

Building Community in Rural America

A Replicable Model for Community Networks

Executive Summary

The most difficult challenges before us have shifted away from access to and acquisition of technology, and moved toward the meaningful integration of network resources into our daily activities. The Internet now offers a significant new tool for the mobilization of community groups for the exchange of information and resources, but there is a critical need for thorough training, education, and user support.

This project will demonstrate the integration of high capacity Internet-based services throughout a rural, underserved county in Appalachia, including government information, social services, public education, and local business information to homes, schools, public libraries and places of work. The project will also demonstrate the replicability of the Blacksburg Electronic Village (BEV) as a model for community networking, through a formal partnership with Radford, Virginia. To support the wider replication of the BEV model, the project will build an online BEV clearinghouse of information and documentation on how-to establish, support, and sustain a community network in other places, especially underserved rural communities.

Statement of Need

Recent studies and our own experience have shown that the technology is the simplest and most easily financed part of establishing a community network. The real challenge lies in integrating network resources into people's daily activities and making those resources accessible on a community-wide basis (Office of Technology Assessment 1995, Carnegie 1995). The current direction of telecommunications regulation suggests that technology will continue to become less expensive and network service will become more accessible and affordable through the introduction of competition and other regulatory measures. Where the regulatory framework stops and the community's responsibility begins is in the mobilization of local resources and services, and in the training and education of local users and information providers.

Rural communities are dissolving as they lose their sense of place, lose jobs, and lose young people to urban, more resource-rich areas of America. The scalable architecture of the Internet offers a new communications medium for increasing small group discussion and participation, with the possibility of re-building community ties, and regaining the "political dynamic of an earlier time" (Tomita 1980; Neuman 1993). Networking has often developed in a piecemeal fashion, with separate niche networks for government, education, or business. But schools, businesses, and other community groups are integral elements of a community, and should be networked as a comprehensive whole. The Blacksburg Electronic Village, which delivers the worldwide Internet to customers, can serve as a model for high capacity community networking.

Significance of the Need

The rural population is often chronically handicapped by disparity, scarce resources, and inadequate access to educational resources and economic development opportunities. With the advent of educational, informational and economic resources available through Internet-based information and communication services, rural communities have an opportunity to close the gap in disparities and overcome some of the chronic handicaps as they attempt to prepare their citizens for an information-based economy, society, and workplace.

Our geographic and demographic situation—a suburban town with a prestigious research university in a rural county—offers a unique combination of technology haves- and have-nots. We have learned that the global reach of the Internet is very appealing and necessary, but it is not sufficient to

sustain community networking by the people it is meant to serve. The majority of potential network users want *local services* that assist them with their daily routines, work, school, and play. But they require assistance in learning how network services can offer unique advantages in performing their daily tasks and leisure time. Preliminary studies of how people use the network in Blacksburg suggest that people can experience dramatic improvements in their quality of life from the increased feeling of control that the network offers them.

There are three qualities of the Blacksburg Electronic Village information infrastructure that distinguish it from many other community network projects:

- 1) The BEV is committed to county-wide, ubiquitous, and inexpensive access for all citizens. Through strong cooperative efforts with the public schools and the public library, all interested school teachers, children, parents and citizens will have free, direct access to the Internet, including private electronic mail accounts.
- 2) From the beginning, the BEV made access to high quality local services a primary goal. The Blacksburg Electronic Village has some of the most comprehensive community Web and gopher pages in the world (<http://www.bev.net/>, gopher.bev.net). These information resources serve both information providers in the community and information consumers.
- 3) Every BEV user has direct access to the Internet, ensuring that members of the community can take advantage of the worldwide reach of Internet users and services. The software that BEV provides makes each user's computer part of the Internet. All BEV users can interconnect and interoperate directly with any other public computer or service on the Internet, world-wide.

Unlike many other networking schemes, the Internet architecture scales up easily and economically to support uses ranging from small home users to large institutions like public schools and local governments. In Blacksburg, the existing Internet infrastructure is already in place to support large numbers of new users. The obstacle to increased expansion into the less affluent and less educated rural areas of the county is not the availability of computers (many homes already have one) or access to the network (local Internet access is already available), but *education*.

This project seeks to increase rural access to the Internet and to local, Internet-based information services by developing an educational program designed to serve students and teachers, parents and citizens, and local government officials. Based on the eighteen months of experience providing network services in Blacksburg, a careful, deliberate education process is the critical first step toward increased use of the network by any community.

At the start of the process, it was not obvious that education would play such a large role. We believed in the "field of dreams" model—if we built the network, users would come. We did build it, and they did not come. We had to begin educating them, one by one and group by group. Only when we did that did we begin to see significant use of the network. Blacksburg is now the most connected town in the world on a per capita basis, with nearly one-third of the community using the Internet at home or at work.

More significantly, we also have nearly one-third of the business community doing business online, with both local and national delivery of products and services. We believe that to create a healthy and sustainable online community, the business interests must be included. Without access to a wide range of local services, including business, we believe most community networks will fail. Historically, all real, physical communities have developed around two factors. First and foremost is a sense of place, and second is the availability of businesses that can provide services necessary for daily life. We believe online communities will develop in the same way, and that is the path we have followed in Blacksburg.

Special interest networks delivering just one or just a few kinds of information cannot sustain broad community interest over the long term. Our experience has shown that there is no one kind of information (government info, health info, business services, etc) that will create sustained demand for access to the network. As many kinds of information and services as possible must be accommodated and included to ensure success.

How We Will Carry Out the Project

The three main aims of the project during the grant period are:

- Educate a wide variety of rural, underserved users on how to integrate network services into their daily activities
- Evaluate and test the replicability of the BEV model for community networking through a formal partnership with another community (Radford)
- Assist other communities interested in networking by augmenting and enhancing the BEV online clearinghouse of "how-to" information, documentation, evaluation and training materials.

Community access to the Internet is an *education* problem, not a *technology* problem.

Our experience indicates that the solution to every problem we have encountered thus far is education, user support, and integration of local information resources into daily life. By focusing on three key information and integration diffusion points (public schools, public libraries, and public servants in county government), we expect to reach a core group of users that will create a critical mass of users and local services which will attract large numbers of users throughout the county. Commercial and business services in the area that want to provide consumer access on the Internet will be helped by an already healthy and growing group of local entrepreneurial start-up firms in the Blacksburg area.

Educating new users

K12 Education: We will demonstrate and evaluate the delivery, integration and support of educational services in several K12 Schools. Teachers and students in Riner Elementary school, Auburn middle school, and Auburn and Christiansburg High Schools will demonstrate the integration of educational network resources into the curriculum. These classes will integrate and evaluate materials from VQUEST, Scholastic Network, the MINTS Grant Program of the Museum of Natural History, and the Busch Entertainment Corporation (physics, conservation/earth sciences, and zoology).

We will deliver collaborative science classes using cost-effective desktop videoconferencing over the Internet between rural Auburn High School, Blacksburg High School and The Virginia Museum of Natural History In Blacksburg, using an outreach education project called MINTS - Museum Inquiry-based Natural History Guide for Teachers - funded by a five-year grant from the Howard Hughes Medical Institute. The program is based on the premise of using the school yard as a resource for biology and natural history and the inquiry method of teaching.

Science educators recