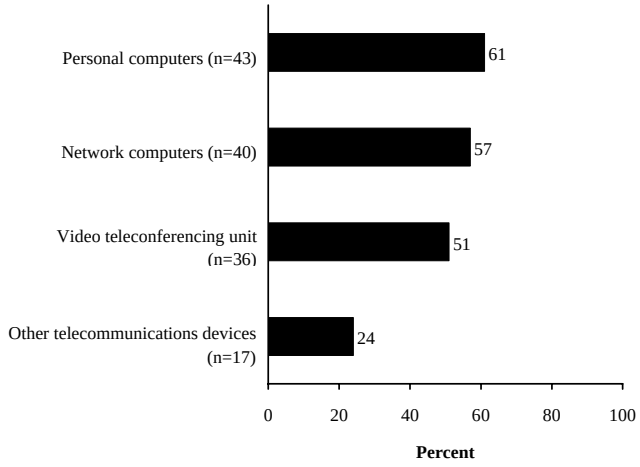
Figure 3-2
Projects' use of telecommunications technologies, by type of technology (n=70)



NOTE: Respondents could report more than one type of telecommunications technology.
SOURCE: 2002 telephone survey of ARC grantees.

Telecommunications devices that projects were most likely to make available to project participants included personal computers (61 percent), network computers (57 percent), and videoconferencing units (51 percent) (figure 3-3). Nearly one-quarter (24 percent) used other devices, such as video production equipment and imaging equipment.

Figure 3-3
Telecommunications devices made available to project participants (n=70)



NOTE: Respondents could report more than one type of telecommunications device.
SOURCE: 2002 telephone survey of ARC grantees.

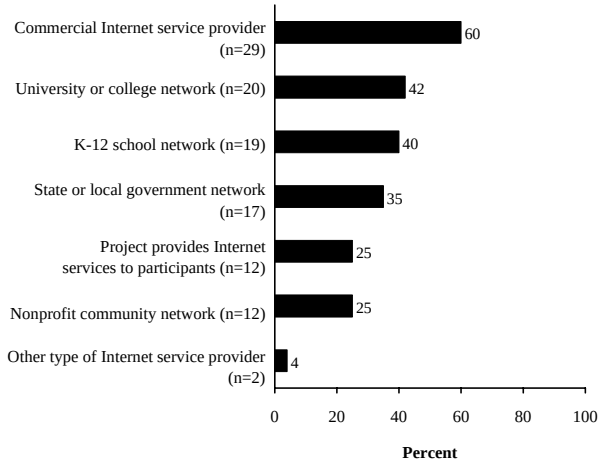
Among the 48 projects that helped participants gain access to the Internet, the most common type of Internet service provider (ISP) was a commercial ISP (60 percent), followed by university or college networks (42 percent), K-12 school networks (40 percent), and state or local government networks (35 percent) (figure 3-4). Fewer used Internet services provided by the project (25 percent), nonprofit community networks (25 percent), or some other type of Internet service provider (4 percent).

Survey results indicate that many projects offered multiple types of Internet connections to participants: 61 percent of the projects made use of more than one type of ISP, whereas 39 percent either used only one type or none at all. Neither the survey results nor the case studies examined why multiple types of Internet connections were used by some projects and whether those projects with multiple Internet connections employed

[10]Neither the survey nor the case studies examined why some projects made use of more than one type of telecommunications connection technology.

them concurrently or one after the other over the course of their grant periods.

Figure 3-4
Types of Internet service providers used by project participants (n=48)



NOTE: Projects could report more than one type of Internet service provider.
SOURCE: 2002 telephone survey of ARC grantees.

Thirteen of the 16 case study sites visited indicated that they used ARC funds to purchase at least one computer. Uses of these computers included running software, data management, overall office efficiency, training, teaching, computer labs, as well as access to local services, state resources, and global connectivity.

Six of the 16 case study projects also purchased videoconferencing equipment, including cameras, microphones, speakers, and projectors, among other types of equipment necessary for telecommunications. Other common peripheral equipment purchased included printers, scanners, copiers, modems, software, and office furniture. Exhibit 3-7 summarizes the range of equipment that was acquired with ARC support, across the 16 case study sites.

In addition to the equipment purchased by each case study site, donations provided by local institutions appear to have made an important impact on several projects. Equipment and software that were donated or provided at a reduced price helped to relieve some of the financial burden on the projects. For example, Marshall University donated a server to the Advantage Valley project, which was used to host a new web site and connect local, smaller communities in the hopes of creating a larger sense of a common region. The university also donated the labor of a web designer. At Jefferson Community College, software was donated by local businesses in return for the community college's professional endorsement.

In addition to donated equipment, at least one other case study site was able to take advantage of secondhand equipment. In the Medical and Government Internet Coalition Network (MAGICnet) project, in Athens, Ohio, a local ISP was dumping external modems from their modem pool, and COM and ILGARD bought them for a reduced price. They were also able to take advantage of surplus equipment made available through Ohio University, which was an unforeseen advantage to the project.

PROJECT TRAINING

In order to use equipment in an effective and productive manner, users must have the requisite knowledge and skills. Therefore, training is a critical part of most telecommunications projects. The telephone survey revealed that 59 of the 70 projects (84 percent) provided onsite education and training activities, and 71 percent, more specifically, provided training in the use of telecommunications technologies (see figure 3-1).

The case studies provided more indepth information on training than the telephone survey. Almost all of the case study sites used a portion of their grants to fund some sort of training activity. For some projects, training constituted a large portion of what they set out to do; for others, it was a smaller activity supplementing other telecommunications activities. Training activities also varied in substance and scope, as well as by recipients and types of providers. While some projects offered free training activities, others required participants to pay a nominal fee to attend sessions. A few sites

admitted that they charged the fee primarily so participants would take the courses more seriously; others had a genuine interest in defraying some of the administrative costs involved. The duration of training sessions ranged from several hours to an entire week. In addition to the training that came about as part of the grants, projects were able to carry out subsequent training activities thanks to space or equipment acquired through ARC grants.

Topics Covered

The majority of case study sites provided training sessions that were designed to familiarize beginners with computers, e-mail, or the Internet. This was a very important step at a time when many organizations and individuals were just beginning to have more regular access to some of the newer technologies. Basic computer training included orientation and familiarization with rudimentary functions in e-mail and operating systems. Internet training involved fundamental browsing and searching techniques as well as more specific demonstrations such as the opportunities and benefits that the Internet can provide in education and the classroom. One project also provided a session in how to apply for grants through the Internet.

Half of the sites visited trained people in the general usage of programs such as Microsoft Word, Excel, PowerPoint, Publisher, and Access. The training focused on the use of a computer application, but did not usually integrate the application into the daily work routine. Only a few projects chose to tailor training to focus on the needs of a particular group of users. For example, the MAGICnet project provided separate training sessions for physicians and government officials that focused on issues particular to their interests. Physicians were taught where to access credible medical information and how they could use interlibrary loans to get books and articles, and were given instruction on Medical Informatics, computer applications in medical care. Similarly, the Institute for Local Government Administration

Exhibit 3-7. Telecommunications equipment purchased by case study sites, by projects' primary focus

Project name	Equipment purchased
Access to Information Infrastructure	
Big Sandy Telecommunications Center (Pikeville, KY)	Computers, monitors, laptops, scanner, printers, V-Tel technology, videoconferencing equipment, audio equipment with DVD, VCR, CD, cassette, AM/FM, CATV
Golden Triangle Telecommunications Network System (Starkville, MS)	Teleconferencing units, cameras, microphones, satellite, laptop, T1 and 64 K lines, projector, server, routers, firewall
Medical and Government Internet Coalition Network (MAGICnet) (Athens, OH)	Computers, modems, monitors, printers,
SEDA-COG Info-Structure Technology Assistance Center (Lewisburg, PA)	Computers, printers, software
Southern Tier Central Telecommunications Initiative (Painted Post, NY)	Computer, teleconferencing equipment, LCD projector, ISDN line, document camera
Sunday Creek Associates/ARC Managing Information with Rural America (Shawnee, OH)	Computers, copiers, printers
Tompkins County Collaborative Communications (Ithaca, NY)	Computers, servers, memory, scanners, drives, printers, modems, networking equipment, software packages, LCD projector
Education, Training, and Workforce Development	
Alleghany High School Cyber Campus (Sparta, NC)	Computers, videoconferencing equipment, printer, scanner, server, video production equipment, software
Grant Career Center Conference/Computer Center (Bethel, OH)	Computers, scanner, printers, TV monitor, speakers, video cameras, amplifiers, color TV, microphones, VCR, antennas
Jackson County Distance Learning (Scottsboro, AL)	Monitors, cameras, projectors, microphones, speakers, cables
Jefferson Community College Computer Labs (Steubenville, OH)	Computers, monitors, software, plotter, scanner
RESA Regional Telecommunication Special Initiative (Cumberland, MD)	Computers, printers, server, software
E-Commerce Readiness/Tech Sector Employment	
Advantage Valley (Huntington, WV)	None
SC-Upstate-Info (SCUI) (Greenville, SC)	Server, software
PA SourceNet (Lewisburg, PA)	Computers, server
Technology 2020 (Oak Ridge, TN)	None

and Rural Development (ILGARD) taught government officials where to access information that may be useful to them, such as federal and state grant opportunities.

Other computer training topics included file management and introduction to applications systems. More advanced web training such as HTML programming, web page design, and web page maintenance were offered in five projects. Some projects also held more specific training, including job development and job skills training, asset mapping, strategic planning, budgeting, management, and team building.

Training Providers

For some case study sites, the grant recipient agency provided training in house. In other cases, project staff worked with contractors to conduct training sessions. Several projects relied on local community colleges or universities that already had adequate facilities to conduct training. They also found that institutions of higher learning had students who were willing to provide services for a reasonable cost or for free if they could receive course credits for internships.

Training Recipients

Three-fourths of the case study sites visited offered training courses to local government or business staff, including libraries, human service agencies, and educators in the community. Some offered training to their own project staff. Three projects trained adults and other students from the community in job skills, including technology and computer skills. In some cases, professional development courses were offered for teachers or other professionals in training centers. Some examples follow:

- *Jefferson Community College Computer Labs project.* Although the primary purpose of both computer labs was to enhance the school's curriculum, the labs have been made available to local companies and their employees for training in the use of computers. Local employees and citizens who have little or no computer skills can enroll in the Step Up program to learn more about e-mail, Internet, and hardware capabilities of the personal computer. The program is designed to train those persons who are not necessarily college-bound, yet are interested in enhancing their career or marketable skills. Many of the people involved in Step Up go on to enroll at the college to pursue associate's degrees. In addition to the Step Up program, faculty and administration cooperate with outside businesses to provide training and guidance. Also, faculty themselves are provided with training in the uses of software and/or hardware as the annual budget allows. (Steubenville, Ohio)

- *South Carolina Upstate Information Telecommunications project.* The training was designed for staff at libraries, government, and business partner sites. Their webmaster provided the training and developed handbooks on web page design and web site architecture for people who attended the training sessions. (Greenville, South Carolina)

- *Golden Triangle Planning and Development District.* Training was not provided to individual counties. Rather, training was provided in a given software package to county government staff across the seven counties. In an effort to publicize classes, notices were mailed out prior to each session, and it was then up to each county supervisor to determine who among their staff should attend. Training was generally provided to 10 individuals at a time. This was made possible through another ARC grant that enabled the purchase of 10 laptop computers. Approximately 240 county employees received training through an ARC grant. (Starkville, Mississippi)

Training Facilities

Computer training courses were often held in computer labs that were created as part of the grant, or in preexisting labs of other entities, such as local community colleges. Other locations included conference rooms or classrooms where laptop computers could be set up. There seemed to be a shift in the style of computer training over recent years. In 1994, early in the life of the ARC telecommunications grants, many people had not been exposed to state-of-the-art training facilities. Some agencies would have a presenter on a large screen computer at the front of a room, and everyone was expected to look over his/her shoulder. Other training situations required the sharing of equipment or were limited to one-on-one training. However, by 2000, training sessions had evolved to the point where every person had his or her own equipment with which to work and gain hands-on experience. Many projects purchased furniture such as computer tables and other electronics including computers, LCD projectors, or teleconferencing equipment which further facilitated training activities.

Materials Developed

Several sites developed their own materials, including overhead slides, handouts, training manuals, and evaluation forms on which to provide feedback. Some agencies were able to use feedback from the evaluation forms to make improvements to the training courses, even during the life of the grant. Other materials developed included training handout packets with practice exercises and comprehensive web page architecture handbooks. Sometimes materials were distributed as a way for those being trained to be able to share what they learned in training with others in their organizations. One of the sites visited noted that the train-the-trainer approach worked better in some agencies than in others. It was noted that some agencies had staff members who were trained and returned to share their newly acquired knowledge with others, while other agencies had problems in losing knowledge and skills as a result of losing training staff.

Best Training Practices

End users must possess the requisite knowledge if they are to take full and appropriate advantage of telecommunications technologies. As such, successful projects emphasized the importance of providing individuals with adequate access to training in how to operate new hardware and software. Case study findings suggest that effective training involves sessions tailored to the characteristics, skills, and needs of specific end users. Further, projects should reinforce their technology training by (1) integrating learning into real-life contexts (e.g., in the workplace), (2) making written materials available, and (3) pointing out or facilitating future training possibilities. Several of the end users we interviewed indicated that single training sessions were ineffective. As such, they recommended that whenever possible, follow-up training should be offered on more advanced topics.

PROJECT PLANNING

The case studies provide evidence that careful project planning is critical to project success. About half of the 16 projects visited attempted to involve end users and other community stakeholders in the planning and development of the project through the form of a needs assessment. While the nature of these assessments varied somewhat, in most cases project staff inquired about the needs of their potential end users and beneficiaries through the use of surveys or, in a few instances, focus groups and interviews.

For example, the Human Services Coalition of Tompkins County, New York, routinely conducts surveys of its agencies to assess their needs in such areas as training, technology, and space. HSC, which serves as the human service planning body for the county and coordinates the overall planning of human services programs and

activities, sent a survey to all of its agencies to assess their needs and their interest in participating in the ARC grant. This resulted in project staff obtaining worthwhile information (e.g., that a considerable number of agencies did not have e-mail or web sites), which ultimately became very useful in the planning and development stages of the project.

Another project that assessed the need for telecommunications technology was the SC-Upstate-Info project. Its staff discovered that a need for a central community information source existed through a survey of, as well as focus groups with, reference librarians, economic developers, and local government officials. Both vehicles inquired about what types of information these groups would like to see about the upstate region of the state and other relevant issues.

Best Planning Practices

Attention to planning results in projects that remain focused on addressing a tangible goal. Several case study respondents indicated that their front-end assessments of end users' needs resulted in the development of project activities that were appropriately utilized by the intended range of end users. These assessments also served to systematically expose community members and potential stakeholders/partners to a project's proposed aims and activities, thereby increasing community involvement and support. The use of a needs assessment also helped some projects avoid purchasing equipment simply because funds were available or because "everyone else already had it."

Case study respondents recommended that future projects formally assess their infrastructure and staff expertise before purchasing and installing equipment. For example, projects recommended that feasibility studies be used to:

- Evaluate the existing infrastructure and identify any changes that should be made to facilities (in advance of a purchase) to accommodate new equipment;
- Consider how long projects expect their equipment to last (or stay current);
- Anticipate equipment obsolescence when developing long-term telecommunications budgets;
- Assess whether existing staff (or those appointed by them) possess the technical expertise required to install and operate the equipment; and
- Review potential vendors' history and references to see if any have a history of problems, e.g., delays acquiring equipment.

PROJECT PROMOTION

Another critical aspect of project success is the promotion of project activities. The case studies revealed that most projects marketed their activities/services directly to potential end users and other beneficiaries through a variety of approaches. The approach (or approaches) adopted by a particular project usually depended largely on the nature of that project. Projects that offered services to the wider community tended to engage in different and multiple marketing activities, while projects that were more narrowly focused used fewer, more direct methods of increasing awareness.

For example, the Jackson County Distance Learning project offered multiple activities and services to the entire community via videoconferencing, and engaged in a wide range of approaches with respect to increasing community awareness. Future activities are posted on the web site of the 21st Century Council, the nonprofit corporation that operates the project, and the Council regularly posts information about upcoming activities in the two local newspapers. Its members frequently appear on local television stations during local news programs, and an e-mail list serve and fax list are also utilized, each consisting of hundreds of different businesses, and community and government agencies.

The SCUI project and the Alleghany High School Cyber Campus carried out similar efforts. SCUI relied on its web site for disseminating information about the project, and included its address on every publication, logo, map, and piece of letterhead it distributed. The Alleghany High School Cyber Campus sought to expand educational opportunities to students and community members in rural and underserved areas, and its outreach efforts consisted of advertisements through flyers, radio stations, the campus's cable TV channel, and newspapers. Students also received letters through the mail each year explaining what types of opportunities were available through the cyber campus.

Projects that focused more on particular groups of users took very different approaches. For example, the Info-Structure Technology Assistance Center was aimed at strengthening the local governments' information structure by developing and maintaining regional coordination of technology and replacing existing manual equipment and/or obsolete systems. While the overall community could be considered beneficiaries of the project, its primary end users were government personnel. Project staff contacted government personnel directly and inquired about the types of assistance they needed to perform their duties more effectively or efficiently.

Similarly, the Golden Triangle Planning and Development District sought to connect county governments and agencies, as well as to facilitate communication among and within them. This project routinely brought in staff from each participating county to demonstrate specific computer and Internet applications and to show off videoconferencing equipment in the hopes of attracting more users.

Some projects encountered difficulties—in the form of resistance—when marketing their activities or services to potential users. For example, when the Info-Structure Technology Assistance Center contacted agencies, many government personnel did not feel the need for advanced telecommunications equipment. Rather, they believed their existing equipment was sufficient. Project staff, therefore, had to take a more aggressive approach by presenting arguments to personnel that the technology would make their lives easier and/or that the investment in training would be worth their time in the long run.

A few projects did not take into account the amount of marketing that would be needed to ensure that potential beneficiaries of the activities or services being offered were aware of them. Several projects relied mostly on the element of word of mouth, and some others did not believe that marketing was at all necessary. With respect to the former, at the Technology 2020 project, the company was involved in almost all technology-related activities in the local communities, thus making it already widely known as well as easier to provide information. Moreover, the staff at the Jackson County Distance Learning project believed that since Scottsboro was such a "tightly knit community," the element of word of mouth was especially effective. One indication of this closeness is that the Director of the 21st Century Council, which operates the project, is the leading family physician and has regular contact with virtually every segment of the community and thus is aware of the community's concerns.

Some projects did not feel marketing was necessary, either because of an existing demand for services or some other unique circumstance. For example, both the Grant Career Center and RESA indicated that their most significant challenge was not *increasing* demand, but *meeting* that which already existed. Further, the Board of Directors of the Kentucky Science and Technology Corporation (KSTC), which was responsible for the implementation of the Big Sandy Telecommunications Center, was composed of representatives of nearly all sectors that the project was designed to serve, including business, education, health care, and government. This greatly facilitated the dissemination of information and awareness of the project among

the community at large, making formal marketing efforts somewhat superfluous.

Best Promotion Practices

Successful telecommunications projects are able to make their services visible and attractive to as many potential end users as possible. Even the best-designed and well-implemented project will fall short if services are underutilized because of a lack of promotion. While the marketing approach employed depends on the nature and scope of the specific project, successful ARC telecommunications projects tend to make use of multiple concurrent forums to promote their services—including web sites, newspapers and magazines, local television stations or cable access stations, radio, newsletters, flyers, direct calls, demonstrations, and billboards.

SUMMARY

Projects employed a wide range of activities as part of their implementation approach, and as a result, ARC-funded projects were able to address the varied needs of the communities they were serving. The case studies revealed that training for project participants, project planning, and the promotion of project activities were often critical elements to successful project implementation.

IV. Project Accomplishments and Impact

It is impossible for a study of this size and scope to quantify the full extent to which ARC projects succeeded in infusing telecommunications technologies into the working and private lives of people in Appalachian communities. However, survey findings and site visit interviews suggest that these projects left a significant imprint, and in many cases set into motion further changes of import to the ways in which business, governance, and education are carried out. This chapter describes the types of accomplishments that projects identified during the telephone survey and site visit interviews.

ACHIEVEMENT OF GOALS

Survey respondents were asked to indicate the extent to which they were successful in meeting the goals they set for themselves (see chapter 2).[11] The two most commonly cited goals were improving skills training and educational opportunities and enhancing economic development (see table 2-3). Of the 61 projects that aimed to improve skills training and educational opportunities, 42 (69 percent) indicated that their success was the same as expected, 14 (23 percent) said it was more than expected, and 5 (8 percent) reported that it was less than expected (table 4-1). Of the 52 projects that aimed to enhance economic development, 37 (71 percent) reported their success to be the same as expected, 7 (14 percent) said it was more than expected, and 8 (15 percent) indicated that it was less than expected.

The most success was found among projects that aimed to address information coordination, enhance employment opportunities, and improve consumers' access to quality health care. Of the 46 respondents who reported the goal of enhancing coordination of community-wide information and communication service, 17 (37 percent) said that their success was more than they expected. Similarly, of the 35 respondents who said their project aimed to enhance employment opportunities, 11 (31 percent) indicated greater success than expected, and of the 17 respondents who said their project aimed to improve consumers' access to quality health care, 6 (35 percent) reported more success than expected. The goal with the least success in implementation was improving the delivery of and access to social services; 5 (23 percent) of the 22 projects that cited this as a goal indicated that they were less successful than expected in meeting it.

IMPACT OF THE ARC GRANTS

Results of the telephone survey reveal that many of the 70 telecommunications projects would never have existed, or would have been seriously impaired, without ARC support. Forty-four of the 70 survey respondents (63 percent) indicated that their project would never have been implemented without ARC funding, and 24 (34 percent) reported that their project would have been only partially implemented had they not received funding through ARC (figure 4-1). Only 2 (3

[11]Response to this measure depended on individual respondents' varying definitions and expectations of success, and allowed them to assess their own level of achievement.

Table 4-1
Extent of achievement of goals

Goal	Number and percent indicating extent of success					
	Less than expected		Same as expected		More than expected	
	Number	Percent	Number	Percent	Number	Percent
Improve skills training and education opportunities (n=61)	5	8	42	69	14	23
Enhance economic development (n=52)	8	15	37	71	7	14
Enhance community development (n=46)	7	15	33	71	6	13
Enhance long-term telecommunications needs (n=46)	5	11	31	67	10	22
Enhance coordination of community-wide information and communication services (n=46)	4	9	25	54	17	37
Improve delivery of and access to government services (n=42)	4	10	30	71	8	19
Enhance employment opportunities (n=35)	6	17	18	51	11	31
Improve delivery of and access to social services (n=22)	5	23	12	55	5	23
Improve consumers' access to quality health care (n= 17)	2	12	9	53	6	35
Something else (n=8)	0	0	4	50	4	50

NOTE: Percents may not sum to 100 due to rounding. N's refer here to the number of respondents indicating their project addressed a given goal.
SOURCE: 2002 telephone survey of ARC grantees.

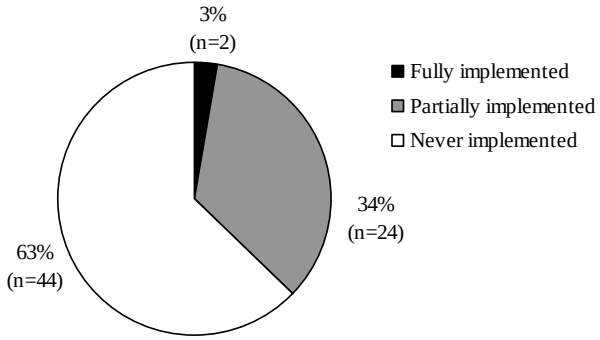
percent) respondents said that their project would have been fully implemented without ARC funding.[12]

Among the 26 projects that would have been partially implemented without the ARC funding, 12 (47 percent) said they would have offered significantly fewer services, 17 (65 percent) said they would have reached significantly fewer people, and 19 (73 percent) reported that the project schedule would have been substantially delayed (figure 4-2).

Respondents' Perceptions of Projects' Most Important Outcome

The survey provided respondents with the opportunity to describe the most important outcome that resulted from their ARC grant. Responses varied widely from narrow statements about activities, such as "Internet access for students and teachers," to broader statements about the impact of those activities, such as "meeting the shortage of trained technicians in our service area" and "access to legal documents in eight counties without having to examine paper records." Some respondents cited impressive but vague outcomes, such as "the community was brought into the 21st century."

Figure 4-1
Percent of projects reporting the most likely outcome if the project had not received ARC funding (n=70)

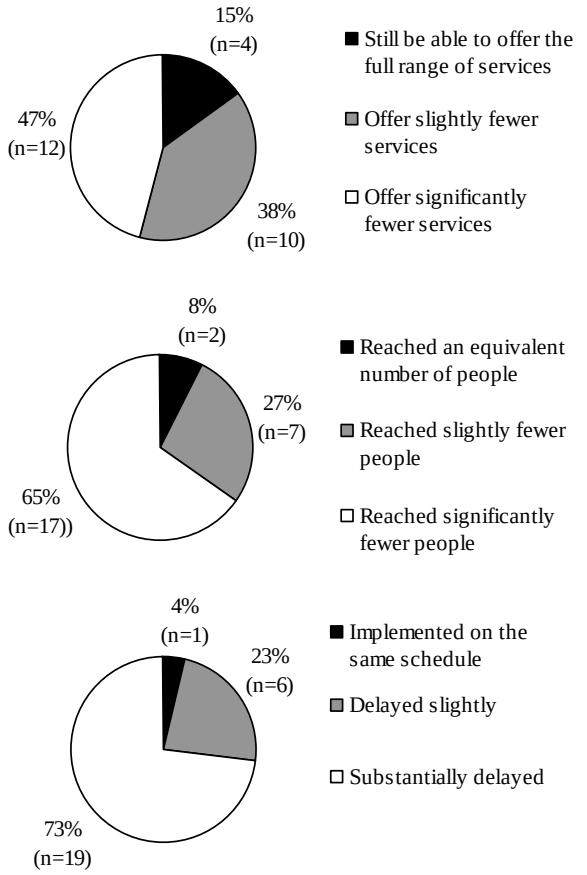


SOURCE: 2002 telephone survey of ARC grantees.

Figure 4-2

[12]Projects that would have been fully implemented in the absence of ARC funds were excluded from the case study sample to assure that Westat was visiting those projects that most benefited from ARC funding.

Among projects that would have been partially implemented without ARC funding (n=26), the percent reporting various effects



SOURCE: 2002 telephone survey of ARC grantees.

Responses generally fell into eight major categories: (1) improvement in skills, (2) expanded educational opportunities, (3) improved access to information and services, (4) improved coordination and communication across jurisdiction and sectors, (5) upgraded and improved technologies, (6) awareness of importance of telecommunications technologies, (7) leveraging of other funding or opportunities, and (8) reduced sense of isolation. Exhibit 4-1 (at the end of this chapter) provides examples of statements respondents made about their ARC grant's most important outcome.

Number of Beneficiaries

Consistent with the breadth of telecommunications projects that ARC has funded, the number of people who benefited directly (i.e., those with direct access to project resources or equipment) from each project varied greatly. Responses ranged from 6 people to nearly 10,000 people as direct beneficiaries from their projects (data not shown in tables), with a mean of 2,180 and a median of 500. A number of projects had difficulty estimating the number of beneficiaries, often due more to the difficulty of counting people in certain categories (e.g., web users) than to inadequate data collection measures.

Impact on Beneficiaries

The case study sites affirmed that ARC-funded telecommunications projects generally achieved their goals and had a substantial impact in many communities. Case study findings suggest that increased access to telecommunications technologies resulted in a wide range of tangible and intangible impacts. These include the creation of new partnerships in communities, the pooling of resources, questioning of outdated ways of doing things, and speculation about potential innovative approaches for improving conditions in a variety of public and private settings. Respondents at most sites made clear that project staff, beneficiaries, and community members were exposed to technologies that served as a catalyst for provoking consideration of how existing practices might be advanced. It is this new paradigm of shared knowledge and awareness that may ultimately help propel communities in Appalachia toward a lifting of the digital divide.

ARC telecommunications grants serve not only the purpose of educating communities, but also help to prove to skeptics the utility and importance of improved telecommunications technologies. In many of the case studies, it was found that projects were able to dispel doubt and

make believers of key decisionmakers, paving the way for future funding and further partnerships. Also, many of these case study projects would not have gotten off of the ground were it not for an ARC grant. In this sense, many ARC grants serve as a springboard for future funding and expansion.

It is also important to note that in many cases, the ARC grant period was primarily used to lay the foundation for longer term telecommunications advances. As such, the benefits that sites reported might not take into account other substantive gains that will accrue over time. Nonetheless, qualitative findings from the case study sites highlight several ways in which projects improved the quality of life in participating communities. The projects imported equipment and infrastructure into communities that had been adversely affected by the digital divide. This infusion of new telecommunications technology improved the flow of information within and across businesses, educational institutions, and governing offices. It also benefited individuals and organizations in many specific ways, such as making classes available through distance learning, promoting education through access to the Internet and specialized software, supporting workforce training, and increasing productivity in the workplace.

To illustrate some of the impacts described above, three detailed examples from the case studies follow.

Jackson County Distance Learning. The Jackson County Distance Learning project had a wide range of impacts. Respondents indicated that, as a result of the ARC grant, graduate and undergraduate students can now pursue degrees via distance education from major universities, including the University of Alabama and Auburn University, without commuting the long distances back and forth from Scottsboro. Also, professional development workshops can be offered to a greater number of teachers. The Director of Special Education for Scottsboro City Schools recently led teachers through a professional development seminar that permitted all the teachers to participate from their respective schools. This allowed the teachers to remain in their everyday setting and not devote extra time and/or expenses to traveling to one central location.

Further, large numbers of community members can participate in health seminars that originate from the University of Alabama Medical Center or other major hospitals and health care centers. Topics of these seminars are designed to address the immediate needs of Scottsboro residents and, as a result, have included topics such as diabetes, nutrition, and obesity.

Teachers can now introduce new subject areas and curriculum resources to students. Students are participating in National Geographic programs, as well as other math/science programs, in which they would not otherwise be able to participate. Students in Scottsboro are also using the distance learning equipment to participate in classes that are not available in the immediate area but are offered in other parts of the state. For example, if one student wants to take calculus, it is likely that either there is no teacher qualified to teach that subject or there is not sufficient demand within the school to offer such a course. Through the use of the distance learning equipment, however, that student can complete such a course and, in some cases, even receive college credit for it.

In addition, government representatives are communicating with their constituents more easily using the distance learning equipment. Scottsboro is over 200 miles away from the state capital of Montgomery, thus making it difficult for Scottsboro residents to communicate with their state representatives and other government officials. However, the first electronic town meeting was offered, which allowed residents to ask questions, and/or express their concerns to their representatives in Montgomery.

Alleghany High School Cyber Campus. The Alleghany High School Cyber Campus has had a

tremendous impact on education in Sparta, North Carolina, not just for the students, but for teachers and the broader community as well.

The cyber campus has given rise to new learning opportunities for Alleghany High School students, and the Curriculum Director has described it as "one of the best things we've done for [them]." There was a time when the curriculum did not even offer AP classes, but now students can enroll in college courses, earning college credits while they are still in high school, and they can participate in enrichment lessons taught through the North Carolina School of Science and Math. Students' aspirations have grown, and staff members at the cyber campus have observed more students continuing on to 2- and 4-year colleges. One of their graduates who became interested in computers through the internship program has begun studying graphic design at a college in Vermont.

Students are learning valuable computer skills in software programs like Excel, Publisher, PowerPoint, PhotoShop, and Corel Draw. Among them is a visually impaired student who was a junior at the time of our site visit. Not only has she learned how to use a computer, but the confidence she has gained through her participation in the cyber campus's internship program was credited as playing an important role in her plans to apprentice at Sparta's Chamber of Commerce during the summer break.

Teachers have benefited from the cyber campus, as well. They have the opportunity to participate in professional development courses, receive certification credits, collaborate with other teachers in their discipline, and earn their master's degrees, all through the cyber campus. One teacher is earning her doctorate from a university 60 miles away and will be completing some of her coursework through the cyber campus. Teachers have also been able to incorporate technology into their lesson plans, which has added another dimension to their teaching and has emboldened them through the positive reaction they receive from their students. One teacher that was interviewed described a conversation with friends of his in New York about the latest innovations in technology. He laughed when he recounted how his friends told him, "You're in the mountains of North Carolina, I'm sure you haven't seen this," only to be amazed by the highly sophisticated technology available to him through the cyber campus.

The reach of the cyber campus extends beyond the students and teachers at Alleghany High School to touch members of the community as well. Through the community lab, they have access to computers, e-mail, the Internet, and courses on basic computer skills that they did not have before the cyber campus was built. One of the interns who teaches classes at the Community Technology Learning Center noted that many of the people who use the computer lab are elderly. He poignantly described the rewarding moment when they realize that they are not too old to learn.

Jefferson Community College Computer Labs. One final example is that of Jefferson Community College, where site visitors clearly saw that the ARC-funded project had wide-ranging effects on students, faculty, and administrators. In general, students could be trained on the latest equipment and software and could acquire the skills and knowledge requisite for employment in technical fields. Specifically, students were able to take programming courses that would not have otherwise been available. In addition, students were exposed to a variety of operating systems (Novell, Unix, NT). In the CAD lab, students could train on the most up-to-date software on faster machines, saving instruction time and increasing the pace of learning. According to the current Dean of Information and Engineering Technologies, the new equipment and software "drastically changed students' experiences," and "opened opportuni-ties to them, like minor league to major league."

Another important benefit for students, as a result of the ARC grant, was the ability to transfer computer science credits to 4-year institutions.

The transfer program facilitated continuing education by providing for a smoother and less expensive transition from Jefferson Community College to other schools. Anecdotal evidence suggests that students were successful in finding employment after graduating (for those who did not transfer to a 4-year school). The AutoCAD instructor said that most of his students "get jobs before getting out of school," many after having done internships. According to this teacher, 95 percent of graduates find work in-field or else go on to 4-year colleges.

Faculty benefited from the equipment in several ways. First, "it showcased for them what technology could do" (Dean of Information and Engineering Technologies). Teachers exposed to the two labs were made aware of the ample pedagogical possibilities of technology. For those teachers with courses based in one of the labs, their instruction was enhanced, as was their sense of pride, in that they were teaching with the most sophisticated and current tools available in their fields. According to the AutoCAD instructor, "we were the envy of the building." Faculty also benefited by participating in staff training/professional development within the labs (e.g., learning how to use an electronic gradebook). The AutoCAD instructor said that having the latest equipment "pushed us to keep up" by attending workshops and conferences (e.g., the AutoDesk University program, and North American AutoCAD user groups seminars). Parents were also indirectly affected by the computer science transfer program (a by-product of the ARC grant), which allowed them to save money on tuition. This is especially the case for parents of students who could attend Jefferson Community College for free as a result of the Horizon grant.

According to the Vice-President of Academic Affairs, "Once you offer advanced programming courses, it pushes the institution to another level of offering services." The Dean of Information and Engineering Technologies said that the project made possible the computer science transfer program and helped Jefferson Community College to take the necessary steps to offering technology-related courses. Perhaps most importantly, the ARC grant proved to be a springboard for other technology-related grants won by the college in the following years. Also, enrollment increased at Jefferson Community College as a result of the equipment purchased with ARC funds (according to several respondents).

Finally, the ARC grant "made a believer out of key decision-makers" at the college, and made it easier for the school to attract new students. Another important effect of the grant on the college was its educational value. The Vice-President of Academic Affairs noted that the project "educated the college as a whole as to what technology can do for us." This increased awareness on the part of the college has already had a profound influence on its organization, curriculum, and mode of operation. Changes in the direction of technology-based instruction are already in evidence throughout the college. The technology director at Jefferson Community College said that the equipment purchased with ARC funds "educated us to what was out there that students could do."

Benefiting Agencies

For some projects, the beneficiaries were particular agencies and their staff. For instance, the Tompkins County Collaborative Communications project facilitated communication among participating agencies. The agencies are now able to send and receive information regarding funding sources via e-mail, which has allowed for more effective reports and timely applications. Agencies can help clients more promptly as increased communication speeds up the process of referrals, and they now are able to network with other agencies from broader coalitions. Further, agencies have much better access to centralized forms and databases through their connections to the Internet. For example, all staff at Neighborhood Legal Services now have access to the Internet and databases in Albany and

Washington, DC. As a result, research happens faster—which leaves more time for clients.

Other projects directly benefited neither individuals nor agencies, but rather entire regions. For example, the Advantage Valley project was not created to serve individuals or specific agencies or organizations. Rather, the beneficiary of this project was the region as a whole. In the end, the impact of ARC-funded telecommunications projects should be assessed not just in terms of the people or organizations that benefited from services, but also the extent to which telecommunications technology has been infused into communities, as well as the ability to make effective use of it.

Intangible Impacts

Besides the tangible impacts of projects, it should be noted that some ARC-funded telecommunications projects also had intangible, but no less significant, impacts on communities. One finding of the case study projects was that projects had the effect of exposing project staff and others to the potential of telecommunications technologies. The educational value of these projects should not be underestimated, since it made apparent new possibilities and instigated thought on how these technologies could be applied in creative ways for the advancement of individuals and communities.

A second intangible impact of the projects was the sense of enthusiasm and pride that they generated. For example, at Jefferson Community College, students expressed pride to be attending a school where the latest equipment and software was at their fingertips. Also, having the latest equipment gave them confidence that they could enter the job market well armed for success. Although it is hard to measure, it seems that the equipment (especially the AutoCAD software and machines) enhanced students' enthusiasm for learning (according to students and teachers with whom we spoke). One teacher, speaking of the AutoCAD lab, told us "we can't get the students out of there."

SUMMARY

The telecommunications projects funded by ARC between 1994 and 2000 left a significant impression on the communities in which they were located. They increased access to telecommunications infrastructure, as well as knowledge about its applications. The infusion of telecommunications technology has also triggered important new connections within communities among institutions, agencies, businesses, and individuals.

Exhibit 4-1. Examples of respondents' perceptions of the most important accomplishment to result from the ARC grant

Improvement in skills:

- *Improved technical skills.*
- *Meeting the shortage of trained technicians in our service area.*
- *Helped students further their education and enhanced their opportunities in the marketplace.*
- *Tremendous increase in math, science, and technology skills.*

Expanded educational opportunities:

- *Able to offer and deliver a whole new set of computer courses; as a result of grant can offer two new degrees.*
- *Ability to use distance learning equipment to provide additional educational opportunities to the students.*
- *Computer lab and conference room provided great educational and meeting areas for community employability skills training.*
- *Enabled organization to provide hands-on, one-on-one training.*
- *Opportunity for students to study a foreign language that they would not have had otherwise.*
- *The ability to offer an expanded curriculum which normally we could not have been able to offer.*
- *Extended postsecondary educational opportunities to rural Georgians.*
- *The educational opportunities provided to the community and to the high school students; it enabled high school students to earn a high school degree if they chose and teachers could earn master's degrees.*

Improved access to information and services:

- *Easier to access information and share resources.*
- *Each of the participating institutions established dial-up capabilities that allow them to access audio-video links with any other institution or agency with similar capabilities.*
- *Ability to access records between county courthouses via WAN.*
- *Having an organized way of having valuable information to be made available, to access and send it out to people; an information and referral system for the 50+ population, caregivers, and other agencies providing services to this group.*
- *Teachers were able to make contact with businesses and industry to see what skills and competencies were needed for employment after students graduated from high school.*
- *Improved Internet access for the clients.*
- *Providing online access to thousands of Pennsylvania companies for self-enrollment, product and service searching, and file update capabilities.*
- *Improved services for member government and community organizations.*
- *Diagnosis of medical problems by nurse practitioners in field by one-way, still-image transmission to a back-up physician.*

Improved coordination and communication across jurisdiction and sectors:

- *Local communities banding together for region-wide economic development; change in state laws allowing cross-county development.*
- *Development of a telecommunications technology assessment for community development.*
- *Pulling together of the community, i.e., education, manufacturing companies, business people, and individuals.*
- *Communication among local, municipal, and county leaders with regard to telecommunications issues.*
- *Improved interaction among individuals in the state who are involved and interested in advanced telecommunications, for example, regional and town meetings.*
- *Facilitating new partnerships in the telecommunications field.*
- *Significantly improved the potential for coordination of ARC-related activities between the New York State Department of State, the three Local Development Districts in the southern tier, and other state agencies.*
- *People came in who had never before been involved; schools called for information; became a resource for other areas of the state; others contacted us for our expertise.*
- *Networking between community teams and community support organizations.*

Exhibit 4-1. Examples of respondents' perceptions of the most important accomplishment to result from the ARC grant (continued)

Upgraded and improved technologies:

- *Enhancement of distance learning and teleconferencing.*
- *The advancement of a wireless network expanding now into Allegheny and Garrett Counties, development of a proposed second network to support economic development and provide repugnance to the first network, the upgrade and importance of the web presence.*
- *Improved telehealth network.*
- *Upgraded significantly several programs for students and industry (i.e., General Motors training).*
- *Final step in getting all public libraries and colleges in upstate South Carolina wired to the Internet.*
- *It allowed us to purchase and install a new server and provide more PCs to our students at a much earlier time.*

Awareness of importance of telecommunications technologies:

- *In target audience, the project raised awareness of telecommunications uses, provided recognition of the importance of Internet connectivity, and demonstration of coordinated negotiating and purchasing power.*
- *Showed demand for telecommunications access in a business incubator setting.*
- *The superintendent was on the task force and gained knowledge of how important it was to do whatever possible to acquire funding.*
- *Enhanced awareness of telecommunication technologies in rural areas.*
- *Continuing enhancement of community awareness of telecommunications capabilities.*

Leveraging of other funding or opportunities:

- *Due to the equipment purchase of the GIS, we have been given additional contracts, utilizing the equipment and able to provide additional services to five ARC counties.*
- *The establishment of the Diffusion Fund Network for which the Virginia phone company awarded us $2.35 million for infrastructure and equipment.*
- *Feasibility engineering study which formed the basis of our implementation grant proposals; grant writing time led to other grants.*

Reduced sense of isolation, increased sense of opportunity:

- *Graham County is very isolated geographically and this project played an important part in reducing the sense of isolation.*
- *Provided a world of opportunity where none existed before.*
- *An awareness of the Internet and the opportunities for education and business within a small rural town—a window to the world.*

V. Measurement of Project Performance

Findings from the survey and case studies indicate that the ARC's telecommunications projects were successful and provided a wide range of benefits to the communities in which they were located. However, case study findings also suggest that the majority of projects did not adequately document these successes. Further, many of the proposals that we reviewed did not delineate clear and measurable outputs and outcomes, thereby hindering the Commission's ability to document more fully the range of benefits associated with its portfolio of telecommunications projects.

This section focuses on the extent to which the 16 case study sites identified realistic and tangible outputs and outcomes in their original proposals to the ARC. Special emphasis is placed on the quality of the outcome statements that projects identified in their original proposals to the ARC—and the extent to which site visitors found evidence that could be used to verify that these outcomes were, in fact, achieved.

POLICY CONTEXT

Under the Government Performance and Results Act (GPRA), even a fully implemented project cannot be considered successful until it provides tangible evidence that it benefited the individuals and communities that it served. In the current environment of enhanced accountability, federal grant projects must be able to demonstrate that their activities led (or at least contributed) to tangible and measurable outcomes. A systematic and accurate assessment of project achievement requires a performance monitoring system that can be used to demonstrate not only that projects carried out their proposed activities, but also the extent to which those activities ultimately benefited individuals and communities. For such a system to work effectively, all activities and related benefits must be clearly defined and measurable—or else the chain of evidence may be weakened. Further, projects should have realistic plans in place to obtain valid and reliable data that can be used to document progress toward their outcomes.

There are two broad types of data that federal grant projects can collect and disseminate. *Output* data provide information on the type and level of services provided to participants. For example, a proposed output of one ARC telecommunications project was to "provide Internet access to at least 20 local governments and 20 medical providers." *Outcome* data document the condition of or circumstance of program participants after a service has been provided. For example, one telecommunications project aimed to "increase sales among area businesses," while another indicated that its efforts would "lead to increased job skills among area workers."

For some ARC-sponsored activities, such as providing skills training to unemployed workers, describing discernible outcomes is relatively easy (e.g., a decrease in local unemployment rates). However, for many ARC-sponsored telecommunications activities, the identification of tangible and measurable outcomes can be difficult. This is because many of the activities commonly supported by telecommunications projects (e.g., increasing access to computers and the Internet) can lead to a wide range of outcomes that are difficult to conceptualize (e.g., increased worker efficiency)—and even harder to measure in a cost-effective manner (e.g., a reduction in the amount of time required to complete a task). For example, as shown in exhibit 5-1, a telecommunications project that provides computers, Internet access, and training might be able to easily document the number of staff receiving technology training (an

output). However, it would likely have more difficulty measuring the extent to which this training contributed to a wide range of short-term outcomes—e.g., an increase in staff technology skills, an increase in the quality and timeliness of services, an increase in the number of clients receiving services. The project would likely have even more difficulty assessing whether the training ultimately contributed to a decrease in local unemployment rates (a long-term outcome). While such outcomes can be difficult and costly to measure, their inclusion in a conceptual framework (such as the one proposed in exhibit 5-1) can increase the likelihood that a project's focus will extend beyond the measurement of outputs.

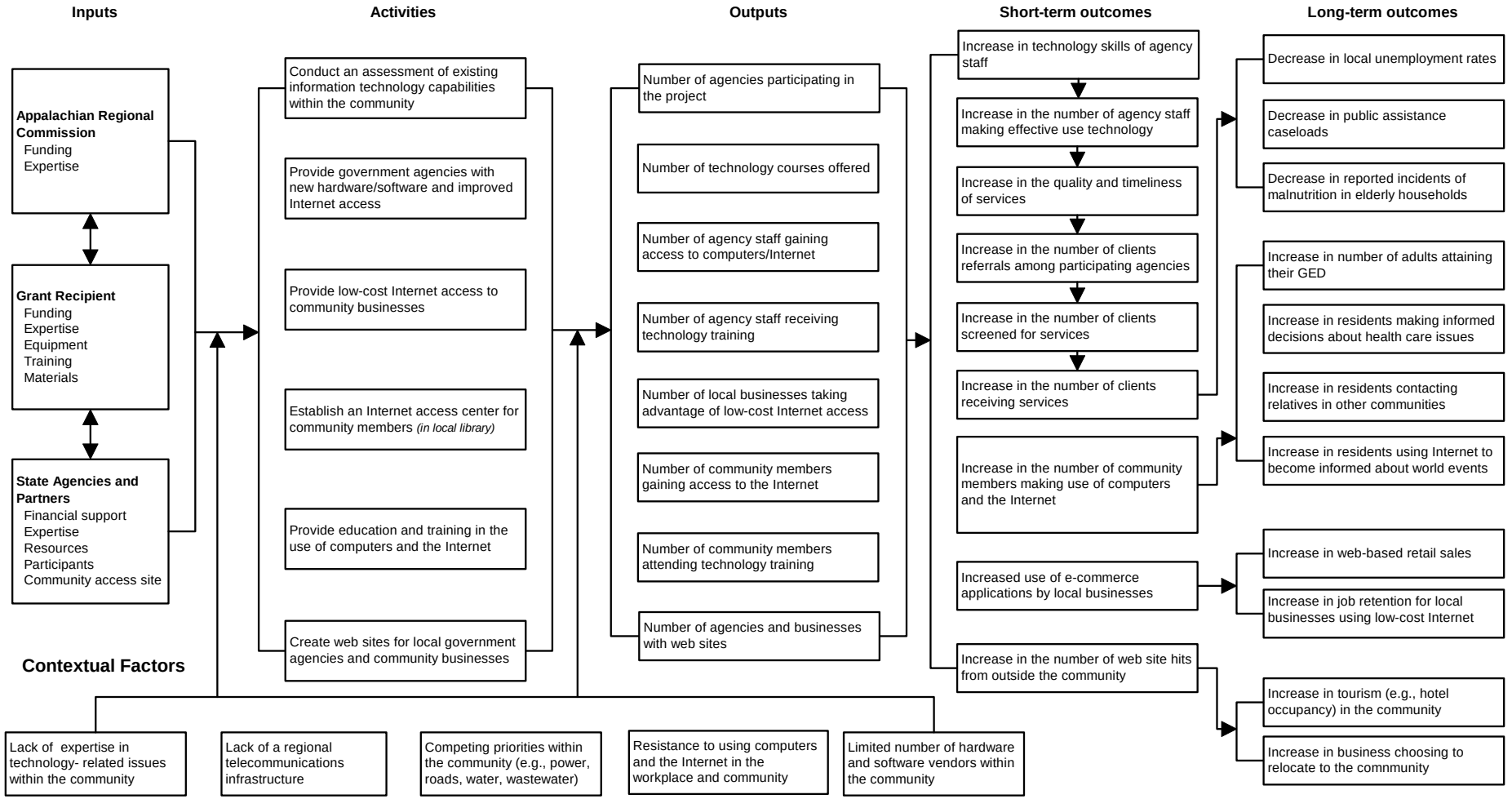
Prior to 1993, many federal agencies primarily relied on output data to quantify the types of services they were providing. However, under GPRA, federal programs must also use outcome data to demonstrate improvements that have occurred as a result of their services. In response to GPRA, several federal telecommunications grant programs have established application and reporting procedures that are designed to establish links between project goals, activities, outcomes, and measurable outcome indicators. For example, the U.S. Department of Commerce's Technology Opportunities Program has a program monitoring system that requires all projects to delineate specific and measurable outcomes. These outcomes, which must be approved by the TOP program at the outset of the project, are supposed to specify community benefits that will occur as a result of a telecommunications activity. At the end of the project, grant recipients complete a final report that provides information and evidence on the extent to which *each* of these outcomes were met.

Until the institution of GPRA in late 1990s, there were few ARC guidelines in place promoting the inclusion of outcomes in applications and final reports. In 1998, this situation changed when the Commission developed application guidelines that were oriented toward GPRA and designed to improve the quality and consistency of the proposals submitted to ARC. Under these new guidelines, applicants are required to describe the objectives of their proposed project, provide an explanation of how the effort pertains to one or more of the Commission's five strategic goals, and offer a rationale for their proposed approach. They must also describe the "output and outcome benefits to be derived from the project—with particular emphasis on the extent to which the benefits to the area being served by the project will be realized on a continuing rather than a temporary basis."[13]

The new guidelines also encourage applicants to provide numeric benchmarks that specify the number of individuals or organizations that will receive services and benefit from the ARC-funded activities. The use of numeric benchmarks provides the Commission and its projects with specific targets against which immediate and long-term progress can be measured. As such, the delineation of numeric benchmarks represents a critical cornerstone of ARC's evolving performance monitoring strategy. It should be noted that because of this shift, the telecommunications projects included in this study were subject to different reporting requirements. For example, of the 16 case study projects discussed throughout this chapter, 6 were initiated before the new 1998 application guidelines (and were therefore not required to quantify how their participants would benefit from their proposed activities), 7 were initiated at the time these guidelines were

[13]ARC Project Application Workbook.

Exhibit 5-1. Logic model for generic telecommunications project



introduced, and 3 were initiated after the guidelines were in place.

TYPES OF OUTCOMES AND OUTPUTS ANTICIPATED BY ARC TELECOMMUNICATIONS PROJECTS

In order to assess the outputs and outcomes anticipated by the ARC telecommunications projects, we conducted a systematic review of the proposals submitted by the 16 case study sites. (As part of this review, we also identified outcomes contained in the ARC memorandums that were prepared for these 16 projects.)[14] The purpose of the review was to evaluate the content, clarity, and measurability of the original outcomes proposed by these 16 projects, as well as to assess the extent to which these projects achieved their anticipated outcomes.[15] For the purposes of the analysis, *outcomes* included statements that referred to benefits to individuals, organizations, or communities. Other statements that referred to the means to these ends were treated as *outputs*.

Distribution of Outputs and Outcomes. Among the 16 case study projects, 73 outputs and outcomes were culled from proposals and ARC memorandums. Of these 73 statements, 36 (49.3 percent) were classified as outcomes, and 37 (50.7 percent) were classified as outputs (table 5-1). All but 2 of the 16 applications delineated at least one outcome statement; the remaining two projects only described activities that would occur as a result of their efforts.

Table 5-1
Distribution of outputs and outcomes in the case study sites

	Number	Percent
Outcomes	36	49.3
Output	37	50.7
Total	73	100.0

Fifteen (41.7 percent) of the 36 outcome statements described how project activities would result in increased efficiency (table 5-2). As shown in exhibit 5-2, many of these statements reflected ways in which the use of technology would enable agencies to provide faster or more efficient services. In addition:

- Ten (27.8 percent) of the outcome statements described how project activities would result in increased knowledge or skills. Although these outcomes tended to be more specific (e.g., "The lab will be used to run educational software to help students pass the 9th grade proficiency tests"), they still lacked information about how projects would know whether their outcomes had been met.

- Eight (22.2 percent) described an economic benefit that would occur as a result of the project. While some of these statements were specific (e.g., "the project will increase sales among area businesses"), others were vague or overly broad (e.g., "Improved opportunities for economic development").

- The remaining 3 (8.3 percent) described how individuals would have increased access to information as a result of the project.

Most of the outputs described the types of activities that would occur or types of individuals who would

[14]Just over half (52.1 percent) of the outputs and outcomes included in this analysis were culled from the project benefits section of an ARC memorandum. The remaining 47.1 percent were pulled from proposals. In addition, output statements that merely described an activity (e.g., "training will be provided") were generally not included in the analysis. However, output statements that included a numeric benchmark (e.g., "training will be provided to 200 workers") were included—since they provided a specific goal against which future progress could be measured.

[15]Since the remaining 54 ARC telecommunications projects were not included in this analysis, it is not possible to conclude whether the findings in this section pertain to the entire study sample.

Table 5-2
Types and number of outputs and outcomes for the 16 case studies*

Type of output/outcome		Breakdown	Benchmarks		Assessment of whether outcome was met					
					Yes		No		Unable to ascertain	
			#	%	#	%	#	%	#	%
Outputs	Increased capacity (n=13)	35.1	3	23.1	9	69.2	3	23.1	1	7.7
	Increased access (n=10)	27.0	6	60.0	4	40.0	4	40.0	2	20.0
	Training (n=8)	21.6	5	62.5	3	37.5	2	25.0	3	37.5
	Enhanced coordination (n=4)	10.8	0	0.0	4	100.0	0	0.0	0	0.0
	Develop web sites (n=2)	5.4	2	100.0	1	50.0	1	50.0	0	0.0
	Subtotal (n=37)	**100.0**	**16**	**43.2**	**21**	**56.8**	**10**	**27.0**	**6**	**16.2**
Outcomes	Increased efficiency (n=15)	41.7	1	6.7	7	46.6	0	0.0	8	44.4
	Increased knowledge/skills (n=10)	27.8	1	10.0	3	30.0	0	0.0	7	70.0
	Economic/social impact (n=8)	22.2	1	12.5	5	62.5	0	0.0	3	37.5
	Increased access (n=3)	8.3	2	66.6	0	0.0	0	0.0	3	100.0
	Subtotal (n=36)	**100.0**	**5**	**13.9**	**15**	**41.7**	**0**	**0.0**	**21**	**58.3**
	Total (n=73)		**21**	**28.8**	**36**	**49.3**	**10**	**13.7**	**27**	**37.0**

*Multiple outputs and outcomes were proposed for virtually every case study

receive services as a result of the ARC grant. For example, 13 (35.1 percent) of the 37 outputs described activities designed to increase the telecommunications capacity of individuals and institutions, while 10 (27.0 percent) described activities designed to increase access to technology and 8 (21.6 percent) described training activities. As shown in exhibit 5-3, these statements generally reflected what would happen (e.g., "Provide Internet access to at least 20 local governments and 20 medical providers").

Quality of the Output and Outcome Statements. An important criterion for an effective performance measurement system is that outputs and outcomes must be specific and clear enough to be measurable in a meaningful way. One common method for achieving such clarity is to provide benchmarks or numeric goals that can be used to assess whether a numeric target has been met. Especially useful are combinations of numeric outputs (e.g., 100 workers will receive training) and outcomes (e.g., of the 100 workers who receive training, 50 will obtain employment in a computer-related field). The use of both numeric outputs and outcomes enables an assessment of both the extent and impact of a particular service.

Ten of the 16 case studies had at least one numeric benchmark, although it should be noted that the six without any number benchmarks all began before 1998, the year in which ARC revised its application and reporting guidelines. Over one-fourth (28.8 percent) of the 73 statements contained a numeric benchmark that could be used to discern the scope of the intended impact and (ultimately) assess whether the outcome or output had been achieved (table 5-2). Most of these numeric benchmarks were either used to describe the number of services that would be provided (e.g., number of web sites), the number of persons or agencies that would receive access to new technologies, or the number of individuals who would participate in a training activity. Only 5 (13.9 percent) of the 36 outcome statements contained a numeric benchmark—and even these tended to focus on the number of persons who would access information after it had been made available.

Exhibit 5-2. Examples of outcomes identified by ARC telecommunications projects

Increased Efficiency

- Impacts will be quantifiable as (1) avoiding cost--elimination of effort and poor investments, (2) reducing technology costs, and (3) reducing education and training costs.
- The availability of accurate, up-to-date information will enhance better decision-making by local governments and community organizations.
- Client referrals will be quicker and more accurate—e.g., time will be saved for agency staff and clients.
- Some participating agencies will report a decrease in staffing.
- Some participating agencies will report increased quality of service—e.g., increased contact with participants, faster and more appropriate referrals.
- Staff will be able to collect more accurate data in a more timely manner (and this will impact program design).
- A major goal will be to reduce the amount of time citizens must spend interacting (dealing with) government and community agencies.

Economic Impact

- Encourage and develop community pride, respect, and confidence in the future.
- The project will benefit all sectors of the economy through the various training programs that will be offered.
- Improved opportunities for economic development.
- The project will assist member businesses in finding successful product matches and marketing their products on a state and worldwide basis.
- The project will increase sales among area businesses.
- Approximately 511 businesses are expected to benefit from the project.
- To utilize the state's advanced telecommunications infrastructure to help create new jobs in existing businesses, establish new businesses, and stimulate the development of new technology applications.

Increased Knowledge/Skills

- Upgrade technological skills of community members.
- Develop or deepen areas of expertise.
- The lab will be used to run educational software to help students pass the 9th grade proficiency tests
- The project will lead to increased job skills among area workers.
- New knowledge and increased skills for clients--as measured by the number of clients who have accessed the Internet for relevant information.
- There will be an increase in the skills and knowledge of agency staff--to be measured through (1) the number of additional staff trained, and (2) the number of times state and national web sites are accessed to obtain current information.

Increased Access

- There will be a 10 percent increase in the use of job development/placement data on the State Department of Labor Office and County Gateway agencies.
- There will be a 5 percent increase in (the number of) people accessing information after a web site has been up and operating for a year.
- There will be an increase in the number of people accessing volunteer opportunities through the I&R web site.

Exhibit 5-3. Examples of outputs identified by ARC telecommunications projects

Increased Capacity

- The project will allow local businesses to attend meetings in remote locations and pre-screen prospective employees via video conferencing.
- The technological innovations in the new facility will provide the needed flexibility to offer dynamic education and training programs of Grant's corporate clients.
- The Computations Laboratory will permit new course offerings in computer science in response to industry needs and support advance mathematics and science curricula as well as support advanced engineering courses.
- The network will allow the SoOM to deliver database information and other services to medical students in regional locations.

Increased Access

- Provide public access for clients to the Internet when appropriate (at least 6 additional sites).
- Provide Internet access to at least 20 local governments and 20 medical providers.
- Measure success by the number of "hits" of users entering the site and/or accessing specific web pages (such as those dedicated to economic development or employment).
- The project will provide Internet access to at least four local government entities.
- The project will provide distance learning programs for approximately 5,300 students from the public school to the community college level.

Training

- The cyber campus will have 15 Novell training workshops interconnected through a LAN.
- The project will provide distance learning opportunities, workshops, video conferencing for schools and businesses, and governmental users.
- An additional 1,400 police officers, firemen, volunteer firemen, emergency medical technicians, etc. will also be offered programs.
- The initial phase of the training program will provide assistance to over 1,500 elected officials, business people, non-profits, development organizations, and other quasi-government organizations.
- The project will include 24 training workshops to educate physicians and other health professionals on how to use advanced telecommunications technologies to augment their professional services.

Enhanced Coordination

- The grant recipient will continue to pursue partnerships with area hospitals to advance telecommunications applications.
- The grant recipient will continue to strengthen partnerships with educational institutions to promote shared-resources, distance learning, and teleconferencing.
- Departments and agencies will be able to communicate electronically about space available in client-based workshops.

Develop Web Sites

- SCUI will contain a regional home page and separate pages for each of six counties of the Upstate with at least 12 categories each.
- Develop 21 web sites.

Many of the outcome statements contained in the telecommunications proposals were vague and difficult to measure in a meaningful way. The following examples demonstrate how projects failed to devise outcome statements that were clear, specific, and measurable:

- The project will result in increased efficiency and improved decisionmaking.
- The project will encourage and develop community pride, respect, and confidence in the future.
- Increase regional communication and coordination
- The project will benefit all sectors of the economy through the various training programs that will be offered.
- The project will increase sales among area businesses.
- The project will lead to increase employment among area workers.
- Develop or deepen areas of expertise.
- Upgrade technological skills of community members.

Even when outcomes were more specific (e.g., "The lab will be used to run educational software to help students pass the 9th grade proficiency tests"), they often lacked critical information (e.g., type of proficiency tests or proportion of students who would pass the test). While all of the proposed outcomes were laudable in their aims—and may have occurred as a result of ARC funding—they failed to provide any information as to how it would be determined if the goal was ultimately achieved. This lack of clarity and focus was prevalent in most of the projects we reviewed, thereby undermining the Commission's ability to systematically document the success and impact of its investment in telecommunications activities.

As discussed previously, several factors may have been responsible for this lack of clarity. Many of the outcome and output statements were crafted before ARC's revised 1998 application and reporting guidelines. Thus, less emphasis may have been given at that time to the quality and measurability of statements of impact (both outputs and outcomes) in project applications. Similarly, it is possible that before 1998, grantees and project coordinators treated many output and outcome statements as qualitative in nature and had not determined how to effectively measure them.

EXTENT TO WHICH CASE STUDY PROJECTS ACHIEVED THEIR INTENDED OUTCOMES AND OUTPUTS

The Commission's requirement that projects submit a final report is intended to help program officers gauge project achievement and impact. The narratives in the final reports submitted by the 16 case study sites affirmed the general value of the projects, and case study findings suggest that these conclusions of success were generally well-founded. Specifically, approximately two-thirds of the 73 outputs and outcomes proposed by the 16 case study projects were addressed in the final reports—and almost all were said to have been successfully carried out (not shown in tables). The remaining third were not discussed in the final reports.

Site visitors reviewed all existing documentation and their own case study notes to verify that these 73 anticipated benefits were, in fact, achieved. As shown in table 5-2, site visitors concluded that 21 (56.8 percent) of the outputs and 15 (41.7 percent) of the outcomes were achieved as planned. However, site visitors also found that there was insufficient evidence to assess the success of six (16.2 percent) of the anticipated outputs and 21 (58.3 percent) of the anticipated outcomes. In some cases, this was because an outcome that was described in the proposal was

not discussed in the final report. In other cases, this occurred because the outcome statements were vague and not easily measurable—and so the resulting narratives provided in final reports were less than persuasive. For example, one project indicated that its marketing and promotion program would "develop community pride, respect, and confidence in the future." This outcome was addressed in the final report as follows:

> To achieve this shared vision, the prevailing mindset that often fostered attitudes of isolation and protectionism needed to be removed and replaced with the concept of regionalism. Individuals, organizations, and businesses in the area needed to be "reminded" of the many benefits of the region they enjoy and may have even taken for granted. [This project] provided these "reminders" through marketing that highlighted the region's benefits and resources and created a focal point and name with which everyone could identify.

This statement was then followed by a detailed description of the marketing approach that was employed, and then concluded: "The goal of the local marketing education and awareness campaign was to develop community pride, boost regional respect, and increase confidence of individuals and businesses in the future of the area." No evidence was provided to show that the proposed outcome was accomplished—i.e., there is no indication in the final report that the project actually enhanced community pride, respect, and confidence in the future. Rather, the final report focuses on the means by which the outcome was to be brought about (i.e., marketing). To be sure, the difficulty faced by many of the projects was due in part to their having to address overly vague and not easily measurable outcome statements.

A review of the final reports submitted by the 16 case study sites suggests that projects did not place much emphasis on collecting new data to assess whether their outcomes had been achieved. Rather, projects relied on anecdotal evidence, used imprecise data collection methods, or implemented surveys that failed to take into account biases introduced through low response rates. For example, one project that indicated it would "impact the entire county socially, educationally, and economically" failed to collect new (or review existing) educational or economic data to assess progress toward these goals. Another project that proposed to "upgrade the technological skills of community members" did not make an effort to assess whether this had, in fact, occurred. A third project that proposed to provide training to almost 3,000 individuals did not maintain ongoing counts of the number of persons who actually attended these sessions. During the site visits, project staff indicated that several factors contributed to their failure to implement robust collection methods—including the difficulty of collecting data on the impact of adopting new technologies, a lack of financial resources, a lack of expertise regarding evaluation techniques, and a lack of understanding about how locally collected data could be used to document success and improve future activities.

SUMMARY

While case study findings suggest that ARC's telecommunications projects were generally successful, evidence of the resulting community benefits were not readily available by way of the Commission's system for monitoring and documenting project performance. However, this may have been due in part to ARC's place on the performance measurement implementation curve—many of ARC's telecommunications projects began before 1998, the year in which GPRA began to exert its influence on ARC's application and reporting requirements.

Our review of telecommunications proposals and final reports suggests that the measurement system was lacking in three important ways. First, many of the statements regarding anticipated accomplishments (in both the proposals and the ARC memorandum) were

actually outputs—i.e., statements involving process and activities—as opposed to outcomes. While outputs are an important aspect of project performance measurement, outcomes more directly reflect project impact and achievement. Second, while most of the proposals we reviewed contained at least one outcome statement, these were sometimes vague, not easily measurable, and not associated with a numeric benchmark. Third, most of the projects we visited did not invest adequate time or effort documenting the benefits associated with their efforts.

Looking forward, ARC should use this evaluation as a management tool to help sharpen its system of performance measurement. Chapter 8 provides specific recommendations for improving ARC's performance measurement system for its telecommunications projects, while taking into account some of the practical constraints that may be faced in implementing such a system.

VI. Implementation Barriers

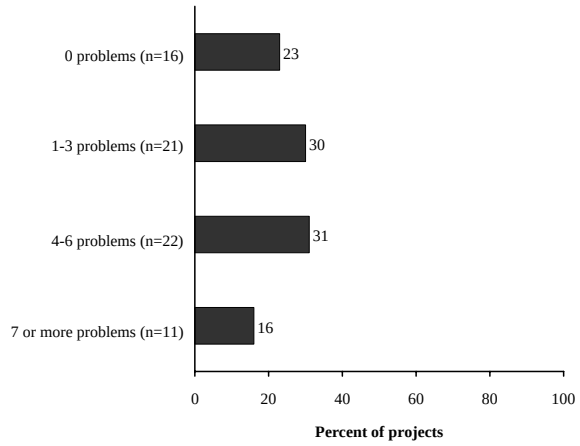
The majority of ARC telecommunications projects encountered at least one obstacle or barrier as they carried out their various approaches. These problems were generally not severe enough to prevent individual projects from implementing their approach. Specifically, 57 of the 70 projects (81 percent) indicated that all of their proposed activities had been conducted as planned (data not shown in tables). Of the 13 remaining projects with activities that were not fully or successfully implemented, the most common problem was either a lack of demand for services or lack of participation in activities (not shown in tables). Other frequently cited reasons for not fully or successfully implementing all proposed activities included insufficient funding, a lack of organization among partner or project-related organizations, difficulties concerning relationships with outside organizations or entities, changes in personnel, and failure to realize the scope of work involved in implementing a particular activity.

This chapter uses information from both the survey and case studies to outline the range of problems that ARC telecommunications projects encountered and assess the impact of these problems on project implementation. In some cases, information is provided on steps that projects took to overcome these problems.

Extent to Which Projects Encountered Implementation Barriers

Survey respondents were provided a list of 13 administration and planning barriers and 7 implementation barriers.[16] Only 16 of the 70 projects (23 percent) indicated that they had not encountered any of the problems outlined on the survey (figure 6-1). Of the remaining 54 projects, 21 (30 percent) had encountered 1 to 3 of the problems cited in the survey, 22 (31 percent) cited between 4 and 6 problems, and the remaining 11 projects (16 percent) listed 7 or more problems.

Figure 6-1
Percent of projects reporting number of problems in implementing project activities (n=70)



SOURCE: 2002 telephone survey of ARC grantees.

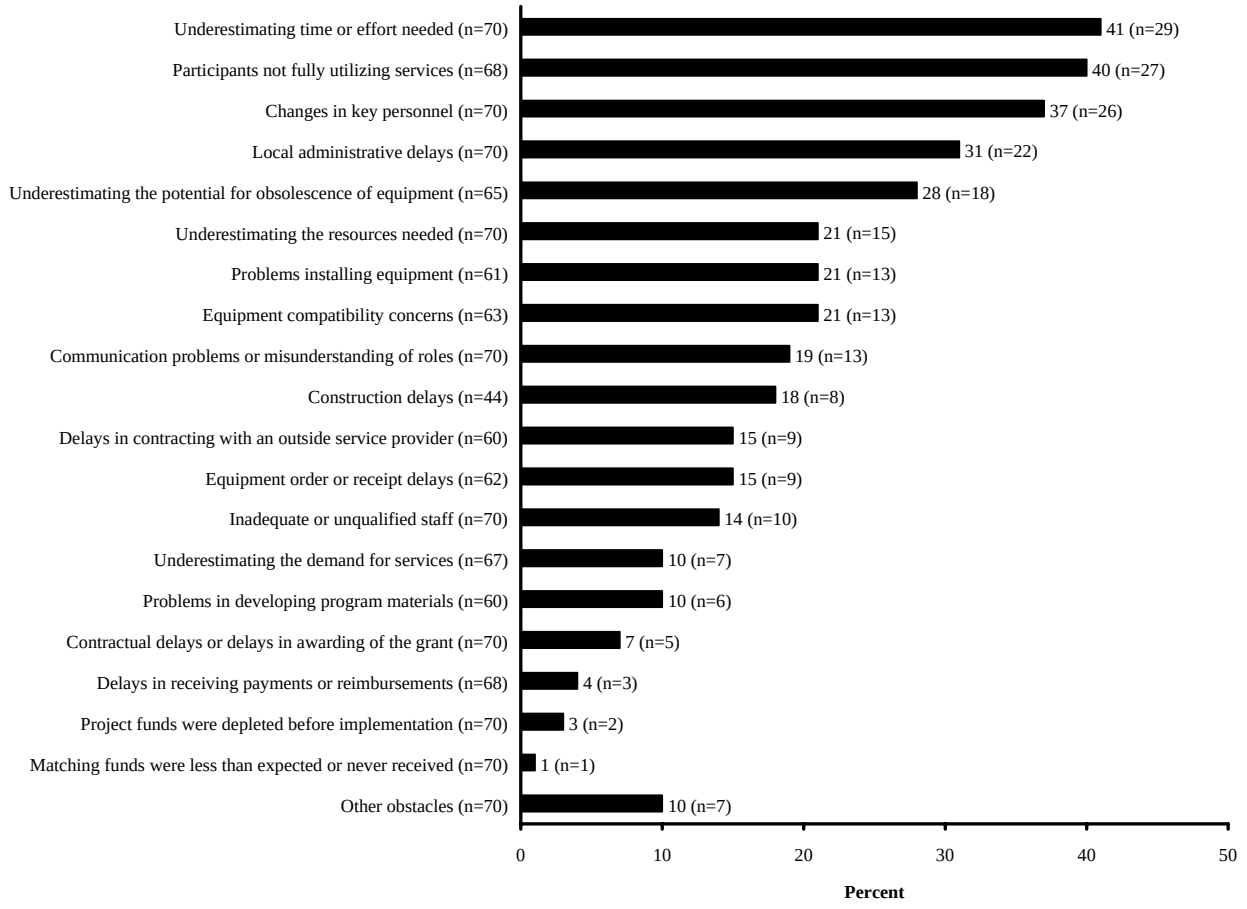
The three most commonly cited problems were underestimating the time or effort needed (29 projects, 41 percent), participants not fully

[16] In some cases, a potential barrier was not relevant to a particular project. For example, "construction delays" would not have been relevant to a project that involved no construction activities. In such cases, respondents could answer, "situation did not apply." In other cases, however, respondents were forced to answer either yes or no because that potential problem was relevant to all projects. An example of a potential problem relevant to all projects is "underestimating the time or effort needed," since all projects require an initial estimate of this type.

utilizing services (27 projects, 40 percent), and changes in key personnel (26 projects, 37 percent) (figure 6-2). Other problems included underestimating the potential for obsolescence of equipment (18 projects, 28 percent), underestimating the resources needed (15 projects, 21 percent), problems installing equipment (13 projects, 21 percent), and equipment compatibility concerns (13 projects, 21 percent).

The finding that 54 (77 percent) of the 70 ARC telecommunications projects encountered at least one of the barriers listed on the survey is not surprising. Interviews with a wide range of case study respondents suggest that the learning curve for a number of these technology projects was quite steep. This was often due to the more complex nature of the telecommunications activities that projects were conducting—and the inherent difficulty of creating and implementing technology projects in communities with limited access to information infrastructure. However, while some of these problems were prominent, they were not severe enough to prevent individual projects from achieving their goals.

Figure 6-2
Percent of projects reporting implementation problems, by problem type



NOTE: Projects could report multiple problems. Variation in the totals (n) is explained by item nonresponse or the removal of cases for those categories where the situation did not apply.
SOURCE: 2002 telephone survey of ARC grantees.

IMPLEMENTATION BARRIERS AT CASE STUDY SITES

The case study sites, while largely successful, encountered and addressed a number of challenging and often interrelated barriers. While some of these obstacles were experienced by a significant number of projects (e.g., delays due to worse than anticipated technology infra-structures), others were unique to a given approach or locality. This section provides more detailed information about the most prominent barriers encountered by the 16 case study sites.[17]

Technology Barriers

Lack of technology infrastructure. A significant barrier for some of the case study sites was the time, cost, and effort required to develop the infrastructures that supported their technological efforts. Many of the projects indicated that their communities' existing physical and telecommunications infrastructures were either nonexistent or incompatible. These problems, which were sometimes discovered *after* a project had been initiated, commonly resulted in excessive fees and extensive delays. Some projects were forced to delay operations until the requisite information infrastructure had been put in place. However, at least one project indicated that as a result of the demand created by the ARC project, the local telephone company had installed telecommunications lines that were still unavailable in many neighboring communities.

Another project found that many of the buildings in which equipment was installed did not have the appropriate physical infrastructure (i.e., wiring) to accommodate the Internet and other new technologies. At times, those installing equipment had to run cable through as many as three floors to get it where they needed it. There were various other minor yet frustrating concerns—such as a lack of, or poor placement of, telephone jacks and/or electrical outlets. As one staff member said, "We found that we could take nothing for granted" when installing equipment.

Keeping pace with evolving technologies. During the period in which projects were receiving ARC support, the technology industry was churning out new advances and upgrades at a record pace, making it difficult for projects to maintain equipment that could be considered current or state of the art. In hindsight, most case study sites were satisfied with the equipment they had purchased. Nonetheless, some case study projects reported that concerns about unanticipated technological advances (and the ensuing obsolescence of ARC-purchased computers) made it difficult to develop long-term budgets for telecommunications equipment. For example, one project director indicated that equipment purchased with ARC funds had stopped working—and had not been replaced or repaired due to a lack of available funding. Another project that had not accounted for obsolescence in the budget found that it was unable to afford upgrades and replacements. Yet another project director stated that his project had recently been dealing with the question of whether broadband, satellite, or wireless would be the dominant method for connecting to the Internet of the future. This was precisely the type of question that ARC telecommunications projects had to face as they purchased equipment. While the answer could have a major impact on projects, projects often found that these questions could not be definitively answered.

It should also be noted that several case study sites indicated that an advantage of the rapid expansion of technology was the volatility of equipment prices. Specifically, when some of the grant recipients prepared their original proposals, they based their budget considerations on the price of equipment at that point in time. However, as they actually moved forward to purchase the equipment, prices had dropped considerably, freeing up valuable funds for the project. For example, the drop in computer prices allowed one project to purchase more computers than originally expected, which in turn made it

[17] Throughout this section, project names are withheld to protect the identify of respondents who were willing to provide extensive information about the types of barriers they encountered during their ARC grant.

possible to include more participants than initially projected.

Keeping pace with end users' evolving needs. One project director indicated that several of the partner agencies participating in his ARC project had severely underestimated the number of staff who would use computers and require Internet access. In addition, as the project evolved, end users were making more advanced use of the Internet (e.g., using computers to share mug shots with the region's police departments—which requires greater bandwidth capacity to facilitate downloading) than had originally been envisioned at the outset of the project. In an effort to keep pace with these evolving end users' needs, the project eventually replaced all of the computers purchased with ARC funding.

Another project overcame this problem by hiring a technology consultant who met with each of the agencies that were scheduled to receive computer equipment through the ARC grant. The purpose of these meetings was to help agencies maximize their utilization of technology. This was accomplished through an onsite assessment of how individual agencies were using computers and the Internet and how these tools might be used in the future. (In fact, agencies could not make a request for new computer equipment until they had met with the technology consultant.) All of the end users we interviewed at this site reported that the equipment obtained through an ARC grant had met their diverse needs. They also suggested that a strength of the project's approach had been the hiring of a technology consultant who also understood the needs of human service agencies—e.g., how such agencies might use computers to streamline their operations. It was also essential that this individual had an adequate understanding of computers so as to assess which equipment was right for a given agency.

Underutilization of project technology. Some case study sites reported that the technologies they made available were not fully utilized by end users. This problem was especially prevalent among projects that purchased videoconferencing equipment. Several factors contributed to the underutilization of this equipment. First, in some cases, grant recipients had asked end users if they would be interested in making use of videoconferencing equipment, but had never assessed the depth of their interest. Thus, when barriers arose (or the novelty wore off), end users did not make the extra effort required to use the equipment. Second, as this equipment became more widely available throughout the community, end users no longer found it necessary to utilize the videoconferencing studios housed at the grant recipient's offices. Third, several projects did not consider in advance the amount of promotion that would be needed to inform potential beneficiaries of their videoconferencing capabilities. Finally, a few sites indicated that the parties they wanted to communicate with lacked the requisite videoconferencing equipment. The following two examples illustrate these issues:

- When one case study site purchased its videoconferencing equipment (in the mid-1990s), it was considered an emerging technology. As such, it was available for use at only a few locations in the entire region in which the project was being conducted. The videoconferencing center was originally intended to meet the needs of companies through training potential employees and other similar activities. However, by the time of the site visit, these companies had acquired and established their own facilities. In addition, the use of videoconferencing equipment had become a fairly common feature in many schools, government offices, and other entities. Thus, the demand for use of the project's facilities by outside entities had, to a large extent, diminished.

- Another case study site indicated that a lack of promotion contributed to an underutilization of its videoconferencing equipment. Specifically, the project had never assigned anyone the responsibility of identifying the types of videoconferencing-based programs that might be of interest to potential users. Nor had they hired someone to publicize the equipment within their community. Equally problematic, respondents indicated that some other government entities lacked access to the

requisite equipment—thereby making it difficult for the project's end users to use the videoconferencing equipment to communicate with their counterparts across the state. Finally, by the time of the site visit, several businesses and educational institutions had gained access to similar equipment.

However, some case study sites sustained their videoconferencing facilities beyond the life of their ARC grant. While it is difficult to draw any conclusions from this small sample of sites, it does appear that projects with a well-defined purpose for obtaining videoconferencing equipment (e.g., for distance learning) were more like to find ways to keep that equipment in use over the long term. This was often because the equipment was a necessary component of project success. Conversely, projects that did not have a well-defined purpose for obtaining this equipment were less likely to report that their videoconferencing equipment was still in use at the time of the site visits.

Administrative and Planning Barriers

Underestimating the time required to implement project activities. Almost all of the case study projects indicated that they underestimated the amount of time implementation tasks would require, particularly with regard to technology. Projects that involved the installation of equipment were especially vulnerable to delays in their proposed schedule because they often had to rely on external entities to provide equipment or carry out other technical functions. In some cases, projects fell behind in their schedule because of poor communication with (or between) service providers. In others, delays occurred because there was a lack of coordination between those responsible for equipment installation and those responsible for network implementation. For example, one project indicated that it took longer than anticipated to get lines installed because the requisite telecommunications infrastructure was not in place. (The grant recipient had not conducted a feasibility study during the planning phase, so this problem was not uncovered until well into the project's implementation phase.) A contributing factor was that the local telephone company was in the middle of internal personnel restructuring, which caused further problems for the project.

Staff turnover. Another common problem faced by case study projects was a change in or loss of key personnel. In some cases, staff members with strong technical skills were lured away by organizations that offered higher paying positions. As a result, some sites had insufficient technical expertise when faced with the need to resolve unexpected problems such as equipment failure or repair. For example, one project experienced a significant setback when the original project director left the staff early in the project's history. During the 9 months until he was replaced, the project operated by using, according to the current project director, a piecemeal or reactive approach to solving problems. Without a director to guide them through such situations, the staff consistently tried to determine the safe thing to do. However, as the current director and members of his staff agreed, this approach did not always lead to the best outcome.

Changes in personnel outside the immediate project staff also resulted in challenges for some projects, especially those that worked with government organizations or other entities. When personnel changes occurred within partners or among end users (especially in the leadership), there was often a need to "start from scratch" by articulating to the new staff members the importance and relevance of the project, as well as what had already been done up to that point in time.

Lack of technical expertise among project staff. In addition to encountering difficulties in retaining knowledgeable and skilled staff, several projects found it difficult to recruit staff with the range of skills needed to lead or implement their efforts. For example, one case study site indicated that the project needed someone who understood technology and possessed the requisite management and marketing skills to fill a leadership position. However, they found it

difficult to find such a qualified individual in their small community. Several other projects reported that after they had purchased equipment, they lacked reliable access to staff capable of resolving unexpected problems such as equipment failure or repair. As a result, some projects were forced to hire outside consultants and incur additional expenses that were not covered by the ARC grant. In one project, crucial positions such as webmaster were repeatedly open and remained so for periods of up to 9 months. Furthermore, staff in another project found it difficult not only to compete with higher salaries, but also to find suitable candidates in a small community.

Problems with equipment vendors. The most prominent communication problems uncovered during the site visits involved interactions with external service providers and venders. In some cases, these problems arose because project staff lacked the experience and expertise to anticipate the types of technical issues they were called upon to navigate as they purchased telecommunications equipment. For example, at the beginning of their grant, one project director indicated that he did not have an onsite CISCO-certified engineer. Once someone on staff became knowledgeable in this area, they found that such expertise would have been beneficial at the outset of the project—that is, it would have made them question some of the advice that was being provided by vendors.

At another case study site, project timelines had to be adjusted on several occasions due to miscommunication between the primary equipment vendor and the project, thereby resulting in equipment orders being delayed. In addition, there was a lack of coordination between those responsible for equipment installation and those responsible for network implementation, which led to additional delays. Eventually, a local consultant was hired by the project staff to assist in providing solutions to these and other similar problems.

Project staff in a third case study site indicated that the vendors from whom they purchased equipment "oversold" what they could do, and underestimated the timeframe within which they could do it. As such, it took longer than anticipated for the vendor to deliver routers and install lines. In hindsight, the project director acknowledged that he should have purchased the equipment and services from another organization.

Lack of a comprehensive training agenda. Research on efforts to provide training in telecommunications applications suggests a range of practices that can maximize the likelihood of success—including the use of multiple training sessions, and providing participants with ongoing follow-up support. However, the site visits uncovered evidence that several of the projects failed to set aside sufficient time and resources for training. As a result, some of the end users we interviewed felt that they still lacked some of the skills needed to take full advantage of their new telecommunications tools. Several factors appeared to contribute to this limitation in the amount of training that end users received. Some grant recipients failed to appreciate the full extent of basic training required by some end users (or failed to appreciate end users' resistance to learning about new technologies). Other grant recipients solicited input from end users *before* they had enough computer experience to make informed decisions on their training needs. A considerable number of projects lacked reliable—and consistent—access to good trainers. Finally, end users reported that trainers often failed to utilize training exercises that demonstrated how end users might use a given technology in their workplace.

It is also worth noting that many of the end users we interviewed indicated that the training they received through their ARC project focused primarily on the rudimentary skills required to operate a specific software program. While some end users were offered group or one-on-one follow-up assistance, others complained that instructional support was terminated at the end of the ARC grant. As a result, some end users expressed concern that although they had learned some important introductory skills, they had not learned how to fully integrate those skills into their daily work routine. For example, end users in one case study site indicated that most of the

training they received was targeted at beginners. While such training was clearly needed at the outset of the project, these end users suggested that the grant recipient might have arranged for follow-up training on how to apply the knowledge they had gained as part of the ARC grant. However, the grant recipient indicated that when supplemental courses were offered, most end users were intimidated by the "advanced" nature of the course work. Based on our interviews with project staff and end users, it appears that the follow-up training at this site was offered before end users had ample opportunity to experiment with their new tools. By the time end users were in a position to articulate new training needs, the grant recipient had moved on to other priorities. Thus, while the project had provided training to its end users, the training that was provided fell short of end users' expectations and workplace needs.

Lack of a comprehensive marketing strategy. A few of the case study sites did not anticipate the amount of marketing that would be needed to ensure that potential end users would be informed of project-related activities or services. For example, one project opened a series of computer labs with little or no fanfare. In hindsight, the staff indicated that they should have campaigned more vigorously to promote the labs prior to and immediately following their opening.

A similar problem occurred at another case study site that was designed to transform an existing local database network that allows companies to search for potential suppliers, distributors, and customers into a statewide Internet site. The project coordinator indicated that adequate resources were never made available to conduct an effective marketing campaign—and that the project could have had an even greater impact if more marketing resources had been readily available.

SUMMARY

As the preceding discussion suggests, telecommunications efforts, especially those involving the purchase of new and emerging technologies, are frequently subjected to unpredictable conditions and obstacles. Nonetheless, Westat's studies of other federal telecommunications initiatives suggests that some of the problems uncovered during the ARC site visits could have been avoided or mitigated with proper planning. For example, a thorough assessment of end users' needs might have prevented the underutilization of video-conferencing services reported by some projects. In addition, a comprehensive feasibility study—with an emphasis on reviewing existing capacities and assessing emerging technologies—might have forestalled problems associated with the purchase of incompatible or obsolete equipment. Recommendations for helping ARC's telecommunications projects anticipate and forestall such problems before they occur are discussed in chapter 8.

VII. Project Sustainability and Expansion

An important measure of the success of an ARC project is its sustainability. In recent years, federal agencies have placed a premium on the ability of grant recipients to maintain projects after the initial period of funding. Funders are especially eager to support projects that will remain operational over time and that will expand to provide supplementary services or reach additional beneficiaries. With respect to telecommunications projects, sustainability and expansion mean increasing awareness of and capitalizing on new possibilities for growth, and the long-term bolstering of communities.

This chapter examines the operating status of projects at the time of the evaluation, as well as the extent to which initiatives had expanded or generated spin-off activities. It also describes factors that influenced whether projects were able to sustain themselves beyond their ARC grants.

PROJECT STATUS

This section provides information on the extent to which projects were able to sustain themselves beyond the ARC grant, suggests factors that may have facilitated or hindered grant recipients' efforts to remain viable over time, and assesses differences between survey and case study findings.

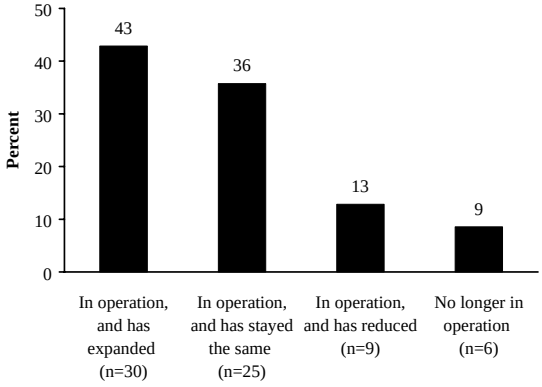
Projects That Sustained or Expanded Operations Over Time

To determine the longevity of ARC's telecommunications projects, respondents were asked to indicate their current operating status at the time of the telephone survey. Fifty-five (79 percent) of the 70 ARC telecommunications projects were still fully operational—with 25 (36 percent) in operation and serving a function about the same as that outlined in the original proposal, and 30 (43 percent) in operation and providing expanded functions (figure 7-1). Additionally:

- Among the 30 respondents who reported in the telephone survey that their projects had expanded, 28 (93 percent) said they were serving more individuals and 24 (80 percent) indicated that their project was providing more services (see table 7-1).

- Twenty-one (70 percent) of these 30 projects reported that they had expanded in some other way, including expansions in the quantity and sophistication of the technologies available to users, additions of different industries and sectors, and becoming community leaders in encouraging the use of telecommunications technologies.

Figure 7-1
Current status of projects (n=70)



NOTE: Percents may not sum to 100 due to rounding.
SOURCE: 2002 telephone survey of ARC grantees.

Table 7-1
Number and percent of projects that reported various ways their projects have changed since the ARC grant

Changes in projects	Number	Percent

Expansions in scope (n=30)		
The project only serves more individuals	28	93
The project only provides more services	24	80
The project has grown in another way	21	70
Reductions in scope (n=9)		
The project only serves fewer individuals	4	44
The project only provides fewer services	6	67
The project has reduced in another way	5	56

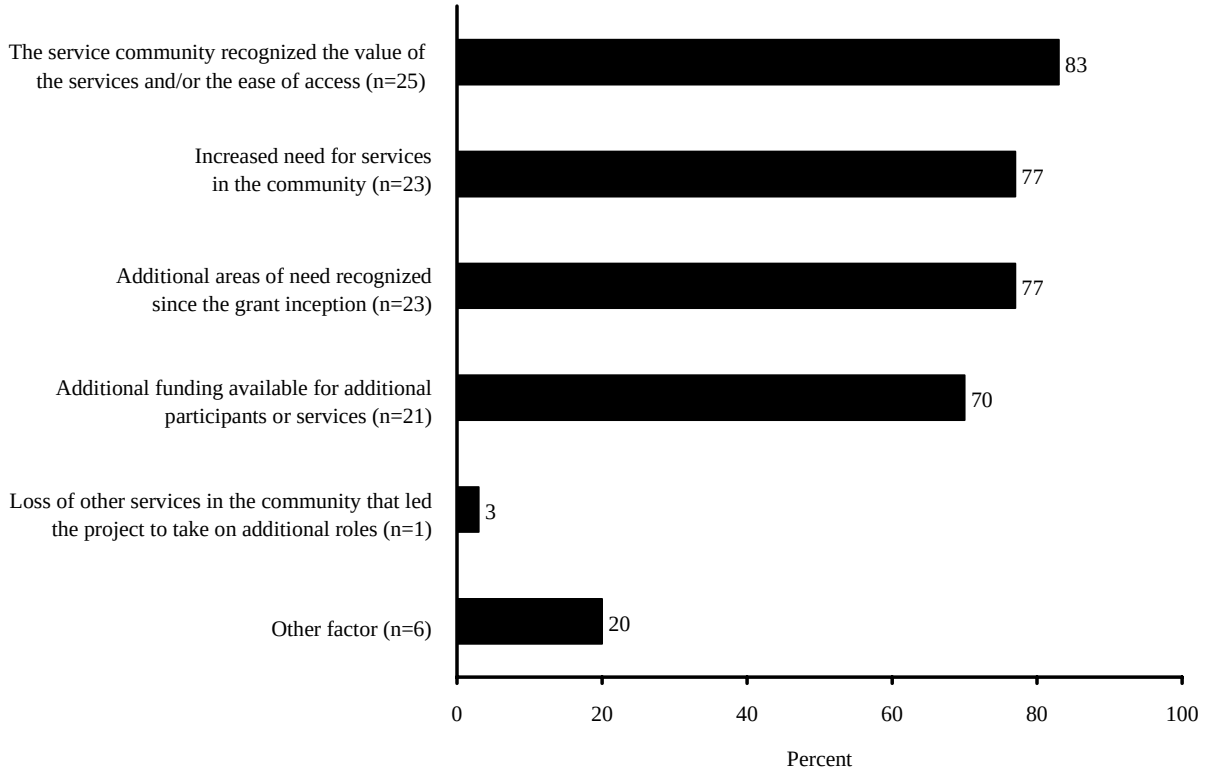
NOTE: Percentage estimates are based on the projects that indicated their project had changed (expanded or reduced) since the end of the ARC grant.

SOURCE: 2002 telephone survey of ARC grantees.

- Almost three-quarters (22 projects, 73 percent) of the 30 projects that expanded were serving more individuals and providing more services (not shown in tables).

The 30 projects that had expanded were asked to review a list and identify factors that had facilitated their growth. Four-fifths (25, 83 percent) of these projects indicated that their community had recognized the value of their services or the ease of access (figure 7-2). That so many respondents indicated that their projects expanded in part because the community recognized their project's value suggests a "build it and they will come" effect of telecommunications technology in underserved areas. Twenty-three respondents (77 percent) cited an increased need for services in the community, and 23 (77 percent) cited additional areas of need that could be addressed by the project. Twenty-one of the 30 respondents (70 percent) reported the availability of additional funding for additional participants or services.

Figure 7-2
Percent of ARC projects reporting various factors that facilitated project expansion (n=30)



NOTE: Projects could report multiple factors

SOURCE: 2002 telephone survey of ARC grantees.

Most (13) of the 16 case study projects reported in the telephone survey that they were serving an expanded function. Of these 13, all reported serving more end users. The site visits shed additional light on factors that facilitated project expansion. For example:

- Case study projects serving the education sector, such as the Allegheny High School Cyber Campus and Jefferson Community College, had reached more students by increasing their course offerings. The Allegheny High School Cyber Campus nearly doubled in size with the addition of the cybertorium and community lab, while Jefferson Community College modified its computations lab and equipment to accommodate more classes and individual students.

- Several case study projects serving the government sector had also been able to provide services to additional counties, towns, and agencies. For example, with the assistance of state funding, SEDA-COG's Info-Structure Technology Assistance Center has been able to include smaller municipalities in the project, providing them with Internet access, e-mail, and word processing and database services.

The ability of case study sites to serve more end users was often a direct result of their providing a new service. Examples of new services that resulted in additional end users included instituting new distance learning programs, providing training in more advanced software applications (e.g., GIS mapping), and adding new equipment and capabilities to the existing infrastructure. For example, SEDA-COG reached an agreement with Team PA to assume responsibility for PA SourceNet. Once the transition is complete, additional features will be added to the system that include (1) a mapping capability that can provide a graphic image of business locations and density, (2) a business portal that will provide business-related information to users, and (3) an "auto-e-mail" capability that would allow users to e-mail all businesses that matched their search criteria for additional information. It is anticipated that the addition of these new services will also expand the number of end users.

Projects That Had Reduced Functions or Were No Longer Operational

Fifteen (21 percent) of the 70 projects had reduced functions or were no longer operational—with 9 (13 percent) operating at a reduced function (i.e., either serving fewer participants or providing fewer services), and 6 (9 percent) no longer in operation (figure 7-1).[18] Among the 9 projects operating at a reduced function, 6 indicated that their projects were providing fewer services, and 4 said their projects were serving fewer individuals. Five respondents reported that their projects were reduced in some other way, for example, by "narrowing the scope of the needs (of users)."

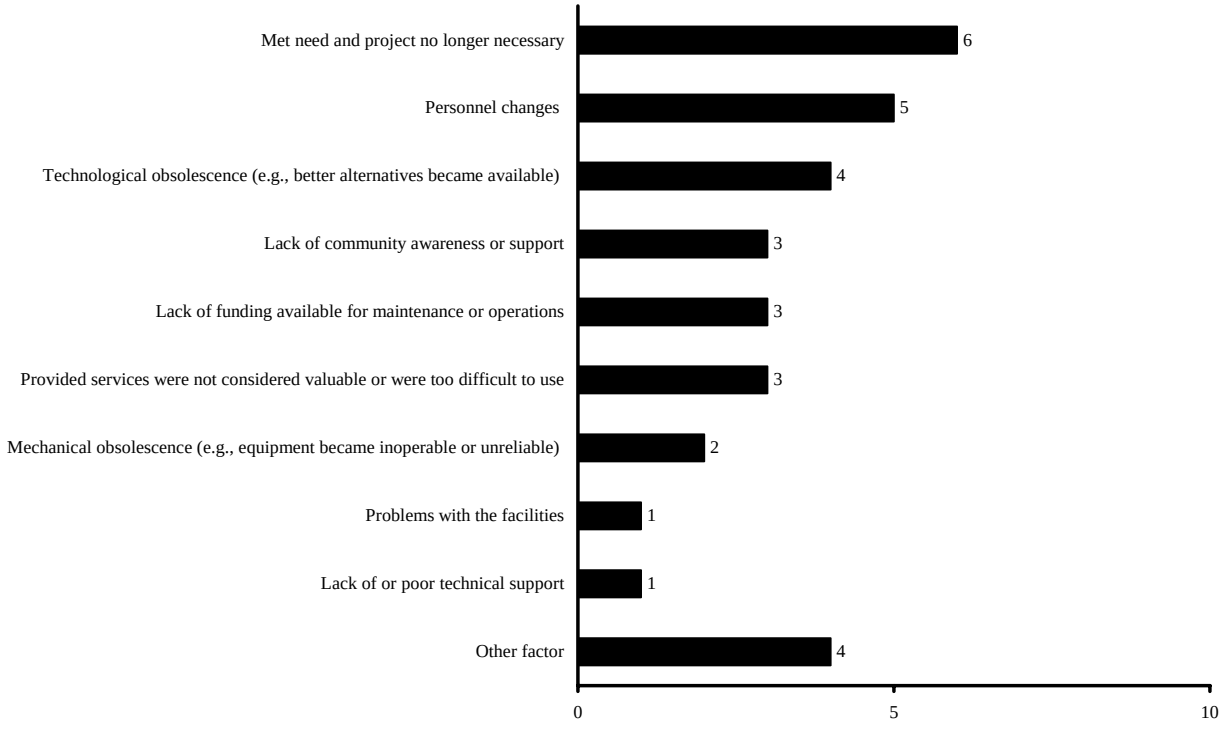
The 15 projects that were operating at a reduced function or no longer in operation were asked to review a list and identify obstacles that hindered their sustainability. Of these, 6 had met the identified need and were no longer necessary—which supports the suggestion that projects must continue to meet the needs of the community in order to carry on their efforts (figure 7-3). Additionally, 5 of the 15 respondents indicated that personnel changes hindered their longer term operational status, and 4 cited technological obsolescence.

Comparison of Survey and Case Study Findings on Project Sustainability

It is worth noting that there were several discrepancies between what respondents indicated was their project's status at the time of the telephone survey and what was subsequently reported and observed during the site visits. For

[18] Some of these projects may have been terminal in nature and not intended to go beyond the initial grant period.

Figure 7-3
Number of ARC projects reporting various factors that have contributed to project no longer operating or operating at reduced scope (n=15)



NOTE: Projects could report multiple factors.
SOURCE: 2002 telephone survey of ARC grantees.

example, one project was described in the telephone survey as being in operation and serving additional end users. However, during the site visit, respondents indicated that the grant recipient was no longer actively managing the project—nor had it been their intent to do so after the period of the ARC grant. In spite of the project's apparent termination, end users were still benefiting from the equipment they had received through the ARC project. (It was left to individual end users to maintain and upgrade their equipment.)

This potential discrepancy between the survey and case study findings suggests two ways of viewing project sustainability. One way, which represents the likely interpretation of many survey respondents, is to consider a project operational if its end users are still making use of project equipment—even if the project itself has ceased to exist. A second interpretation, which came out during the site visits, looks more closely at whether the project itself continues to exist beyond the ARC grant—and whether steps are still being taken to maximize end users' access to (and utilization of) new and emerging technologies. Under this second interpretation, several of the case study sites had indeed ceased operations in that no additional training or technical support was being provided to end users (even though those end users were still using the technology and training that had been obtained through the ARC grant). The implications of this discrepancy are worth noting. In one site, for example, some of the end users that we interviewed indicated that they would have benefited from supplemental training (e.g., how to utilize new technology skills obtained through the project) and ongoing access to technical assistance.

Relationship Between Project Status and ARC Funding Amount

Study findings suggest a relationship between the ARC funding level and projects' operating status (as reported on the telephone survey). Specifically:

- The average ARC funding level for projects that were in operation and serving an expanded function was $242,000 (not shown in tables).
- The average ARC funding level for projects that were still in operation but serving a function that had stayed the same over time was $119,000.
- The average ARC funding level for projects that were in operation, but serving a reduced function was $112,000.
- The average ARC funding level for projects that were no longer in operation at the time of the site visit was $57,000.

One potential explanation for this trend is that projects with an ambitious agenda (as evidenced by their request for a substantial amount of ARC funding) were in a better position to sustain and expand their telecommunications efforts. It may also suggest that smaller projects were primarily designed to fill a temporary gap or meet an immediate need. Our review of other related trends in the ARC database and telephone survey does not suggest any other obvious patterns that would link the six projects that were no longer operational at the time of the study.

STEPS TAKEN TO SUSTAIN PROJECTS OVER TIME

Case study projects that were able to sustain and expand their efforts beyond the ARC grant period employed a number of different strategies. Many grant recipients had the internal capacity to support their projects' development or had established partnerships to ensure that they had access to the expertise in technology and project management that maintaining their projects required. These projects were often able to draw together multiple sources of funding and achieve the support of key stakeholders. In some cases, projects had transferred responsibility of certain aspects of the project to another organization that was able to take the initiative to a new level. Each of these strategies is discussed below.

Internal Capacity

Grant recipients need to have the capacity to handle the demands of the project they have set out to implement. As discussed in chapter 4, many projects initially lacked the technical expertise necessary to choose the most appropriate equipment for the project (for example, making sure that the various components were compatible), or to maintain and repair the equipment when necessary. Hiring consultants can be expensive, and many projects had difficulty offering competitive salaries for skilled information technology employees. However, some grant recipients took steps that enabled them to overcome these challenges over the long term.

For example, MAGICnet was created by a partnership between the College of Osteopathic Medicine (COM) at Ohio University and the Institute for Local Government Administration and Rural Development (ILGARD). As an educational organization, ILGARD has the internal capacity for training and played a significant role in developing the training agenda and materials. They also have the technical expertise on which the project participants can rely. Because of their affiliation with the University of Ohio, both COM and ILGARD are able to take advantage of a vast array of resources. However, they also noted that providing project participants with the requisite skills is a significant issue that needs to be addressed on a long-term basis if projects are going to succeed.

Partnerships

Collaboration has been essential to the success of several of the case study projects, because it has allowed them to pool their resources and take

advantage of other resources already in existence. Partnerships often resulted naturally from the ARC requirement that telecommunications projects serve more than one sector of their community, and this frequently helped elicit broad support for the project. Collaborative efforts were also used to address the issue of internal capacity to implement and sustain a project. Many projects were able to sustain themselves by collaborating with local educational institutions on which they were able to rely for technical assistance and other kinds of project-related support.

Such collaborations allowed partnering organizations to play off each other's strengths. For example, the Southern Tier Central (STC) Regional Planning and Development Board knew the needs of the community from their work with local agencies and the ARC. In partnering with the local Boards of Cooperative Education Services (BOCES), STC was able to incorporate BOCES' experience and expertise in the field of education. Together they secured grant money from the Verizon Diffusion Fund and have brought high-speed access to small rural schools in the area, and have wired hospitals and other public entities with telecommunications services.

Another project extremely successful at building a network of partners was Technology 2020. At the time of the ARC grant, Tech 2020 was preparing to provide Oak Ridge, Tennessee, with new and innovative opportunities to develop new businesses in the area of telecommunications technology. The project relied on several partners to provide investment capital, including Bell South, UT-Battelle, the Department of Energy, the State of Tennessee, SAIC, Lockheed Martin, Bechtel Jacobs Development Company, CROET, Oracle, Motorola, University of Tennessee, U.S. Internet, and WorldCom. These companies' contributions ranged from donating hardware to $1 million in funding. Tech 2020 also created five new organizations that act as a team to sustain Tech 2020 ventures. Tech 2020 continually seeks new investors and works to maintain current relationships with local businesses and economic development groups. Tech 2020 is also able to draw on the technological expertise from the Oak Ridge National Laboratory and other scientific research facilities in the vicinity.

Ongoing Funding

Seventy percent of telephone survey respondents indicated that having additional funding available facilitated project expansion. The case study projects have employed multiple strategies to ensure ongoing funding—e.g., seeking government funding and subsidies, seeking new grant opportunities, enlisting the support of corporate partners, and charging fees for services. Notably, a number of sites mentioned that receiving funding from ARC served as a springboard for other funding opportunities. Several examples of efforts to obtain ongoing funding are provided below.

- The Alleghany High School Cyber Campus has received funding from a multitude of sources including the ARC, the Rural Internet Access Authority (RIAA), and the Technology Literacy Challenge Fund (TLCF). They also led a fundraising campaign, which focused on local businesses and raised more than $200,000, which has been used to supplement grant money. Staff salaries were initially paid for by the North Carolina School of Science and Math on the condition that within a few years, the local school system would take over these costs. At the time of the site visit, North Carolina was covering a substantial portion of the transmission fees of distance education sites, but state officials had proposed eliminating these subsidies, which would lead to an additional $26,000 in annual costs that the cyber campus would need to cover. To help cover some of the expenses, the project plans to charge fees for some of their services; fees have already been paid for some video production and videoconferencing work, and cyber campus staff see this as a viable revenue stream.

- The Marshall University Research Corporation also used the fee for service strategy. A key component of the campaign

to create "Advantage Valley," an economic regional entity, was the establishment of a web site to link area businesses and provide community information for community members as well as for prospective employers interested in learning about the region (its transportation, schools, shopping, safety, etc.). The web site and the Advantage Valley enterprise relied on annual membership fees paid by local businesses and other organizations that subscribe to the mission of regionalization

- Only two projects cited a heavy reliance on volunteers and small-scale fundraising to sustain their efforts: the Community Teams that were funded as part of MIRA, in Southeastern Ohio, as well as the Jackson County Distance Learning project, in Alabama. In both cases, though, other funding opportunities were sought. The Jackson County Distance Learning project receives state funding for staff salaries from the Alabama Adult Education Program, and the Community Teams in Ohio have received advice from and have collaborated with Community Support Organizations to pursue grants. For example, in Ohio, the Miller Business Team, which reorganized into the Southern Perry Incubation Center for Entrepreneurs (SPICE), has worked extensively with ACEnet, a community organization committed to building local capacity to create and sustain a strong regional economy. SPICE has received funding from sources such as the Ohio Department of Development, which gave them money to conduct an asset mapping survey of the community that will be used to assist business development.

- A few projects were trying to build on the local tax base, but that has been problematic because of the fiscal strain in many of these communities. Southern Perry Unified Recreation (SPUR), for example, has been trying to pass an initiative to create a recreational district; similarly, SEDA-COG received state funds to expand their efforts beyond county-level offices to smaller municipalities, such as boroughs and townships. However, many of these communities have tax bases and budgets that are so small that it is difficult for them to even cover the monthly fees to an Internet provider. This was also the case for government sites of the MAGICnet project, some of which have had difficulty covering ISP fees. In both the SEDA-COG and MAGICnet projects however, once the project connected sites free of charge for a specified period of time, most of those sites continued the service when the time came for them to pick up their own costs, because they recognize the benefits as so vital.

Buy-In of Key Stakeholders

Gaining the backing of key stakeholders is important because they have the ability to make or break a project. Community members must see the value in the project and provide the demand for the projects' services. Other stakeholders include college administrators and lawmakers, who can facilitate additional funding and partnerships.

The experience of Jefferson Community College illustrates the role of a project's stakeholders. At the time of the ARC grant, Jefferson Community College was badly lacking the equipment necessary to adequately prepare its students for employment in computer science and engineering fields. Further, there was no network connection at the college as late as 1995. With ARC funding, Jefferson Community College installed a computations lab in which computer science courses could be taught. Respondents pointed out that the Jefferson Community College board of trustees was, at the time, cool to the notion of directing large sums of money toward new technologies, given the college's relatively small budget. However, the Vice-President of Academic Affairs noted that the success of the ARC project made getting new grants easier, and the Vice-President for Business Services said that once the board of trustees saw the benefits of technology to the college, it became far easier to persuade them to provide matching funds for new grants. In an attempt to encourage community buy-in, Jefferson Community College also

developed the e-world learning center web site (www.eworldlearningcenter.com), which serves as an access point and guide for community members interested in taking courses to develop computer and information technology skills.

In a similar case, ARC funds were used by the Regional Education Service Agency (RESA) of Appalachian Maryland to provide equipment and technical assistance to local school systems, government agencies, and higher education institutions to develop telecommunications capacity. Most of these efforts were carried out in the mid-1990s when Internet access and other technologies were being used primarily in higher income, heavily populated areas of the state and the country. For example, these efforts provided both Frostburg State University and Allegheny College with their first Internet capabilities, but RESA had to convince agency heads and educational administrators that acquiring new telecommunications resources would, in fact, be beneficial and cost-effective. The result has been that participating institutions have increased funding for technology in their organizations.

Transfer of Ownership

In some cases, grant recipient organizations realized the benefits of having another organization assume responsibility for some or all of the project's activities. The new organization may have more financial resources and technical expertise, or the ability to reach a broader audience. For example, SEDA-COG received ARC funds to build upon their Manufacturing Marketing Network (M-Net), a database network that assisted businesses in locating in-state customers for their products and finding reliable leads for marketing products within and outside the state. The result was PA SourceNet, an Internet software-based program that allows anyone to search for Pennsylvania businesses using a variety of qualifiers (by industry, by location, by company size, etc.) and allows companies to search for potential suppliers, distributors, and customers. SEDA-COG and six other Local Development Districts (LDDs) involved in the project continued to maintain the PA SourceNet site with state enterprise development funds. However, under an agreement with the Team Pennsylvania Foundation, a broad-based, statewide economic development network, Team PA will eventually assume responsibility for the site. This agreement reflects a significant buy-in by the state and will allow both technology modernization and an increase in marketing of the system throughout the state. Although the system will no longer be housed at SEDA-COG, the LDDs will continue to help add additional features to the system, such as mapping capability that can provide a graphic image of company locations and densities.

SUMMARY

Findings from both the telephone survey and site visits suggest that the majority of ARC-funded telecommunications projects sustained themselves beyond their ARC grant. More than three-fourths of the projects were still in full operation and/or had expanded at the time of the telephone survey. Projects that had expanded beyond their original mission were serving more individuals and providing more services than originally intended.

Several factors appeared to be responsible for the high proportion of projects that sustained and/or expanded their efforts over time. In most cases, there remained a continued need and demand for the services that these projects were offering. However, in some cases, projects had to modify and/or expand their mission in order to meet additional needs within the community. Successful projects were able to secure continued funding after the ARC grant, achieve buy-in of key stakeholders, and rely on partnerships. Strategic planning, however, did not seem to play a large role. Rather, projects were able to pull together different resources and find solutions to problems as they arose.

VIII. Summary and Recommendations

The wide range of activities uncovered through this study makes it difficult to describe a "typical" ARC telecommunications project. As with our previous studies of the Commission's education and workforce training projects, this lack of a one-size-fits-all model was viewed by many case study participants as an important feature of ARC's approach to selecting and funding projects. It clearly reflects the Commission's emphasis on using its grant solicitation process to support the localized needs and capacities of individual communities. Through this process, ARC continues to provide organizations the opportunity to address local disparities and take advantage of regional resources.

Taken as a whole, study findings suggest that ARC's telecommunications projects made significant progress toward fulfilling the Commission's goals of (1) building access to infrastructure, (2) infusing telecommunications technology into the business sector, and (3) cultivating the skills and knowledge of the region's citizens to use technology effectively. Besides these tangible effects, there were other impacts on the communities in which these projects were situated. Perhaps most importantly, the infusion of infrastructure within and across communities contributed to an increased awareness of the potential of telecommunications technologies for improving economies and individual lives, especially in areas with little or no past exposure to these technologies. The new awareness generated by many projects then served the critical function of setting into motion further advancements in telecommunications technology. It appears that many Appalachian communities are now learning how to exploit these possibilities to benefit themselves and erase the digital divide.

However, it is worth noting that over three-quarters (77 percent) of the projects in the study encountered at least one implementation barrier as they carried out their various approaches. This was often due to the complex nature of the telecommunications activities that projects were carrying out—and the inherent difficulty of creating and implementing technology projects in communities with limited access to the information infrastructure. While these barriers were generally not severe enough to prevent individual projects from achieving their goals, they did hinder the efficiency with which some of these goals were achieved.

The remainder of this chapter outlines a series of steps that the Commission might take to enhance the implementation and impact of its telecommunications projects. These recommendations reflect suggestions made by representatives from the 16 case study projects, our own observations from the site visits, and our review of best practices in other federal technology programs. In addition, they are designed to build upon ARC's existing grant management structure and reinforce practices described in several ARC publications—most notably *Information Age Appalachia*, *Preparing a Grant Proposal: Five Steps in the Proposal Writing Process* (an ARC guide for preparing successful grant proposals), and *Best Practices in Telecommunications* (a description of innovative telecommunications activities that have been conducted with ARC support).

RECOMMENDATIONS FOR REINFORCING ARC'S APPLICATION AND REPORTING GUIDELINES

In previous studies, we have recommended that ARC reinforce the application and reporting guidelines for its education and vocational education/workforce training projects. Specifically, we have advised that the Commission consider developing separate guidelines (or supplemental materials) that provide customized examples and outcomes for a particular issue area. The following recommendations identify specific steps that ARC might take to further enhance the application and reporting guidelines for its telecommunications projects.

Provide more feedback to projects during the application review process. Although ARC's grant award process is designed to assure that the Commission funds initiatives that reflect local and state priorities, project coordinators review each application to assure that the proposed project is workable and aligned with the Commission's five strategic goals. If needed, ARC project coordinators recommend changes to the proposed projects to state program managers.

Findings from the 16 case study sites suggest several areas where ARC project coordinators could reinforce their efforts to counsel projects about potential improvements to their proposed approach. For example, given the imprecise character of some outcome statements delineated by many of the 16 case study sites, ARC project coordinators might take a more proactive role during the review process in assessing the quality of the outputs and outcomes proposed by future telecommunications projects. This approach, similar to one used by the U.S. Department of Commerce's Technology Opportunities Program (TOP), would help applicants craft outcome statements that clearly describe how their efforts will benefit end users and the greater community—and how those benefits will be measured. As part of this process, project coordinators could also help applicants more fully develop the data collection activities that will be used to assess whether outcomes have been met. In addition, ARC could have someone on staff who is familiar with evaluation methodologies review proposals (prior to approval) to help assess the adequacy of applicants' proposed outcomes and corresponding evaluation strategies.

ARC project coordinators might also use the review process to help applicants consider the feasibility of their proposed approach. For example, applicants might be asked to revise their proposals to enhance their discussion of such issues as assessing end users' needs, staffing, training, and sustainability. (These issues are discussed in more detail later in this chapter.) Addressing these issues during the review process might help projects avoid some of the implementation barriers that were encountered by the case study projects.

Reinforce the ARC application materials provided to telecommunications applicants. The Commission has developed a wide range of materials designed to provide prospective applicants with generic guidance on what constitutes a successful proposal, as well as specific examples of the types of telecommunications activities it is looking to support. Three recent ARC publications are worth noting:

- In 1998, the Commission published an application workbook designed to improve the quality and consistency of the proposals submitted to ARC. Under these generic guidelines, applicants are urged to describe the objectives of their proposed project, provide an explanation of how the effort pertains to one or more of ARC's five strategic goals, and offer a rationale for their proposed approach. In addition, they are encouraged to describe the "output and outcome benefits to be derived from the project with particular emphasis on the

extent to which the benefits to the area being served by the project will be realized on a continuing rather than a temporary basis."

- *Preparing a Grant Proposal: Five Steps in the Proposal Writing Process* describes steps that organizations can take to develop successful grant proposals, including (1) identifying a problem that can be addressed through grant funding, (2) describing expected outcomes, (3) devising a proposed approach, (4) locating funding sources, and (5) writing a proposal. While this guide is designed to provide generic advice for securing grant funding from a wide range of sources, its principles can be applied to the development of ARC proposals.

- *Information Age Appalachia* provides a detailed "framework under which the ARC and its partners will work to bring together the benefits of the information revolution to those whom it threatens to bypass." Published in 2001, the document further states that the purpose of this technology program will be to "stimulate economic growth and improve the overall standard of living in the region through technology-related avenues." To meet these ambitious goals, *Information Age Appalachia* outlines a comprehensive range of telecommunications activities and outcomes that the Commission is seeking to support. Additional examples of innovative telecommunications activities that have been supported by the ARC are provided in a separate document on the Commission's web site.

To reinforce the general blueprint set forth in these publications, we recommend that ARC develop additional materials that build upon the application workbook and *Information Age Appalachia*. Using the framework outlined in the current application workbook (see exhibit 8-1), the Commission could compel applicants to think ahead about avoiding common implementation barriers, measuring project success, and maximizing the likelihood of long-term sustainability.

Exhibit 8-1. ARC application submission format and guideline checklist: Current instructions for the project narrative

1. **Goals and Objectives**—Relate the project to one or more of the ARC Strategic Plan goals and to one or more of the strategies in your State's Annual Strategy Statement.
2. **Purpose and Rationale for the Project—**Describe the principal purpose and rationale (need) for the project and the problem or issues the project will address.
3. **Project Description**—Provide a detailed description of the major project activities, including what will be done, who will complete each activity, and a projected timeline for project completion.
4. **Relation to Other Local/Regional Activities—** Describe how the project meets the priorities of local or regional community or economic development plans. Describe efforts to coordinate the project with other area economic development activities.
5. **Geographic Area**—Identify and describe the geographic area to be served.
6. **Benefits and Performance Measures**—State the expected benefits to be derived from the project in quantitative and qualitative terms. State the outputs and outcomes in accordance with ARC Performance Measurement Guidelines.
7. **Funding Need**—Detail the need for ARC funding and identify each different funding source for the project. Attach letters of commitment for **all** additional funding sources.

SOURCE: ARC Project Application Workbook.

Exhibit 8-2 illustrates how the existing generic guidelines might be expanded and adapted to provide specific guidance about the types of

Exhibit 8-2. Potential enhancements to ARC's submission format and guideline checklist for telecommunications projects*

1. **Goals and Objectives**—Relate your proposed project to one or more of the focus areas delineated in *Information Age Appalachia*.

2. **Purpose and Rationale for the Project—**A compelling application defines a problem or set of needs that can be addressed through the use of technology. You should use this section of your proposal to describe the principal purpose and rationale (need) for the project and the problems or issues the project will address—with special emphasis on (1) the specific educational, economic, community, or family/individual well-being need(s) that your initiative will attempt to address, (2) the characteristics of the intended beneficiaries, and (3) the disparities (e.g., economic, educational, lack of access to the information infrastructure) that exist within the regions to be affected by your project.

3. **Project Description**—Competitive applications demonstrate a logical link between the problem(s) they define and the solution(s) they propose. In this section, discuss how you will use your ARC telecommunications grant to address the problem(s) you defined in the preceding section. In writing this section, you should attempt to address as many of the following points as possible:

   - How will the solution that you are proposing address your community's specific economic, educational, and technology needs?
   - What is your rationale for selecting this approach? Have you considered any alternative approaches for addressing the disparities described in your proposal?
   - Have you assessed (or do you plan to assess) the feasibility of your proposed approach? For example, have you determined whether your community's existing infrastructure is sufficient to support your project's technology?
   - What is your plan for hiring and maintaining knowledgeable staff with experience in the technology that you are proposing?
   - What steps have you taken to assess the technology needs of your intended beneficiaries? Of assessing the extent to which your intended beneficiaries are likely to make use of your proposed technological solution?
   - What steps will you take to provide immediate and long-term technology training to your intended beneficiaries?
   - What steps will you take to provide telecommunications services to multiple sectors?
   - What steps will be taken to sustain the telecommunications effort beyond the ARC grant?
   - What steps will be taken to provide technical assistance and technology training to end users beyond the ARC grant?
   - Do you anticipate that the project's scope will eventually increase? For example, are there plans to expand the number of beneficiaries or increase the range of telecommunications services provided through this project?

*Some of the text for this example was taken from the FY2002 application guidelines for the U.S. Department of Commerce's Technology Opportunities Program (TOP).

Exhibit 8-2. Potential enhancements to ARC's submission format and guideline checklist for telecommunications projects (continued)

4. **Relation to Other Local/Regional Activities—**Once you have presented a coherent and convincing discussion of the project definition and shown that what you propose is feasible, you should demonstrate that the communities to be served by the project support it and will participate in its development. Specifically, describe the steps you have taken to include a wide variety of community stakeholders in the planning and development processes. For example, have you held open meetings, conducted surveys, employed focus groups, met with representatives of different community groups, or developed a steering committee or advisory panel that involves end users and other key stakeholders?

5. **Geographic Area**—Identify and describe the geographic area to be served by your project. You should consider presenting a profile of the community or communities to be served and the intended beneficiaries of the project, citing supporting statistics (e.g., per capita income, percent of households living in poverty, population density, size of the region, relevant health statistics) as appropriate. You may wish to append materials such as maps and other geographical representations to illustrate the scope of the project. You can also bolster your presentation by using specific quantitative data to document the nature and extent of the community's needs.

6. **Description of Anticipated Project Benefits—**Provide a description of the benefits that you expect to occur as a result of your project. For example, describe how you expect that individuals will use project-related technology to enhance their skills, improve their productivity, or expand their access to previously unavailable information. You might also indicate how your project will affect your overall community—e.g., enhanced employment opportunities, increased access to high-quality medical care.

7. **Anticipated Project Outcomes**—When describing project outcomes, it is helpful to keep in mind the distinction between project *outputs* and *outcomes*. *Outputs* may be thought of as a unit of service or the result of the project's activities—e.g., number of training classes held, number of "hits" to your home page. Such data are important because they often lead to the desired or expected outcome(s). *Outcomes*, on the other hand, are the benefits derived from the project activity or the consequences of project participation. Outcomes reflect a changed state or condition of your target population or the project beneficiaries—e.g., an increase in local employment rates, a decrease in response time for 911 emergency calls. For example, a telecommunications project designed to computerize a food distribution program for the elderly might anticipate the following outcomes:

   - An increase in the program's ability to match meals with individual recipient's dietary needs.
   - A 20 percent increase in the number of elderly persons receiving food donations.
   - A 5 percent increase in the percentage of elderly residents within the community who report having healthy meals on a regular basis.
   - A 15 percent reduction in the time needed for elderly recipients to apply for food assistance.
   - A 10 percent reduction in food spoilage in storage facilities.
   - A 10 percent reduction in administrative costs for service providers and food donors.

   This section should also specify your plans and corresponding schedules for collecting the outcome data that will be needed to assess whether intended outcomes have been achieved.

8. **Funding Need**—Detail the need for ARC funding and identify each different funding source for the project. Attach letters of commitment for **all** additional funding sources.

issues that applicants should address in their telecommunications proposals. (Many of the questions posed in this example address issues described later in this chapter.) Enhanced application materials would also enable ARC to provide additional guidance as to how it expects projects to interpret the "guiding principles" delineated in *Information Age Appalachia*. For

example, the materials could be used to require that applicants describe their proposed approach for (1) providing telecommunications services to multiple sectors, (2) sustaining local operations without continued infusions of grant monies, and (3) creating solutions that are affordable to the community.

Provide prospective applicants with examples of telecommunications outputs and outcomes. While many of the case study sites included at least one numeric output or outcome in their proposal, these statements primarily focused on the number of services that would be provided (e.g., number of web sites), the number of persons or agencies that would receive access to new technologies, or the number of individuals who would participate in a training activity. Only 5 of the 36 outcome statements that we identified in the case study proposals contained a numeric benchmark—and even these tended to focus on the number of persons who would access information after it had been made available. All of the numeric benchmarks that we reviewed were necessary and useful. However, evidence from the site visits suggests that most of the projects had difficulty identifying intermediate and long-term outcomes commonly associated with technology projects.

The Commission clearly recognizes the need for its applicants to use their proposals to set realistic, achievable and measurable outcomes. In *Preparing a Grant Proposal: Five Steps in the Proposal Writing Process*, organizations are encouraged to focus on how their efforts will benefit participants and the broader community:

> As a result of your intervention or activity, what will occur? How will things change? What will the world—or your community—look like once you fix the problem or change the situation?

In an effort to help prospective technology projects address these questions in their proposals, we recommend that the ARC prepare supplemental materials that demonstrate the range of outputs and outcomes that might be attributed to a generic telecommunication project. For example, several variations of the logic model presented in chapter 5 might be developed and posted on the ARC web site. We further recommend that successful telecommunications applicants be required to specify (1) which community goal(s) their projects are designed to address, (2) a numeric benchmark against which their progress can be assessed, (3) a description of the timeframe within which this benchmark will be achieved, (4) a description of the methodology that will be used to assess whether the numeric benchmark was achieved, and (5) a description of how and when the data will be reported to ARC. Projects could also provide information about any other numeric outputs and outcomes that can be used to document the scope and impact of their efforts. As discussed above, projects that fail to specify numeric outcomes could be asked to do so during the review process.

Applicants might also be provided standardized criteria for estimating the number of persons expected to benefit from their ARC grant. The use of such standardized criteria might improve the quality of the statistics that are reported to ARC, thereby enhancing the Commission's capacity to aggregate outcome data across all of its telecommunications projects.

Encourage applicants to describe how technology will affect residents and organizations in participating communities. There is an inherent danger that a requirement to specify a numeric benchmark will reduce projects' expectations of what they need to report about their anticipated activities and outcomes. Our experience with ARC and other federal telecommunications initiatives suggest that the impact of introducing technology into a professional or educational setting cannot always be adequately conveyed through the attainment of a numeric benchmark. Rather, it requires a more thoughtful discussion of how individuals are using technology to enhance their skills, improve their productivity, and expand their access to previously unavailable information. As such, we

recommend that ARC encourage its applicants to support their statistical benchmarks with broader statements of how the circumstances of Appalachian citizens will be improved through the use of telecommunications technology. These statements provide projects an important opportunity to describe how their efforts might eventually improve the efficiency and quality of activities performed by individuals and organizations. ARC should therefore view the recommendation for including numeric benchmarks as an enhancement to—as opposed to a replacement of—the narratives that applicants are currently required to provide in their proposals.

Reinforce ARC's reporting structure. If ARC is to be in a position to identify innovative and successful telecommunications practices, its staff will need to be able to systematically access more detailed information about the implementation and impact of its projects. One method would be to enhance the quality of the final reports that projects submit at the end of their ARC grant. ARC grant recipients are currently required to submit a final narrative and financial report when they complete their project. The ARC Grant Administration Manual contains general guidelines and examples of topics that projects *might* address in their final report.[19] However, findings from our document review suggest that this lack of mandated uniform reporting requirements has resulted in an uneven quality to the closeout reports submitted by the technology projects. In addition, interviews with case study respondents suggest that projects would actually welcome more structured reporting requirements—so long as those requirements are not onerous or unrealistic.

We therefore recommend that ARC develop closeout report guidelines that are to be used by all of its technology projects. Exhibit 8-3 provides an example of how the general guidelines in the current ARC Grant Administration Manual might be adapted to the Commission's telecommunications projects. Whatever format is used, the use of a more formalized reporting structure would likely enhance project coordinators' ability to obtain consistent data that can be used to assess project—and program—success. In addition, while some grant recipients might continue to rely primarily on anecdotal information, the use of standard reporting guidelines should compel projects to rely on more sophisticated and robust data collection and analysis techniques.

Continue to disseminate information about innovative telecommunications practices to prospective grantees. The digital divide is commonly used to refer to gaps in access to new and emerging technologies; it can also refer to gaps in knowledge about how new and emerging technologies might be utilized. Indeed, most of the projects that we visited were implementing a conventional telecommunications strategy, such as enhancing computer and Internet access to businesses, government agencies, or residents. While these types of activities are both necessary and valuable, it is worth noting that few of the telecommunications strategies that we reviewed were pioneering or groundbreaking. This likely reflects the reality that many of the case study sites were designed to address an immediate community concern (e.g., obtaining basic Internet access for community residents). Indeed, many of the communities we visited were not ready to experiment with more innovative technological applications at the time they applied for ARC funding.

While many of the projects that we visited were relying on conventional telecommunications strategies, *Information Age Appalachia* calls for future projects to "be open-minded" and "introduce new practices." ARC currently uses a variety of methods to disseminate ideas about innovative technology applications. For example, the Commission's web site includes examples of innovative technology initiatives that have been carried out with ARC support. We believe that

[19] The instructions that accompany these guidelines state, "You may find the attached outline useful in compiling your report, though you have flexibility in how to best present information for your project."

ARC should continue its existing efforts to inform community leaders about innovative applications for new and emerging technologies. Specifically, we suggest that the Commission continue to add new information to its web site about creative telecommunications projects and links to other useful technology-related web sites. We further recommend that ARC carry out the full range of technical assistance activities outlined in *Information Age Appalachia*—e.g., technical assistance and consultations, an online "Yellow Pages" directory of regionally based technology resources, workshops (via teleconference and traditional means), outreach to identify new public and private partners, the development of an advisory board, and liaison with other federal agencies.

Exhibit 8-3. Example of potential ARC guidelines for telecommunications final reports

Background—Provide a short statement regarding the need for this project. What problems did you hope to solve when you applied for ARC funding?

Activities—Describe in detail what actually happened during this grant cycle, and explain how you implemented the project activities. If there were significant changes to your program during the course of the project, or if the project was implemented differently than described in your original proposal, please describe those changes here.

Description of Project Benefits—Provide a description of how individuals are using project-related technology to enhance their skills, improve their productivity, and expand their access to previously unavailable information. Also, assess the extent to which your project has addressed the problems or needs that you identified in your original request for ARC support.

Outcome Data—Provide any data that documents the outcomes associated with your project. Data will vary according to the type of project you completed, and it may be difficult to provide data at this time. However, it is very important to gather this kind of information so both your organization and ARC can document our successes. At a minimum, report on the extent to which you met the numeric goals that you identified in your original request for ARC support.

Problems Encountered—What would you do differently if you were starting this project again? Describe any major problems that may have occurred during the implementation of your project. Knowing the types of difficulties you encountered and how you resolved them will be helpful to other technology grantees that may be interested in replicating your program.

Program Continuation and Sustainability—This section should describe whether and how you intend to continue program activities after the end of the ARC grant period. Will the program continue with other funding, and if so, what other sources of funds have been identified? If the program is to be discontinued, has it served its purpose, or is there still a need to solve the problems you were addressing? What additional steps are being taken to obtain other resources needed to continue the project?

Conclusions and Recommendations—This section summarizes your project and the lessons learned during its implementation. Include a review of your successes and suggest ways that your experiences may be helpful to others.

Attachments—Attach any material that helps to describe your project and documents your success, such as photographs, news clippings, maps, videotapes, or web site addresses. Also, please attach copies of any written evaluations that may have been completed for your project.

SOURCE: Adapted from the ARC Grant Administration Manual.

While these activities cannot, by themselves, provide sufficient information for prospective grantees, they can point applicants in the right direction and lead them to useful resources (including staff at "model" or exemplary projects). We believe that these activities will help to provide rural communities with valuable information about innovative ways to utilize new and emerging technologies.

Provide projects with written materials on high-quality evaluation practices. Most of the 16 case study sites did not appear to be emphasizing the collection of data or use of evaluation methods to assess whether their outcomes had been achieved. Rather, projects were relying on anecdotal evidence, using imprecise data collection methods, or implementing surveys that failed to take into account biases introduced through low response rates. Several factors contributed to projects' failure to implement robust collection methods—including the difficulty of collecting data on the impact of adopting new technologies, a lack of financial resources, a lack of expertise regarding evaluation techniques, and a lack of understanding about how locally collected data could be used to document success and improve future activities.

In light of these problems, ARC should provide applicants and grant recipients with written materials that describe suitable evaluation practices. Such materials could be designed to help guide projects through their own evaluations by highlighting data collection and analysis methodologies, identifying typical pitfalls in evaluation, and describing good reporting practices. Simply assuring grantees that they are taking appropriate steps is also likely to be helpful. Westat has developed many such materials, and others are readily available. These could be adapted for use by ARC telecommunications projects and posted on the ARC web site.

In addition to offering training to Local Development Districts and state-level program managers, ARC might also offer evaluation workshops to applicants, grant recipients, and evaluators. These workshops might cover such topics as selecting evaluators, budgeting for project evaluations, devising meaningful study questions, determining appropriate methodologies for assessing whether a particular objective has been achieved, working with external evaluators—e.g., to assure that methodologies are properly selected and applied, assuring that evaluations are conducted in a cost-effective and reliable manner, displaying data in a meaningful and useful manner, interpreting and using data, and preparing effective evaluation reports.

ISSUES TO ADDRESS WITH ARC TELECOMMUNICATIONS PROJECTS

The previous section outlined a series of steps that the ARC could take to reinforce the framework within which its telecommunications projects are selected and managed. This section addresses some of the significant barriers that hindered the implementation and impact of some case study sites. ARC might use the framework described in the previous section to help future telecommunications projects anticipate and, if possible, avoid these barriers.

Assessing end user needs. Our review of case study findings suggests that the most successful projects generally sought input from their stakeholders and end users from the very beginning, and involved them in every phase of the project. Half of the projects that we visited took steps to assess the needs of their prospective end users before finalizing their telecommunications approach. Some of these sites used surveys or focus groups to assess end users' equipment and training needs; others included representatives from various end user groups on their board of directors. One site went so far as to conduct extensive on-site needs assessments with each of its 24 partners. As a

result of these visits, the project decided to alter its original strategy (i.e., providing the same equipment to all partners to maximize compatibility and minimize costs) in favor of purchasing computers and other equipment that matched end users needs and capabilities.

Conversely, the least successful tele-communications projects were those that unwittingly forced a vision or approach on their end users—a strategy that increased the potential for differing expectations and conflicting goals. A number of the projects that we visited appeared to have selected a technology solution before assessing whether a significant number of end users were indeed interested in using it. In addition, several of the projects that did survey prospective end users failed to do so in a manner that encouraged extensive discussions of how (or even whether) the equipment would likely be used. For example, a few projects used their surveys to ask end users whether they would use a given technology if it were made available to them—as opposed to identifying ends users' informational needs and then searching for appropriate ways of addressing those needs. In some instances, this "build it and they will come" (or "buy it and they will use it") strategy appears to have contributed to an underutilization of videoconferencing equipment and other project resources. A more thorough needs assessment by these sites might have promoted a better understanding of the long-term training that would be required to assure that end users make full use of project-related technology.

ARC has traditionally funded a range of strategic telecommunications planning activities. In addition to these formal efforts, we recommend that the Commission encourage that all of its technology projects invest the time and energy required to determine whether end users need (or will use) a particular approach (and, if so, under what conditions). In most cases, this inquiry can be accomplished through early discussions with prospective end users and other community stakeholders about (1) the scope of the problem, (2) the range of desired outcomes—for both end users and the overall community, (3) the full range of acceptable strategies that might be used to bring about these desired outcomes, (4) the likelihood that end users will make use of new technology, and (5) the type of training that will be needed to maximize end users' knowledge of how to integrate telecommunications technology into their work, school, or home environments. While such an assessment will not assure project success, it will likely help some grant recipients develop a framework for documenting and addressing the technology needs of their end users.

Assessing project feasibility. We did not systematically document the extent to which projects conducted formal (or informal) feasibility studies. However, a number of the case study sites admitted that they would have benefited from a more thorough assessment of the feasibility of their proposed approach. These sites were often surprised by the amount of time required to develop the necessary infrastructure and purchase equipment. This failure to gain information that could help them realistically plan their approach often resulted in significant delays, unforeseen expenses, and requests to ARC for extensions.[20]

We therefore recommend that ARC intensify its efforts to assure that telecommunications projects assess the feasibility of their proposed approach—either before submitting an application to ARC or as part of their initial planning process. This assessment could be used to identify technical barriers (e.g., poor quality of the existing telecommunications infrastructure), organizational barriers (e.g., lack of strong commitment among some influential stakeholders), and management issues (e.g., need to hire technical staff with the requisite skills) that should be addressed before the implementation phase. It could also be used to delineate the range of technical skills that will be needed to fully implement the proposed approach—and the strategy that will be used to assure that these

[20]It should be noted that our evaluations of other federal telecommunications initiatives have uncovered similar problems associated with the lack of a needs assessment or feasibility study.

skills are accessible throughout the duration of the project.

It may not be necessary for all telecommunications projects to conduct a comprehensive feasibility study. Smaller projects may only need to hold ongoing meetings with their partners to identify likely hurdles before they arise. (In such cases, ARC project coordinators could also engage grant recipients in a conversation about project feasibility during the review process or soon after grants are awarded. The purpose would be to help new projects identify a range of issues they may need to consider before finalizing their approach.) However, the experiences of other federal telecommunications programs suggest that complex technology initiatives—especially those in rural communities with limited access to the information infrastructure—can benefit from a feasibility report that identifies potential barriers and lays out nuts-and-bolts issues that need to be addressed. Once developed, this report can provide stakeholders with a detailed roadmap of how they will progress from their present status to where they would like to be. To promote such front-end planning, the Commission might consider developing criteria (e.g., project complexity, limited access to the information infrastructure) for identifying telecommunica-tions projects that would be eligible to receive financial support to assess the feasibility of their proposed approach.

Staff turnover. The very nature of technology projects requires that end users have quick and dependable access to technical staff who can provide ongoing training, maintain the equipment, resolve problems, and identify new and useful products. However, study findings suggest that rural telecommunications projects are especially vulnerable to losing their technical staff to organizations that can offer higher wages, benefits, and career/educational advancement opportunities. This staff turnover can harm a project in many ways. At a minimum, it can delay a project's progress. If the problem persists, however, the loss of key staff can cripple a project's ability to keep pace with technological advances and end users' demands. It is therefore important that projects remain aware of the potential for staff turnover and devise creative methods for overcoming the high cost of maintaining computer specialists. While it may not be possible for rural projects to avoid such problems, they can be encouraged to use their applications to describe their plans for hiring and maintaining knowledgeable staff with the requisite technical expertise. If this issue is not adequately addressed in the proposal, ARC project coordinators might ask projects about their staffing plans during the review process.

Staff expertise. Some of the projects we visited were able to assemble an impressive array of technical experts who helped guide strategic decisions. For example, one grant recipient contracted a telecommunications consulting firm, establishing a fruitful and continuing relationship that has lasted for over 5 years. Another grant recipient that lacked the requisite technical expertise relied on a high school student to assess end users' computer needs. Projects also used college faculty and students to augment their technical assistance capabilities.

However, several other projects indicated that they lacked access to knowledgeable technology staff. In a few cases, projects did not appear to realize that they lacked access to useful technology expertise until it was too late. For example, one project made decisions regarding equipment purchases that turned out to be naïve or impractical. Representatives of this project indicated that they were too reliant on advice offered by vendors—and would have made more informed decisions if they had access to staff with the requisite technology knowledge.

One option would be for ARC to encourage grant recipients that lack the requisite expertise to include funding in their proposals for outside technology consultants. These consultants could then help grant recipients navigate the range of technological issues that are commonly addressed by telecommunications projects. Given the problems experienced by case study sites that

relied on technology vendors, we would further recommend that grant recipients be warned against relying on consultants who are tied to a specific product or technological approach.
When such consultants are not available in the immediate community, ARC might suggest other resources (e.g., nearby colleges and universities) that projects can gain access to for help in dealing with specific issues. Another option would be for ARC to develop guidelines that delineate the range of staff skills that are commonly associated with successful technology projects. These specifications might help to prepare projects for the range of issues they will need to address as they consider the feasibility of their proposed approach.

Training for end users. *Information Age Appalachia* highlights the need for activities designed to assure that Appalachian residents have the skills required to make effective use of new and emerging technologies:

> In addition to access, the people of Appalachia must have the appropriate knowledge to use technology in ways to enhance their children's education and improve their own job skills. This will require upgrading the skills of teachers, creating training opportunities for local leaders including the LDD, IDA, SBDC staffs, and other interested parties such as Chambers of Commerce.

However, the study uncovered evidence that without appropriate training, end users may lack the requisite skills to fully utilize their new tools. Project staff and end users in the case study sites provided numerous recommendations as to how ARC's telecommunications initiatives can enhance their training component, including:

- Solicit input from end users as to the content and format of training;
- Anticipate the need to provide some end users with training in such basic computer skills as keyboard functions;
- Develop training exercises that demonstrate how the technology fits into the workplace and embed training in the actual duties staff will be performing—e.g., train staff not only in the use of Excel, but also in the use of spreadsheets to perform a common and necessary administrative function.
- Provide trainees with written materials that they can share with others and/or refer back to at a later date.
- Tailor training to the skills and needs of specific categories of end users.
- Provide follow-up training to end users.

These last two recommendations merit additional consideration. With respect to tailoring instruction, research suggests that technology training is most effective when it is designed to address end users' skills and needs. Several of the case study sites developed separate training sessions for different participant types. For example, one site prepared additional training to help physicians access credible medical information and navigate computer-based health applications. Another project asked teachers to bring in course materials so that training could be tailored to reflect their lesson plans. However, end users at other case study sites indicated that they had attended "opportunistic" training sessions that were designed to instruct a mix of individuals simply because it was convenient for them to meet at a given time. Because participants often had differing job functions and technology proficiencies, the resulting training was often too broad to be of any lasting value. Projects might therefore be encouraged to host training sessions that target workers who perform similar duties and/or possess comparable technology skills. While this might require additional time and resources (e.g., additional sessions to accommodate different end user types), it would enable projects to customize their lessons and instructional materials to the skill levels and needs of a common core of end users.

With respect to follow-up assistance, the training received by the majority of the end users we interviewed tended to focus on the basic skills required to operate computers or a specific software program. While some end users were offered group or one-on-one follow-up assistance, others complained that instructional support was terminated at the end of the ARC grant. As a result, some end users indicated that they had not received the follow-up support that was needed to help them integrate new software into their daily work routine. It appears that the lack of follow-up training can be attributed to two factors:

- Some grant recipients indicated that their projects were primarily designed to provide end users with new equipment and basic information about how to operate a range of software programs. As such, they did not take steps to optimize the ability of their end users to integrate new equipment and software into their workplace. Nor did they attempt to help end users obtain access to follow-up training. We therefore recommend that the Commission encourage projects to offer follow-up assistance to end users who are interested in extending their technology knowledge beyond the rudimentary skills that are often emphasized during such introductory training.

- Other grant recipients lacked the financial or staff resources to provide follow-up training and assistance beyond the period of the ARC grant. To overcome this barrier, ARC might consider the feasibility and potential benefits of funding regional technology training initiatives that are designed to help citizens in adjoining communities maximize their utilization of new and emerging technologies. The ARC is currently offering community workshops on demand aggregation—a technique for identifying and accumulating existing and potential demand for telecommunications in an area. While this technique is generally used to create enough volume to entice private-sector investment in facilities, it might also be used to harness a critical mass of demand for technology training.

In providing follow-up, projects should be mindful that individuals who are using computers for the first time may not be able to articulate how they want to use these new tools. In such cases, it might be helpful to offer one-on-one follow-up that is tailored to the skills and functional needs of individual end users.

Project sustainability. According to *Information Age Appalachia*, "The Commission desires to promote projects that will have the capability of remaining in operation without continuing infusions of grant monies." This statement suggests that ARC is looking to fund projects that will take steps to assure that their end users continue to have access to—and make optimal use of—state-of-the art technology beyond the period of the ARC grant.

In light of this goal, it is worth noting that some survey respondents considered their projects to be operational (i.e., end users were still making use of project resources)—even though site visits revealed that project-related activities had ceased and there had been no sustained effort to provide end users with ongoing training or technical support. In essence, these respondents were indicating that while the impact of their efforts had endured, the actual activities associated with the projects (e.g., training and technical assistance) had ended—even though some end users at these sites indicated a need for additional assistance.

We therefore recommend that ARC use its application process to promote a more operative definition of project sustainability for its telecommunications projects. For example, applicants might be directed to describe their plans for sustaining the training and technical assistance components of their projects beyond the ARC grant. ARC project coordinators might then use the review process to assess whether projects have adequately considered the range of strategies that might be used to maintain the

functional elements of their proposed approach. This would reinforce the need for projects to develop realistic strategies for addressing the long-term technical assistance and training needs of end users. (This is especially important in rural communities where end users might otherwise lack the skills and resources to maintain and fix their computer equipment after the ARC grant has ended.) It would also maximize the likelihood that projects put in place a plan for assuring that end users continue to have access to new and emerging technologies over time.

Appendix A

Summary of Case Study Findings

Appendix A

Summary of Case Study Findings

Although surveys can be used to obtain basic information about the extent to which projects were implemented, site visits generally allow for a more indepth understanding how and why projects evolved over time. For example, it is unlikely that a survey would reveal that a project's success occurred as a result of a combination of factors—e.g., aggressive promotion of services, targeted training, community buy-in, and strong technical expertise. Nor would a survey allow for a comprehensive understanding of the external factors—such as the economic and political characteristics of the participating communities—that contributed to the success or failure of a given project.

The site visits were therefore designed to allow for a more detailed examination of successful ARC-funded telecommunications projects—with an emphasis on gaining a deeper understanding of how the projects were implemented, outcomes that occurred as a result of ARC funding, and the range of lessons learned by project staff. Information obtained through the 16 site visits was summarized in a series of structured case study notes. In addition, specific findings are used in this appendix and throughout the final report to illuminate issues of interest to ARC and other stakeholders.

This appendix summarizes findings and lessons learned from the site visits. It also provides an overview of the methodology used to select the site visit sample and a description of the 16 case study sites.

Case Study Methodology

The case studies were designed to collect indepth information from a range of ARC telecommunications projects that might be of interest to future grant recipients. One of our principal criteria for selecting these sites was the use of a compelling or innovative strategy to solving a problem commonly faced by rural communities. We therefore attempted to select projects that appeared to have undertaken an approach that went beyond simply providing access to businesses and residents. In addition, we looked for projects that were either addressing interesting problems or had developed content that would be useful in other communities and might warrant replication.

Because the case study sites were selected after the telephone survey of all 70 sites had been conducted, we were able to use information from both the ARC database and the telephone survey to identify potential projects for the case studies. As a first cut, the following criteria were used to narrow the pool of projects considered for the site visits:

- Projects had to indicate that they were still be in operation (full, partial, or changed) at the time of the telephone survey (February 2002). Five projects failed to meet this criterion.

- Projects had to have received a substantial portion of funding from ARC. Twenty-eight projects were excluded from consideration for the site visits because (1) they received $15,000 or less in ARC funding, and/or (2) less than 40 percent of their total project cost came from ARC funding.

- Projects had to indicate on the telephone survey that they would *not* have been fully implemented without the ARC grant. Two projects failed to meet this criterion.

Survey data for the 42 (of 70) projects that met these criteria were then used to further narrow the pool of site visit candidates. Specifically, an effort was made to:

- Select projects with multiple ARC-funded activities;
- Exclude projects that were identified as problematic by the Westat interviewers who conducted the telephone survey (e.g., because the original project director was no longer available);
- Select projects that were implementing an innovative approach that other sites might replicate or adapt;
- Exclude projects that appeared to be relying on conventional approaches—e.g., establishing Internet access sites in public libraries;
- Select projects with multiple goals;
- Select projects that appeared to have expanded—e.g., reported on the telephone survey that they were serving more participants than originally envisioned, or providing a service not delineated in the original ARC proposal; and
- Exclude projects that were especially unsuccessful—e.g., those that achieved all goals less than expected, proposed activities that were never implemented, encountered many obstacles/barriers, were reduced in scope, and/or cited many factors responsible for the project being reduced in scope.

Finally, information from the telephone survey and ARC database were used to select case study sites were at least somewhat reflective of the overall study sample. Specifically, an attempt was made to:

- Select projects in those states that had received the greatest proportion of ARC telecommunications funding;
- Distribute projects across type of grant recipient organization and sectors served; and
- Distribute projects across project types (e.g., distance learning, telecommunications acquisition and training, planning, e-commerce, etc.).

As shown in exhibit A-1 (at the end of this appendix), 7 of the 16 case study sites were primarily designed to enhance residents' access to information infrastructure, while 5 were designed to promote education, training, and workforce development. Almost half (7) of the 16 case study grant recipients were educational organizations, while 4 were government agencies. In addition, half (8) of the case study sites were designed to provide services in multiple counties, while 3 were designed to provide services in a single county.

Once the case study sample had been selected, site visitors spent 2 days at each of the 16 sites. During these visits, site visitors met with the project director, other key staff, project partners, and a sample of end users. In many sites, we also had an opportunity to observe a demonstration of how new technologies were being used by workers and community residents. The resulting case study notes were used to address the following types of issues:

- What specific problems were the projects designed to address?
- What technical approaches did the projects use to ameliorate these problems?
- What steps were taken to involve stakeholders and end users in the planning and implementation of the projects? To inform end users about the project-related activities?
- What steps were taken to provide end users with training and technical assistance?
- What impact did the projects have on the way in which services were delivered or accessed? On the overall community?

Exhibit A-1: Characteristics of case study sites

Project name	Characteristics				
	Grant recipient type[1]	Geographic distribution[1]	Current project status[1]	Total ARC funding amount[2]	Total matching funds[2]
Access to Information Infrastructure					
Big Sandy Telecommunications Center (Pikeville, KY)	Community or social services organization	A single county	In operation, same function	$553,530	$551,576
Golden Triangle Telecommunications Network System (Starkville, MS)	Government organization	2 or more but not all ARC counties in state	In operation, same function	$254,173	$63,543
Medical and Government Internet Coalition Network (MAGICnet) (Athens, OH)	Educational organization	Other	In operation, same function	$77,167	$149,168
SEDA-COG Info-Structure Technology Assistance Center (Lewisburg, PA)	Government organization	2 or more but not all ARC counties in state	In operation, expanded function	$200,000	$200,000
Southern Tier Central Telecommunications Initiative (Painted Post, NY)	Government organization	2 or more but not all ARC counties in state	In operation, expanded function	$97,219	$31,847
Sunday Creek Associates/ARC Managing Information with Rural America (Shawnee, OH)	Community or social services organization	2 or more but not all ARC counties in state	In operation, expanded function	$100,000	$120,000
Tompkins County Collaborative Communications (Ithaca, NY)	Other organization type	A single county	In operation, expanded function	$95,000	$95,053
Education, Training, and Workforce Development					
Alleghany High School Cyber Campus (Sparta, NC)	Educational organization	2 or more but not all ARC counties in state	In operation, expanded function	$100,000	$112,168
Grant Career Center Conference/Computer Center (Bethel, OH)	Educational organization	2 or more but not all ARC counties in state	In operation, same function	$146,015	$208,955
Jackson County Distance Learning (Scottsboro, AL)	Educational organization	A single county	In operation, expanded function	$399,000	$249,600
Jefferson Community College Computer Labs (Steubenville, OH)	Educational organization	2 or more but not all ARC counties in state	In operation, expanded function	$198,300	$198,300
RESA Regional Telecommunication Special Initiative (Cumberland, MD)	Educational organization	All ARC counties within a single state	In operation, expanded function	$445,917	$114,183
E-Commerce Readiness/Tech Sector Employment					
Advantage Valley (Huntington, WV)	Educational organization	Other	In operation, expanded function	$209,000	$592,049
SC-Upstate-Info (SCUI) (Greenville, SC)	Government organization	All ARC counties within a single state	In operation, expanded function	$420,000	$180,000
PA SourceNet (Lewisburg, PA)	Other organization type	All ARC counties within a single state	In operation, expanded function	$1,293,000	$1,272,000
Technology 2020 (Oak Ridge, TN)	Other organization type	2 or more but not all ARC counties in state	In operation, expanded function	$203,000	$204,000

[1]Westat telephone survey of ARC telecommunications projects.

[2]ARC database.

- What problems did projects encounter—and what steps did projects take to overcome these obstacles?

- What approaches did projects use—or propose to use—to sustain themselves beyond the ARC grant period?

- What lessons did projects learn that could be passed on to other ARC projects?

SUMMARY OF SITE VISIT FINDINGS

The site visits provided the study team an opportunity to more thoroughly assess the implementation and impact of 16 ARC telecommunications projects. They also enabled us to document the environment in which these efforts occurred and the obstacles that had to be overcome. While these projects implemented different approaches—and had to navigate a unique combination of circumstances—we were able to draw some common insights across these 16 sites. This section aims to illustrate, by way of the case studies, the range of practices and problems that characterized the telecommunications projects that we visited.

Project Context

Some of the projects were located in economically distressed regions of Appalachia, while others were in more economically progressive areas, or in areas with both distressed and nondistressed counties. The relative lack of resources available in poorer areas served as an additional challenge to telecommunications projects, since they often had to rely on community support for their maintenance and continued operation. For instance, many of the case study projects had to exert considerable effort to locate and secure ongoing funding, much of which came from local sources.

Most of the case study sites were in rural areas, where physical isolation continues to hinder access to infrastructure. The lack of established infrastructure (e.g., inadequate broadband, dearth of Internet service providers) was an obstacle that detracted several projects from their initial mission. Projects located in rural areas were therefore faced with challenges particular to their environment. However, it should be noted that for some communities, this geographical isolation was actually the impetus for devising a technology-based solution. As such, several of the rural projects we visited made use of telecommunications technology to overcome their isolation by way of videoconferencing, e-commerce, and expanding community access to the Internet. It is not surprising that so many rural projects indicated that telecommunications technologies were viewed as a shining hope with the potential to revolutionize and revitalize physically isolated communities.

Many of the case study sites appeared ready to embrace telecommunications technology, at least in spirit. As a result, projects were generally able to establish partnerships with community organizations based on its promise. This ability to generate networks within communities is a testament to the ability of telecommunications projects to facilitate new communication between businesses, educators, and offices of governance and social service. However, some technology applications were at least initially hindered by well-established attitudes and habits, and resistance to change was not uncommon in the 16 communities we visited. For example, many individuals were apprehensive about working with, teaching, learning about, or using the new tools of telecommunications technology. Such resistance was often overcome by a display of the utility and value of the technologies that ARC supported.

Project Implementation

The case study projects were diverse in their design and intent, but shared certain features. First, most aimed to make available and/or employ telecommunications infrastructure and applied technologies in order to make communication and the transfer of information more efficient for the purposes of business, education, social service (e.g., health), and/or governance. Sixteen of the 70 projects in the study sample were selected for intensive visits. The case study sites conducted a wide range of telecommunications-related activities, including the purchase and installation or upgrade of

equipment and facilities; networking organizations and offices, technical assistance and consulting, web site design, and marketing.

Project equipment (much of which was purchased with ARC funds) included computers, monitors, scanners, printers, V-Tel technology, videoconferencing equipment, audio equipment, cameras, microphones, T1 and 64 K lines, projectors, servers, and software. For many project staff members, exposure to the task of selecting, purchasing, and managing the installation, use, and maintenance of equipment was a profound introduction and education to the world of telecommunications technology.

In addition to increasing telecommunications infrastructure and access, most of the projects emphasized training individuals to make effective use of these technologies. Training activities varied in substance, scope, and level (e.g., introductory versus more advanced). In a few cases, efforts were made to reinforce the knowledge acquired in training (e.g., by offering follow-up training, integrating knowledge into real-world contexts, or providing written materials for later reference). However, case study findings suggest that in a number of sites, knowledge acquired through such training was not reinforced—and the utilization of any knowledge gained through the training was therefore limited.

The 16 projects undertook a variety of efforts to involve and engage their various stakeholders. Sites often noted that stakeholders' involvement was important for gaining project buy-in within the community, as well as for gathering feedback on project development and design. Projects generally identified three primary strategies for involving stakeholders: establishing (or taking advantage of existing) advisory boards, holding regular project meetings, and conducting formal or informal needs assessments among prospective end users. Findings from the site visits suggest that stakeholder and end user buy-in was generally a critical component of successful technology projects. Among the projects we visited, the most successful appeared to have involved community stakeholders in their design and development phases. This inclusive approach contributed to technology initiatives that met the needs of (and were therefore used by) their intended beneficiaries. Conversely, projects that failed to involve stakeholders and end users often found themselves struggling to gain community support for their overall approach.

Project Impact

Case study findings suggest that increased access to telecommunications technologies resulted in a wide range of tangible and intangible impacts. These include the creation of new partnerships in communities, the pooling of resources, questioning of outdated ways of doing things, and speculation about potential innovative approaches for improving conditions in a variety of public and private settings. Respondents in most sites made clear that project staff, beneficiaries, and community members were exposed to technologies that served as a catalyst for provoking consideration of how existing practices might be advanced. It is this new paradigm of shared knowledge and awareness that may ultimately help propel communities in Appalachia toward a lifting of the digital divide.

ARC telecommunications grants serve not only the purpose of educating communities, but also help to prove to skeptics the utility and importance of improved telecommunications technologies. In many of the case studies, it was found that projects were able to dispel doubt and make believers of key decision-makers, paving the way for future funding and further partnerships. Also, many of these case studies would not have gotten off of the ground were it not for an ARC grant. In this sense, many ARC grants serve as a springboard for future funding and expansion.

It is also important to note that in many cases, the ARC grant period was primarily used to lay the foundation for longer term telecommunications advances. As such, the benefits that sites reported might not take into account other substantive gains that will accrue over time. Nonetheless, qualitative findings from the case study sites highlight several ways in which projects

improved the quality of life in participating communities. First, the projects imported equipment and infrastructure into communities that had been adversely affected by the digital divide. This infusion of new telecommunications technology improved the flow of information within and across businesses, educational institutions, and governing offices. It also benefited individuals and organizations in many specific ways, such as making classes available through distance learning, promoting education through access to the Internet and specialized software, supporting workforce training, and increasing productivity in the workplace.

Measurement of Project Performance

While case study findings suggest that ARC's telecommunications projects were generally successful, evidence of the resulting community benefits were not readily available by way of the Commission's system for monitoring and documenting project performance. This may have been due in part to ARC's place on the performance measurement implementation curve – many of ARC's telecommunications projects began before 1998, the year in which GPRA began to exert its influence on ARC's application and reporting requirements.

Our review of telecommunications proposals and final reports suggest that the measurement system was lacking in three important ways. First, many of the statements regarding anticipated accomplishments (in both the proposals and the ARC memorandum) were actually outputs—i.e., statements involving process and activities—as opposed to outcomes. While outputs are an important aspect of project performance measurement, outcomes more directly reflect project impact and achievement. Second, while most of the proposals we reviewed contained at least one outcome statement, too often these were vague, not easily measurable, and not associated with a numeric benchmark. Third, most of the projects we visited did not invest adequate time or effort documenting the benefits associated with their efforts.

Implementation Barriers

The sites we visited, while largely successful, encountered and addressed a number of challenging obstacles. Some of these problems were experienced by a majority of projects (e.g., delays due to worse-than-anticipated technology infrastructures); others were unique to a given approach or locality. Understanding the dynamics of these problems is instructive, since they offer insights into the range of issues that future telecommunications projects can expect to encounter. The following provides summary information about the most prominent barriers encountered by the 16 case study sites:

- **Lack of technology infrastructure.** A significant barrier for some of the case study sites was the time, cost, and effort required to develop the infrastructures that supported their technological efforts. Many of the projects indicated that their communities' existing physical and telecommunications infrastructures were either nonexistent or incompatible. These problems, which were sometimes discovered *after* a project had been initiated, commonly resulted in excessive fees and extensive delays. Some projects were forced to delay operations until the requisite information infrastructure had been put in place.

- **Keeping pace with evolving technologies.** Some case study projects reported that concerns about unanticipated technological advances (and the ensuing obsolescence of ARC-purchased computers) made it difficult to develop long-term budgets for telecommunications equipment.

- **Keeping pace with end users' evolving needs.** One project director indicated that several of the partner agencies participating in his ARC project had severely underestimated the number of staff who would use computers and require Internet access. In addition, as the project evolved, end users were making more advanced use of the Internet (e.g., using computers to share mug shots with the region's police departments—which require

greater bandwidth capacity to facilitate downloading) than had originally been envisioned at the outset of the project.

- **Underutilization of project technology.** Some case study sites reported that the technologies they made available were not fully utilized by end users. This problem was especially prevalent among projects that purchased videoconferencing equipment. Several factors contributed to the underutilization of this equipment—e.g., a failure to more fully assess end users' interest in making frequent use of videoconferencing equipment, improved availability over time to videoconferencing equipment, a lack of promotion to inform potential beneficiaries of videoconferencing capabilities.

- **Underestimating the time required to implement project activities.** Almost all of the case study projects indicated that they underestimated the amount of time implementation tasks would require, particularly with regard to technology. Projects that involved the installation of equipment were especially vulnerable to delays in their proposed schedule. This is because such projects were often required to rely on external entities to provide equipment or carry out other technical functions.

- **Staff turnover.** Another common problem faced by case study projects was a change in or loss of key personnel. In some cases, staff members with strong technical skills were lured away by organizations that offered higher paying positions. As a result, some sites had insufficient technical expertise when faced with the need to resolve unexpected problems such as equipment failure or repair.

- **Lack of technical expertise among project staff.** In addition to encountering difficulties in retaining knowledgeable and skilled staff, several projects found it difficult to recruit staff with the range of skills needed to lead or implement their efforts. For example, several projects reported that after they had purchased equipment, they lacked reliable access to staff capable of resolving unexpected problems such as equipment failure or repair.

- **Problems with equipment vendors.** The most prominent communication problems uncovered during the site visits involved interactions with external service providers and venders. In some cases, these problems arose because project staff lacked the experience and expertise to anticipate the types of technical issues they were called upon to navigate as they purchased telecommunications equipment.

- **Lack of a comprehensive training agenda.** The case studies uncovered evidence that several of the projects failed to set aside sufficient time and resources for training. In cases where instructional support was terminated at the end of the ARC grant, end users expressed concern that although they had learned some important introductory skills, they had not learned how to fully integrate those skills into their daily work routine.

- **Lack of a comprehensive marketing strategy.** A few of the case study sites did not anticipate the amount of marketing that would be needed to ensure that potential end users would be informed of project-related activities or services. For example, one project opened a series of computer labs with little or no fanfare. In hindsight, the staff indicated that they should have campaigned more vigorously to promote the labs prior to and immediately following their opening.

BEST PRACTICES OF TELECOMMUNICATIONS PROJECTS

During each of the site visits, we asked respondents to summarize the lessons that they had learned as a result of their efforts to implement their technology projects. In asking this question, we tried to get respondents to share any practical advice they would proffer to other grant recipients looking to develop a similar

approach. What follows, therefore, is our effort to identify some broader practices that future grant recipients—regardless of their location, project type, or application area—can use to overcome common barriers and develop sustainable telecommunications solutions.

Conduct a Thorough Needs Assessment and Feasibility Study. Just as a lack of planning often resulted in a range of problems, attention to planning often resulted in projects that remained focused on addressing a tangible goal. Several case study respondents indicated that their front-end assessments of end users' needs resulted in the development of project activities that were appropriately utilized by the intended range of end users. These assessments also served to systematically expose community members and potential stakeholders/partners to a project's proposed aims and activities, thereby increasing community involvement and support. The use of a needs assessment also helped some projects avoid purchasing equipment simply because funds were available or because "everyone else already had it."

Case study respondents also recommended that future projects formally assess their infrastructure and staff expertise before purchasing and installing equipment. For example, projects recommended that feasibility studies be used to:

- Evaluate the existing infrastructure and identify any changes that should be made to facilities (in advance of a purchase) to accommodate new equipment;
- Consider how long projects expect their equipment to last (or stay current);
- Anticipate equipment obsolescence when developing long-term telecommunications budgets;
- Assess whether existing staff (or those appointed by them) possess the technical expertise required to install and operate the equipment; and
- Review potential vendors' history and references to see if any have a history of problems, e.g., delays acquiring equipment.

Provide End Users with Targeted and Ongoing Training. Enhancing access to telecommunications applications is an important project goal. However, end users must possess the requisite knowledge if they are to take full and appropriate advantage of these new technologies. As such, projects emphasized the importance of providing individuals with adequate access to training in how to operate new hardware and software. However, while most projects provided training as part of their activities, few did so as extensively as needed. In hindsight, several respondents indicated that their training would have been more effective if sessions had been tailored to the characteristics, skills, and needs of specific end users. Further, they recommended that future projects reinforce their technology training by (1) integrating learning into real-life contexts (e.g., in the workplace), (2) making written materials available, and (3) pointing out or facilitating future training possibilities. Several of the end users we interviewed indicated that single training sessions were ineffective. As such, they recommended that whenever possible, follow-up training should be offered on more advanced topics.

Promote Utilization of Technology Services among the Range of Intended End Users. Successful telecommunications projects are able to make their services visible and attractive to as many potential end users as possible. Even the best designed and well-implemented project will fall short if services are underutilized because of a lack of promotion. While the marketing approach employed depends on the nature and scope of the specific project, successful ARC telecommunications projects tended to make use of multiple concurrent forums to promote their services—including web sites, newspapers and magazines, local television stations or cable access stations, radio, newsletters, flyers, direct calls, demonstrations, and billboards.

Build and Maintain Buy-In of Community Members and Partners. Generating community buy-in is critical for project success, especially in poorer communities with limited resources. The case studies gave evidence for the importance of such support, where organizations within communities provided projects with various donations (e.g., computers, network connections, servers, software) or other services (i.e., training, staff support).

In addition, many of the successful case study projects were able to establish strong partnerships within their communities. Such partnerships allowed for increased and coordinated negotiating and purchasing power. They also opened new opportunities for growth in business and education, increased cooperation and collaboration among providers and beneficiaries, and facilitated the dissemination of knowledge about the potential of telecommunications technologies.

Be Ready to Adapt to Changing Circumstances and Seize Opportunities. The most effective telecommunications projects are those that are able to locate and coordinate the best of available resources, those that are flexible and can adapt to changing circumstances, and those that seize new opportunities in a timely way. Locating the necessary resources was often a function of solid project promotion, avid networking with stakeholders and community members, and knowledge of new and emerging technologies. Given the unpredictable and novel nature of telecommunications technology, projects indicated that they also had to be ready to alter their course, modify goals, overcome technical obstacles, and work with a constant learning curve. Such nimbleness was essential, since time was often a critical factor in conducting project activities.

Projects also sustained themselves by seizing opportunities for expansion, new partnerships, and further funding. Respondents indicated that they had to be continuously alert to possibilities for development and change. In the spirit of ongoing, rapid technological change, successful telecommunications projects were often those that risked innovation and reached out beyond established and tested practices.

PA SourceNet

Project Location:	Lewisburg, Pennsylvania
Grant Recipient:	Susquehanna Economic Development Association-Council of Governments (SEDA-COG)
ARC Number:	PA 11568
Project Type:	E-Commerce Readiness/Technology Sector Job Creation
Total ARC Funding:	$1,293,000
Total Matching Funds:	$1,272,000
Date of Site Visit:	May 7, 2002
Site Visitor:	Glenn Nyre and John Wells

The PA SourceNet project was designed to assist Pennsylvania businesses (especially those in the Susquehanna area of central Pennsylvania) in marketing their products on a state, national, and international basis. It involved the upgrade of the Manufacturing Marketing Network (M-Net), a database network, into an Internet software-based program, which was renamed PA SourceNet. M-Net had been assisting businesses in locating in-state customers for their products and finding reliable leads for marketing products both within and outside the state.

PA SourceNet allows anyone to search for Pennsylvania businesses using a variety of methods and allows companies to search for potential suppliers, distributors, and customers. Pennsylvania companies register with PA SourceNet over the Internet, provide general information about themselves, and then list what they sell and what they buy, thereby creating links between companies in the state and other companies both within the state and beyond. ARC funds were used to pay for the staff, equipment, and software licenses needed to develop and maintain the PA SourceNet site, and to provide training to staff, who helped the user businesses learn how to navigate the Internet and establish web pages.

Indications are that PA SourceNet has assisted Pennsylvania businesses in marketing their products. While project staff are no longer able to track successful sales transactions, the site is highly utilized by both Pennsylvania businesses and potential customers/suppliers, maintaining a significant number of unique users each month.

PA SourceNet has served as a model for other communities and regions seeking to develop their local economies. It is an engine that can be used to drive specific industries or as a general business assistance model. The project also has been successfully replicated within specific industries in Pennsylvania and at the state level.

Info-Structure Technology Assistance Center (ITAC)

Project Location:	Lewisburg, Pennsylvania
Grant Recipient:	Susquehanna Economic Development Association-Council of Governments (SEDA-COG)
ARC Number:	PA 12737
Project Type:	Access to Infrastructure
Total ARC Funding:	$200,000
Total Matching Funds:	$200,000
Date of Site Visit:	May 8, 2002
Site Visitor:	Glenn Nyre and John Wells

ITAC sought to increase the impact of local county tax dollar investments in information management technologies. County and local governments in the central Pennsylvania region have lagged behind many other areas with respect to access to telecommunications and the Internet, and therefore have not been able to benefit from the availability and use of these technologies. ITAC took significant steps to strengthen the region's information structure by developing and maintaining regional coordination of technology and bringing to the forefront a focus on integrated community networks. The project replaced existing manual or obsolete automated systems with the latest technology systems in order to assure self-sufficient, rapid integrated access to data essential for daily government operations.

The project provided basic and advanced telecommunications services, including access to e-mail, the Internet, word processing, and database services, which previously had either not been available or had been available only on a very limited basis. The purpose of providing these capabilities was to allow government personnel to perform their duties in a more effective and efficient manner, and to coordinate communications between various government entities, such as police and fire departments and the courts, or between government agencies and the residents they serve.

The ITAC project has made government operations and other public functions in the region it serves more technology-based and, as a result, more cost-efficient. For example, it helped streamline the process of property reassessment in Perry County by implementing an automated system for assessing property values, receiving resident feedback, and demonstrating how the new values were devised.

ITAC also provided Internet access to public employees in several localities in a more cost-efficient manner or, in some cases, for the first time ever. The project was also the impetus for SusquaNet, which connected 25 school districts in four of the counties being served. Finally, ITAC also introduced the concept of videoconferencing to several localities, which has been utilized to the largest extent by the courts and has greatly reduced administrative costs.

Jackson County Distance Learning

Project Location:	Scottsboro, Alabama
Grant Recipient:	21st Century Council – IMPACT Learning Center
ARC Number:	AL 13086
Project Type:	Education, Training, and Workforce Development
Total ARC Funding:	$399,000
Total Matching Funds:	$249,600
Date of Site Visit:	May 21-22, 2002
Site Visitor:	John Wells

The Distance Learning Project engages in a wide range of activities that are aimed at several different sectors of the city of Scottsboro as well as the surrounding portion of Jackson County. While most of the project's activities are affiliated with the local schools or are otherwise education-based, the project also serves the overall community, in addition to the government, health care, and private sectors.

While the project has installed distance learning equipment in several schools and other locations, the project is centered at the Impact Learning Center, an adult education and community center that offers a wide variety of programs. These are conducted on a daily basis and are designed to help adults gain the desired skills (academic, technical, and interpersonal) needed to be productive members of the workforce. The distance learning equipment that was acquired as a result of the ARC grant is the primary tool for delivering the aforementioned programs and services.

Generally speaking, Scottsboro residents feel somewhat isolated from the world around them. Jackson County is one of the largest counties in Alabama in terms of square miles and has a widely dispersed population. This makes it difficult for residents to communicate with others and for the county and city to deliver many basic services. Scottsboro is also nearly 100 miles away from any major metropolitan area, such as Huntsville or Birmingham, which makes it difficult for residents to gain access to such opportunities as higher education.

The Jackson County Distance Learning project has diminished this sense of isolation. Through the use of distance learning equipment, graduate and undergraduate students can pursue degrees via distance education from major universities, and professional development workshops can be offered to greater numbers of local teachers. Moreover, large numbers of community members can participate in health seminars that originate from the University of Alabama Medical Center or other major hospitals and health care centers, and teachers can introduce new subject areas and curriculum resources to students that are customarily offered to students in areas with greater resources. Finally, government representatives can communicate with their constituents (and vice versa) more easily.

Grant Career Center Conference/Computer Center

Project Location:	Bethel, Ohio
Grant Recipient:	U.S. Grant Joint Vocational School District/Grant Career Center
ARC Number:	OH 12571
Project Type:	Education, Training, and Workforce Development
Total ARC Funding:	$146, 015
Total Matching Funds:	$106,491 (state); $102,464 (local)
Date of Site Visit:	June 27-28, 2002
Site Visitor:	John Wells

This project was designed to help bring about higher rates of employment and educational attainment as well as to provide students increased access to technology and telecommunications equipment that is either in short supply or absent in Clermont County. Since the Grant Career Center is both a vocational high school as well as a learning center for adults, one of its main goals was to provide people with specific job skills that will help them seek immediate employment in the local Clermont County area.

This project consisted of two major activities: the establishment of a video teleconferencing center and the establishment of a computer center, both of which are housed within the Grant Career Center. These facilities were designed to meet the basic needs of those first entering the labor market as well as the continuing education needs so vital to the continuing growth and development of current employees and the companies that employ them.

Since the grant recipient is a vocational high school and adult learning center, the primary goal of this project was to provide students the knowledge and skills necessary to obtain employment and to succeed in such positions. The most important outcome was the high rate of employment among those who have graduated from the program. Over the past several years, the placement rate, or percentage of graduates who secure full-time employment, has been steadily increasing. Between the 1997-98 and 2000-01 school years, between 80 and 100 percent of graduates obtained full-time employment.

Regional Educational Service Agency (RESA) – Regional Telecommunications Special Initiative

Project Location:	Cumberland, Maryland
Grant Recipient:	Regional Educational Service Agency of Appalachian Maryland
ARC Number:	MD 12354
Project Type:	Access to Infrastructure
Total ARC Funding:	$445,917
Total Matching Funds:	$114,183
Date of Site Visit:	June 20-21, 2002
Site Visitor:	John Wells

This project was designed to address the traditional disparities in access to telecommunications technology that occur in rural or underdeveloped areas. Although the project engaged in a wide variety of approaches in dealing with these disparities, much emphasis and significant resources were devoted to higher education institutions, namely, Allegany College and Frostburg State University.

The most recent activity of this project was the establishment and operation of a help desk at Frostburg State University. This help desk was staffed mainly by interns (all of whom are students at Frostburg State), who provide basic computer assistance to students, faculty, and administration. Student interns from Frostburg State also developed web pages for various businesses, organizations, government agencies, and other entities in the western Maryland region.

In earlier stages of the project, ARC funds were used for equipment and technical assistance to be provided to local school systems, government agencies and institutions, and higher education institutions to develop or increase telecommunications capacity. Most of these efforts were carried out in the mid-1990s when Internet access and other technologies were being used primarily in higher income, heavily populated areas of the state and the country. These efforts provided both Frostburg State University and Allegany College with their first Internet capabilities.

This project has greatly increased the presence of computers and telecommunications technology in government and public offices, local institutions of higher learning, as well as elementary and secondary schools in western Maryland. Although the ARC funds did not pay for every computer or every piece of equipment that is currently utilized, they did provide an important building block on which these entities could elaborate and enhance.

Alleghany High School Cyber Campus

Project Location:	Sparta, North Carolina
Grant Recipient:	Alleghany County
ARC Number:	NC 13075
Project Type:	Education, Training, and Workforce Development
Total ARC Funding:	$100,000
Total Matching Funds:	$112,168
Date of Site Visit:	May 15-16, 2002
Site Visitors:	Brian Kleiner and Kimberley Raue

The Alleghany High School Cyber Campus is one of seven cyber campuses developed across the state of North Carolina as part of an effort to improve the educational opportunities available to students and teachers in rural, remote, and underserved areas. The North Carolina School of Science and Mathematics plays a integral role in the cyber campus system, with the North Carolina Information Highway (NCIH) serving as the primary infrastructure for broadband connectivity.

The Alleghany High School Cyber Campus has bridged an educational and technological divide, bringing resources and educational opportunities into Alleghany County. Students are exposed to challenging content through enrichment lessons. They can earn college credit while still in high school, and they are learning valuable computer skills that will prove advantageous in the course of their careers. Teachers participate in professional development opportunities and master's degree programs offered through the cyber campus, and collaborate with other teaching professionals in their discipline.

Learning opportunities have also been extended to members of the community through the cyber campus's computer lab. Some members of the community are using e-mail for the first time and taking classes on computer and Internet basics, which are taught by interns from the cyber campus. They have access to various software packages, including software directed toward people earning their GED or learning English as a Second Language.

Medical and Government Internet Coalition Network (MAGICnet)

Project Location:	Athens, Ohio
Grant Recipient:	Ohio University
ARC Number:	OH 12590
Project Type:	Access to Infrastructure
Total ARC Funding:	$77,167
Total Matching Funds:	$149,168
Date of Site Visit:	June 9-11, 2002
Site Visitor:	Kimberley Raue

The primary goal of the Medical and Government Internet Coalition Network (MAGICnet) was to provide rural physicians and government officials access to "local services, state resources, and global connectivity" through the Internet. Toward this end, Ohio University's College of Osteopathic Medicine (COM) and Institute for Local Government Administration and Rural Development (ILGARD) provided project participants with hardware, software, training, implementation assistance, and 1 year's worth of Internet access. COM and ILGARD also assisted local Internet service providers (ISPs) in expanding their service to underserved areas of southeast Ohio.

Project participants have taken advantage of the capacity-building opportunities made possible through the MAGICnet project. Sites have been able to institute computerized billing systems, saving time and money. Internet access has provided sites with access to a wealth of information, such as inter-library loan services for physicians and federal and state grant opportunities for government sites. Members of the community have received better service as a result. Physicians can access patient education materials online and print and disseminate them to their patients. Government officials can provide services in a more timely manner and can use technology to gain information which makes their grant applications more competitive. The ISP situation has changed dramatically as well, with more competing ISPs and choices for service.

Recognizing the impact of technology, many sites have taken the initiative to upgrade their equipment and expand their vision of how they can use technology. As an example, some local governments have expressed an interest in learning Geographic Information Systems (GIS), which can be used for resource management and community planning and development.

Technology 2020

Project Location:	Oak Ridge, TN
Grant Recipient:	Oak Ridge Chamber of Commerce
ARC Number:	TN 12106
Project Type:	E-Commerce Readiness/Technology Sector Job Creation
Total ARC Funding:	$203,000
Total Matching Funds:	$204,000
Date of Site Visit:	April 7, 2002
Site Visitor:	Carl Setzer

Technology 2020 had the goal of providing incentives to local scientists, researchers, and engineers (who were seeing a decrease in federal funding) to stay in the region. To accomplish this goal, a small business incubator program was established to provide local area scientists, researchers, and engineers with an opportunity to become entrepreneurs themselves. Technology 2020 also wanted to use its facility to provide demonstrations on the uses and abilities of e-commerce in today's markets, as well as to demonstrate the opportunities that the Internet could provide in education. Technology 2020 set up facilities for meetings and seminars that included videoconferencing and other presentation materials. Businesses are able to utilize these facilities to make presentations or for other purposes. A training center was developed to show local educators the benefits technology can bring into the classroom. However, this training center was later discontinued, and the local community college took over the initiative. Technology 2020 is no longer involved and feels the community college is more adept in handling the project.

Since the beginning of the Technology 2020 project 88 start-up companies have been launched out of the Technology 2020 SBDC program. Of these 88 companies, 16 are now defunct (of the 88 companies, 29 had not reported data as of the site visit). The initial 197 jobs created by these companies has grown to 515 jobs. The ARC grant was used to subsidize operational costs to the facility. As a result of a broader focus, Technology 2020 is now the umbrella company for 5 new organizations: Southeast Community Capital, Center for Entrepreneurial Growth, Digital Crossing, TennesSeedFund1, and the East Tennessee Technology Council. These organizations work in conjunction to maintain the entrepreneurial spirit in the area of technology.

Early in the project, Technology 2020 was also able to implement a regional Internet traffic exchange (RITE), which helps to provide better service to the ISP customers. Another early accomplishment of the project was the Asynchronous Transfer Mode (ATM) network established between the University of Tennessee, Oak Ridge National Laboratory, and Technology 2020. This network provided a better infrastructure and data transfer speeds between Oak Ridge and Knoxville.

Managing Information with Rural America (MIRA)

Project Location:	Shawnee, Ohio
Grant Recipient:	Sunday Creek Associates
ARC Number:	CO 13236
Project Type:	Access to Infrastructure
Total ARC Funding:	$100,000
Total Matching Funds:	$120,000
Date of Site Visit:	June 12-13, 2002
Site Visitor:	Kimberley Raue

MIRA was designed to help build the capacity for community development in rural communities through collaboration and the use of technology. Sunday Creek Associates, along with three other Community Support Organizations (CSOs) in southeastern Ohio, sought to increase regional communication and coordination, build organizational capacity, and develop and deepen areas of expertise. CSOs were also expected to play a significant role in supporting the development of local, resident-driven Community Teams (CTs), which were also funded by MIRA.

MIRA was described as catalytic in that it encouraged collaboration between organizations that would not normally work together (for example, an arts and media collaboration) and spurred the development of true grassroots activism. Many of the collaborative efforts that arose from MIRA have been sustained and have effectively enhanced participant organizations' growth and development, which has had a positive impact on the community in which these organizations work.

CSOs like Sunday Creek Associates have become stronger organizations, benefiting from staff development, the purchase of hardware and software, and cooperative relationships with other organizations. There are also several CTs still in existence that may not have been established had it not been for this project. Among other activities, these teams have promoted business development, preserved local history, and organized recreational activities in their communities.

Tompkins County Collaborative Communications

Project Location:	Ithaca, New York
Grant Recipient:	Tompkins County/ Human Services Coalition of Tompkins County, Inc.
ARC Number:	NY 13107
Project Type:	Education, Training, and Workforce Development
Total ARC Funding:	$95,000
Total Matching Funds:	$95,053
Date of Site Visit:	May 2-3, 2002
Site Visitor:	Gary Silverstein and Kelly Long

The purpose of the grant was to allow county departments and their contracted human service agencies to provide increased and higher quality services and outreach through electronic communications. The goal was to develop cooperative activities and enhanced service delivery mechanisms by instituting performance-based contracting and increasing monitoring and evaluation between local governmental departments and 25 participating not-for-profit agencies. The Human Services Coalition viewed the project as a way to streamline activities. People envisioned a common application in order not to require intake for each client each time, but instead to share information across agencies. Increased technology and computer training was a need expressed across most of the agencies.

The primary focus of the ARC grant was to get all of the participating county agencies up to a minimum standard of equipment and accessibility in order to increase communication methods and capability. This was to be accomplished through a combination of equipment purchases, training, assistance in developing web sites, and technological support. The intention was to provide increased and higher quality services through electronic communication by developing cooperative activities and enhanced delivery mechanisms, by instituting performance-based contracting, and by increasing monitoring and evaluation between local government and the participating agencies.

The grant has facilitated communication for agencies in several respects. The agencies are able to send and receive information regarding funding sources via e-mail, which has allowed for more effective reports and timely applications. Agencies can help clients more promptly as increased communication speeds up the process of referrals, and they are able to network with other agencies from broader coalitions that they may not have been able to communicate with as easily before. Agencies have much better access to centralized forms and databases through their connections to the Internet, and, as a result, research happens faster, thereby leaving more time for clients. Overall, the project was a success in that it equipped agencies with computers and the Internet. In addition, there is evidence that this equipment is being used to expand agencies' operations, make programs more efficient, and make more time available for client interactions.

SC-Upstate-Info (SCUI)

Project Location:	Greenville, South Carolina
Grant Recipient:	South Carolina Appalachian Council of Governments (ACOG)
ARC Number:	SC 13175
Project Type:	Access to Infrastructure
Total ARC Funding:	$420,000
Total Matching Funds:	$180,000
Date of Site Visit:	May 23, 2002
Site Visitor:	Kelly Long

The project was designed to aid the citizens of rural and disadvantaged counties through equal access to telecommunications and mapping resources, technical support, long-range planning, and county information. They envisioned this project as a way to provide exposure to rural and disadvantaged counties for economic development.

Previously, the ACOG had founded a regional network named AppNet (Appalachian Network) which had helped to get public and community colleges wired to the Internet. Through another ARC telecommunications grant, AppNet continued its mission to maintain ACOG's role in facilitating affordable connectivity in the upstate region. The SCUI telecommunications project was a logical progression from the point where AppNet left off. There was an established need for a central community information source. Therefore, the information services division developed a web page with a searchable directory of information.

The council of governments developed a main SC-Upstate-Info home page as well as a separate page for each of the six counties of the upstate. The interface was developed based on a framework created in previous projects. They updated the look of the pages that had changed several times during the course of the project. Nevertheless, each county page had community information on tourism, recreation, government, education, health and social services, business and economic development, agriculture and weather, and employment.

ACOG staff admits that end users are so diverse that it is impossible to know all who have benefited from accessing information available on their web site. They know that it has been used as a tool for tourism purposes in addition to providing information to individuals and/or companies looking to relocate to the area. They believe the web site has helped increase tourism and relocation of business to the area.

Southern Tier Central (STC) Telecommunications Initiative

Project Location:	Painted Post, New York
Grant Recipient:	Southern Tier Central Regional Planning and Development Board
ARC Number:	NY 12593
Project Type:	Access to Infrastructure
Total ARC Funding:	$97,219
Total Matching Funds:	$31,847
Date of Site Visit:	June 19, 2002
Site Visitor:	Kelly Long

The STC Initiative was designed to provide technical assistance, phone line costs, training programs, the development of web sites, coordination efforts to link various networks together, and the development of programming that would be available over the Internet or through videoconferencing to the three-county region of the STC. The project was intended to provide a continuing phase in the development of the STC as a regional point of telecommunication services. The STC was expected to continue to provide technical assistance, training, web site development, and networking after the life of the ARC grant.

The training offered as part of the ARC grant motivated persons in government agencies and economic development organizations to make others in their offices more aware of current technology. The participants in the computer training courses have learned valuable skills that have helped them perform their jobs more efficiently and take their skills back to share with others in their agencies. Moreover, the project not only succeeded in training members of local agencies to improve their computer literacy. It also has led to lasting partnerships that keep opening doors to subsequent opportunities.

The STC Initiative also has led to other projects, which in turn have led to the state-of-the-art, fiber optic wiring of schools in nine school districts. Area schools now have the ability to access and share digitized resources from each desktop as well as access the Internet or videoconferencing. Thus, the more rural and disadvantaged schools are now able to share the resources of the more affluent areas, which opens doors for distance learning for students as well as teachers. Hospitals and other providers are also being wired and will be able to benefit in similar ways.

Golden Triangle Telecommunications Network System

Project Location:	Starkville, Mississippi
Grant Recipient:	The Golden Triangle Planning and Development District (GTPDD)
ARC Number:	MS 12805
Project Type:	Access to Infrastructure
Total ARC Funding:	$254,173
Total Matching Funds:	$63,543
Date of Site Visit:	June 10-11, 2002
Site Visitor:	Gary Silverstein

Prior to the ARC grant, none of the seven county governments that compose the Golden Triangle Planning and Development District were able to communicate with one another—or with the state government. In addition, these seven county governments were making minimal use of computers and the Internet.

The project was primarily designed to provide the following services to the seven county governments: 1) connect the county governments with one another; 2) connect agencies within each county with one another; 3) create web pages for each county; 4) purchase videoconferencing equipment that could be used to facilitate communication between the counties, promote economic development across the region, and provide opportunities for distance learning; and 5) serve as the central point of expertise in telecommunications technical assistance.

Since receiving ARC funding, the project has been able to significantly enhance the equipment and knowledge base of the county governments in the Golden Triangle Planning and Development District. The county governments received Internet service and training (through another ARC grant), would likely would not have happened without ARC support. This project was clearly implemented in a region that might otherwise have not taken advantage of the Internet.

However, project staff did not appear to have a good sense of the project's impact on the government agencies or the greater community. For example, they showed no evidence of how the Internet and/or staff training had changed the way in which government agencies conduct their business. Moreover, Internet access appears to have remained limited in several of the counties due to a weak telecommunications infrastructure, and while the videoconferencing equipment received adequate usage during the life of the ARC grant, indications are that it is currently underutilized.

Big Sandy Telecommunications Center

Project Location:	Pikeville, Kentucky
Grant Recipient:	Big Sandy Telecommuting Services, Inc./Pikeville College
ARC Number :	KY 12014
Project Type:	Education, Training, and Workforce Development
Total ARC Funding:	$553,530
Total Matching Funds:	$1,105,106
Date of Site Visit:	May 21, 2002
Site Visitor:	Gary Silverstein

Prior to the ARC grant, very few businesses or residents in the Pikeville region had Internet access. In fact, there was no Internet service provider (ISP) in the region at the time the grant recipient applied for ARC funds. In addition to the lack of an ISP, most businesses and residents in Pikesville lacked access to training in the latest computer software programs. Given its isolated setting, there was also a desire to use the Internet and other forms of telecommunications technology, such as videoconferencing, to link schools, businesses, and community leaders with other communities in eastern Kentucky.

This project was primarily designed to provide a range of services to the businesses and residents of the five counties in the Big Sandy region of Kentucky. These included serving as an ISP, providing training and technical support in the use of the Internet and software, and building a telecommunications access site equipped with computers and videoconferencing equipment. Although the original ARC grant was designed to support a wide range of activities, much of the effort focused on establishing and maintaining the community's only ISP.

In serving as the region's first ISP, the project connected over 750 customers to the Internet. In addition, through the project's training and telecommunications acquisitions, community businesses, educational institutions, and residents were exposed to new and emerging technologies. While this might have occurred without the ARC project, many felt that the ARC project accelerated this process. There are now 4-6 ISPs in the region, which are staffed or managed by people who received training or were exposed to the Internet through the project. In addition, the entire Big Sandy area was recently upgraded with a fiber optic backbone, which would not have been possible if not for the ARC grant and the resulting use of the Internet throughout the region.

Over the life of the ARC grant, over 700 people participated in classes on computer skills and applications. Because of the project, these professionals were able to take advantage of continuing education opportunities without leaving the community. People who attended BSTSI training are now employed in numerous businesses and educational institutions practicing the skills learned at BSTSI. Finally, the region has experienced increases in business productivity and job security, and several businesses had located in the region in part because they were able to find employees who had computer skills obtained through BSTSI.

Advantage Valley

Project Location:	Huntington, West Virginia
Grant Recipient:	Marshall University Research Corporation
ARC Number:	WV-12589
Project Type:	E-Commerce Readiness/Technology Sector Job Creation
Total ARC Funding:	$209,000
Total Matching Funds:	$592,049
Date of Site Visit:	June 17, 2002
Site Visitor:	Brian Kleiner

The Advantage Valley project vision involved the orchestration of a massive marketing campaign to cultivate a tri-state regional entity (called Advantage Valley) that would break down state and community barriers and persuade community and business leaders that economic collaboration within the region is, in the long run, in everyone's best interests.

A key component of this campaign to create an economic regional entity was the establishment of an Advantage Valley web site. The web site was meant to be instrumental in linking area businesses and providing community information for community members as well as for prospective employers interested in learning about the region (its transportation, schools, shopping, safety, etc.). The web site showcased, under one umbrella, all that was offered and available in the region, and it did this in a dynamic, non-static way. The web site was also aimed to serve as a catalyst for regional cooperation. Given the history of competition and bickering between communities, something was needed that was viewed by all as forward thinking and innovative to challenge and break resistance to cooperation. It was believed at the time that the new technology of the Internet would serve as a unifying force and would help to affect the cultural shift involved in creating "Advantage Valley" in the minds of community and business members.

The marketing campaign was the centerpiece of the effort to unify the region under the name of Advantage Valley. The early marketing campaign consisted of live demonstrations to local businesses on the web and its capabilities; popularization and internalization of the name Advantage Valley within the region; postings in *Site Magazine* (a magazine dedicated to news sites for businesses), other national magazines, and local newspapers; an Advantage Valley video; wining and dining of local executives; and annual dinners that promoted the achievements of community members and businesses.

The vision of a regional economic entity, working in collaboration toward greater economic prosperity, appears to have installed itself as a default position among business and community leaders. Twenty-seven major companies within Advantage Valley continue to serve on the Advantage Valley Board of Directors and contribute significant funds for operation of the Advantage Valley program. These include utility companies, banks, chambers of commerce, hospitals, postsecondary institutions, and local television stations. This continuing support indicates a consensus belief that regional cooperation is in everyone's best interests.

Jefferson Community College Computer Labs

Project Location:	Steubenville, Ohio
Grant Recipient:	Jefferson Community College
ARC Number:	OH-12562
Project Type:	Education, Training, and Workforce Development
Total ARC Funding:	$198,300
Total Matching Funds:	$198,300
Date of Site Visit:	April 18-19, 2002
Site Visitor:	Brian Kleiner and Carl Setzer

The ARC grant was used to accomplish two immediate aims. The first was to install a computations lab in which computer science courses could be taught. The lab included, among other things, 28 workstations networked through UNIX, Novell, and Windows NT file servers. The hardware and software purchased with ARC funds provided for a significant stepping up of the computer science program at the college. The second aim was the upgrading of the Computer Aided Design (CAD) laboratory. This included the installation of equipment and software that made possible the most currently available computer-based design capabilities. These new capabilities represented a quantum leap for the CAD lab, because previous outdated equipment made instruction and hands-on learning difficult. The lab is used by students in design, manufacturing, robotics, and mechanical engineering technologies.

Students benefited in a variety of ways as a result of the equipment purchased with ARC funds. In general, students could be trained on the latest equipment and software and could acquire the skills and knowledge requisite for employment in technical fields. Specifically, students were able to take programming courses that would not have otherwise been available. In addition, students were exposed to a variety of operating systems (Novell, Unix, NT). In the CAD lab, students could train on the most up-to-date software on faster machines, saving instruction time and increasing the pace of learning. According to the current Dean of Information and Engineering Technologies, the new equipment and software "drastically changed students' experiences," and "opened opportunities to them, like minor league to major league."

Another important benefit for students, as a result of the ARC grant, was the ability to transfer computer science credits to 4-year institutions. The transfer program facilitated continuing education by providing for a smoother and less expensive transition from Jefferson Community College to other schools. Anecdotal evidence suggests that students were successful in finding employment after graduating (for those who did not transfer to a 4-year school). The AutoCAD instructor said that most of his students "get jobs before getting out of school," many after having done internships. According to this teacher, 95 percent of graduates find work in-field or else go on the 4-year colleges.

Appendix B

Notes on the Technical Approach

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Notes on the Technical Approach

This appendix provides an overview of the procedures used to conduct the evaluation of ARC's telecommunications projects. Specifically, information is provided on the procedures used to (1) determine the study universe, (2) conduct the document review, and (3) conduct the telephone survey.

Determining the Study Sample

The evaluation encompassed the 70 completed telecommunications projects that were funded by ARC from 1994 to 2000.[21] The ARC database contained information about all 70 completed projects that were awarded grants during this period. ARC made available to Westat project files for each of these awards. The information extracted from the documentation enabled us to establish a point of contact with each project and to then determine whether someone with knowledge of the ARC grant was still available to reply to the telephone survey. We were able to identify a knowledgeable contact for all 70 projects.

Document Review

ARC provided Westat with copies of available documentation for all 70 telecommunications projects. The most widely available form of documentation was the announcement/summary of the ARC grant (86 percent of projects) followed by final reports (62 percent), the initial proposal to ARC (59 percent), and progress reports (18 percent). The following information about the projects was entered into an Access database:

- Project description;
- Population sectors served;[22]
- Project activities;
- Project beneficiaries;
- Obstacles/barriers to implementation; and
- Objectives.

We made considerable use of the information obtained through the document review. First, these data were used to provide project staff with background information about the types of activities and outcomes that were supported by ARC. Second, the document review database was used to develop some of the close-ended options for the telephone survey. Third, we used the materials in a subset of project files to inform the selection of the case study sites. Finally, examples from the document review were used to illustrate findings in the final report.

Telephone Survey

The telephone survey represented the primary data collection activity. The survey was designed to obtain data concerning project context, implementation, and accomplishments, as well as information about the extent to which projects achieved anticipated outcomes. Specifically, section 1 of the survey contained primarily close-ended items relating to project context. Section 2 focused on the specific activities of projects, and any obstacles or problems they encountered during the planning and implementation stages. Section 3 inquired about project technology, and

[21] All of the projects were closed (i.e., no longer receiving ARC funding) as of spring 2002.

[22] Projects were categorized into one or more of the following sectors: education, government, health, business, economic development, library, community/social services, public safety, and other.

section 4 asked about project goals and outcomes. The final two sections contained questions about current project status and the overall impact of the ARC grant.

The survey was pretested with 5 of the 70 projects in early January 2001. The survey was subsequently revised and conducted in late January and early February 2002. A 100 percent response rate was achieved; therefore, information obtained from the telephone survey reflects the universe of 70 completed telecommunications projects that were awarded grants between 1994 and 2000. A copy of the survey is provided on the following pages.

AFFIX LABEL HERE

ARC TELECOMMUNICATIONS TELEPHONE SURVEY

1. Please indicate the category that best describes the grant recipient organization. Was it … (CIRCLE ONLY ONE.)

An educational organization,	1
A government organization,	2
A private sector organization,	3
A community or social services organization, or	4
Some other type of organization? (SPECIFY) _____	5

2. What was the last year you received ARC funding for this project? [INTERVIEWER: RANGE SHOULD BE BETWEEN 1993 AND 2001. IF YEAR GIVEN IS OUT OF RANGE, CHECK WITH SUPERVISOR.]

_____

These next questions are about the project. By "project" we are referring to all of a project's goals, objectives, and activities, including those that were not directly or indirectly supported by ARC funding.

3. Which of the following sectors did this project intend to serve? How about the… (CIRCLE 1 FOR YES OR 2 FOR NO ON EACH LINE.)

	Yes	**No**
a. Education sector?	1	2
b. Government?	1	2
c. Health care?	1	2
d. Business or private?	1	2
e. Economic development?	1	2
f. Library?	1	2
g. Community or social services?	1	2
h. Any other sectors? (SPECIFY) _____	1	2

4. Which one of the following best describes the geographic distribution of the individuals who had **direct** access to the equipment or resources from this project? (CIRCLE ONLY ONE.)

A single county,	1
Two or more but not all ARC counties within a single state,	2
All ARC counties within a single state,	3
Two or more states, or	4
Some other geographic area? (SPECIFY) _____	5

5. Which one of the following best describes the geographic distribution of the individuals who **indirectly** benefited from the project (i.e., individuals who did not have direct access to project resources or equipment)? (CIRCLE ONLY ONE.)

A single county,	1
Two or more but not all ARC counties within a single state,	2
All ARC counties within a single state,	3
Two or more states, or	4
Some other geographic area? (SPECIFY) _____	5
Not applicable (i.e., no individuals indirectly benefited from the project)	6

6. Was this project designed to provide direct services, resources, or other assistance to people who are… (CIRCLE 1 FOR YES OR 2 FOR NO ON EACH LINE.)

	Yes	No
a. Living in poverty?	1	2
b. Illiterate?	1	2
c. Disabled?	1	2
d. Elderly?	1	2
e. Geographically isolated or rural?	1	2
f. Living in urban or inner-city areas?	1	2
g. Unemployed or underemployed?	1	2
h. Underrepresented minorities?	1	2
i. Any other group? (SPECIFY) _____	1	2

PROJECT ACTIVITIES

Now let's talk about project activities that were implemented.

7. Did the project… (PLEASE INDICATE "YES" OR "NO" FOR EACH ITEM IN COLUMN A. FOR EACH ITEM IN WHICH "YES" WAS SELECTED, CIRCLE ONE RESPONSE IN COLUMN B.)

	Column A.		**Column B. What proportion of this activity was funded by ARC?**		
	Yes	No	None	Some	All
a. Establish a new computer or telecommunications access center?	1	2	1	2	3
b. Upgrade an existing computer or telecommunications access center?	1	2	1	2	3
c. Provide on-site education and training?	1	2	1	2	3
d. Provide training in the use of telecommunications?	1	2	1	2	3
e. Develop a distance learning system for electronic or online training?	1	2	1	2	3
f. Develop materials for distance learning or educational training?	1	2	1	2	3
g. Develop materials regarding the use of telecommunications technologies?	1	2	1	2	3
h. Create a network of certified trainers?	1	2	1	2	3
i. Install videoconferencing equipment?	1	2	1	2	3
j. Establish a new interactive network for distance learning, teleconferencing, or telemedicine?	1	2	1	2	3
k. Upgrade an existing network for distance learning, teleconferencing, or telemedicine?	1	2	1	2	3
l. Establish new links between existing networks?	1	2	1	2	3
m. Develop a new database or link existing databases to the Internet?	1	2	1	2	3
n. Facilitate communications between various regions or organizations?	1	2	1	2	3
o. Develop a strategic plan to meet long-term telecommunications needs?	1	2	1	2	3
p. Conduct an assessment of existing information technology capabilities?	1	2	1	2	3
q. Conduct a telecommunications marketing effort or outreach program?	1	2	1	2	3

[INTERVIEWER: CHECK TO ENSURE THAT FOR EACH "YES' RESPONSE, COLUMN B WAS ASKED.]

8. Were there any activities proposed in your ARC application that were <u>not</u> fully or successfully implemented? (CIRCLE ONLY ONE.)

YES..... 1 (GO TO QUESTION 9.)
NO ..... 2 (GO TO INSTRUCTION AFTER QUESTION 9.)

9. What were these activities and why were they not fully or successfully implemented?

_____

_____

_____

_____

_____

_____

Now I would like to ask you about obstacles or problems that could be encountered while carrying out the project activities. For each, please indicate if you encountered the obstacle, did not encounter the obstacle, or did not encounter the obstacle because the situation did not pertain to your project.

10. With respect to <u>administration and planning</u>, were any of the following an obstacle or problem? How about… (ON EACH LINE CIRCLE 1 FOR YES, 2 FOR NO, OR 3 IF THE SITUATION DID NOT APPLY.)

	Yes	No	Situation did not apply
a. Underestimating the resources needed?	1	2	
b. Underestimating time or effort needed?	1	2	
c. Underestimating the demand for services?	1	2	3
d. Participants not fully utilizing services?	1	2	3
e. Underestimating the potential for obsolescence of equipment?	1	2	3
f. Local administrative delays?	1	2	3
g. Changes in key personnel?	1	2	
h. Inadequate or unqualified staff?	1	2	
i. Communication problems or misunderstanding of roles?	1	2	
j. Project funds were depleted before implementation?	1	2	
k. Matching funds were less than expected or never received?	1	2	
l. Delays in receiving payments or reimbursements?	1	2	3
m. Contractual delays or delays in awarding of the grant?	1	2	
Thinking now about the <u>implementation</u> of the project, were any of the following obstacles or problems? How about…			
n. Construction delays?	1	2	3
o. Delays in contracting with an outside service provider?	1	2	3
p. Problems installing equipment?	1	2	3
q. Equipment order or receipt delays?	1	2	3
r. Equipment compatibility concerns?	1	2	3
s. Problems in developing program materials?	1	2	3
t. Were there any other obstacles that prevented you from carrying out the project activities? (SPECIFY) _____	1	2	

_____

_____

_____

_____

PROJECT TECHNOLOGY

These next few questions are about project-related telecommunications technology.

11. Did the project use… (CIRCLE 1 FOR YES OR 2 FOR NO ON EACH LINE.)

	Yes	No
a. Dial-up telephone lines and modems?	1	2
b. Wireless services such as cellular, PCS, or microwave?	1	2
c. Satellite services?	1	2
d. Cable modems?	1	2
e. Digital services, such as ISDN, DSL, or T1?	1	2
f. Any other telecommunications technologies? (SPECIFY) _____	1	2

12. Which of the following devices were made available to project participants? How about…. (CIRCLE 1 FOR YES OR 2 FOR NO ON EACH LINE.)

	Yes	No
a. Personal computers?	1	2
b. Network computers?	1	2
c. A video teleconferencing unit?	1	2
d. Any other telecommunications devices? (SPECIFY) _____	1	2

13. Did your project help participants obtain access to the Internet?

YES..... 1 (GO TO QUESTION 14.)
NO ..... 2 (GO TO QUESTION 15.)

14. Which of the following types of Internet service providers did your project's participants use to connect to the Internet? (CIRCLE 1 FOR YES OR 2 FOR NO ON EACH LINE.)

	Yes	No
a. A commercial Internet service provider or ISP	1	2
b. A nonprofit community network	1	2
c. A university or college network	1	2
d. A K-12 school network	1	2
e. A state or local government network	1	2
f. The project itself provides Internet services directly to participants	1	2
g. Some other type of Internet service provider (SPECIFY) _____	1	2

PROJECT GOALS AND OUTCOMES

I'd like to talk with you now about the project goals and outcomes.

15. Did the project aim to… (PLEASE INDICATE "YES" OR "NO" FOR EACH ITEM IN COLUMN A. FOR EACH ITEM IN WHICH "YES" WAS SELECTED, CIRCLE ONE RESPONSE IN COLUMN B.)

	Column A.		**Column B. How successful was your project in meeting this goal?**		
	Yes	**No**	**Less than expected**	**Same as expected**	**More than expected**
a. Improve skills training and education opportunities?	1	2	1	2	3
b. Improve delivery of and access to social services?	1	2	1	2	3
c. Enhance employment opportunities?	1	2	1	2	3
d. Enhance economic development?	1	2	1	2	3
e. Enhance community development?	1	2	1	2	3
f. Improve delivery of and access to government services?	1	2	1	2	3
g. Enhance long-term telecommunications needs?	1	2	1	2	3
h. Improve consumers' access to quality health care?	1	2	1	2	3
i. Enhance coordination of community-wide information and communication services? ...	1	2	1	2	3
j. Something else? (SPECIFY) _____ _____	1	2	1	2	3

[INTERVIEWER: CHECK TO ENSURE THAT FOR EACH "YES" RESPONSE, COLUMN B WAS ASKED.]

16. What was the approximate number of individuals who had **direct** access to the equipment or resources provided by your project? .....

[INTERVIEWER: RANGE SHOULD BE BETWEEN 0 AND 9995.
IF RESPONDENT CANNOT GIVE A NUMBER, PROBE FOR ESTIMATE.]

(If not applicable, check this box.) ..... ☐

17. What was the most important outcome, anticipated or not, to result from the ARC grant?

_____

_____

_____

_____

_____

_____

PROJECT STATUS

Now let's talk about the status of the project.

18. Which statement best describes the current status of your project?

The project is in operation and serving a function that has expanded from that outlined in the original proposal.	1	(GO TO QUESTION 19.)
The project is in operation and serving a function that has stayed about the same as that outlined in the original proposal.	2	(GO TO QUESTION 23.)
The project is in operation and serving a function that has been reduced from that outlined in the original proposal.	3	(GO TO QUESTION 21.)
The project is no longer in operation.	4	(GO TO QUESTION 22.)

19. Which of the following statements indicates the way(s) in which your project has expanded? (CIRCLE 1 FOR YES OR 2 FOR NO ON EACH LINE.)

		Yes	No
a.	The project is serving more individuals.	1	2
b.	The project is providing more services.	1	2
c.	The project has grown in some other way. (SPECIFY) _____	1	2

(GO TO QUESTION 20.)

20. Which of the following statements indicates the factors that have facilitated expansion of the project? How about… (CIRCLE 1 FOR YES OR 2 FOR NO ON EACH LINE.)

		Yes	No
a.	Increased need for services in the community?	1	2
b.	Additional funding available for additional participants or services?	1	2
c.	Loss of other services in the community that led the project to take on additional roles?	1	2
d.	Additional areas of need recognized since the grant inception?	1	2
e.	The service community recognized the value of the services and/or the ease of access?	1	2
f.	Some other factor? (SPECIFY) _____ _____		2

(GO TO QUESTION 23.)

21. Which of the following statements indicates the way(s) in which your project has been reduced? (CIRCLE 1 FOR YES OR 2 FOR NO ON EACH LINE.)

	Yes	No
a. The project is serving fewer individuals.	1	2
b. The project is providing fewer services.	1	2
c. The project was reduced in some other way. (SPECIFY) _____	1	2

22. Which of the following factors are responsible for the project no longer operating or no longer operating at full capacity? (CIRCLE 1 FOR YES OR 2 FOR NO ON EACH LINE.)

	Yes	No
a. Mechanical obsolescence (for example equipment became inoperable, unreliable, or worn out)	1	2
b. Technological obsolescence (for example faster, more accurate, or better alternatives became available)	1	2
c. Personnel changes	1	2
d. Lack of funding available for maintenance or operations	1	2
e. Lack of or poor technical support	1	2
f. Lack of community awareness or support	1	2
g. Problems with the facilities	1	2
h. The provided services were not considered valuable or were too difficult to use	1	2
i. Met need and project no longer necessary	1	2
j. Some other factor? (SPECIFY) _____ _____	1	2

IMPACT OF THE ARC GRANT

These last questions are about the impact of the ARC grant.

23. If you had not received funds through the Appalachian Regional Commission, do you think the project would have been….(CIRCLE ONLY ONE.)

fully implemented,	1	(GO TO QUESTION 24.)
partially implemented, or	2	(GO TO QUESTION 24.)
never implemented?	3	(GO TO CLOSE.)

24. If you had not received ARC funds, do you believe the project would ….(CIRCLE ONLY ONE.)

Still be able to offer the full range of services,	1
Offer slightly fewer services, or	2
Offer significantly fewer services?	3

25. If you had not received ARC funds, do you believe the project would have…. (CIRCLE ONLY ONE.)

Reached an equivalent number of people,	1
Reached slightly fewer people, or	2
Reached significantly fewer people?	3

26. If you had not received ARC funds, do you believe the project would have been….(CIRCLE ONLY ONE.)

Implemented on the same schedule,	1
Delayed slightly, or	2
Substantially delayed?	3

CLOSE:
Those are all of the questions I have for you. Thank you for your time and participation in this survey.

Interviewer's initials _____

Date _____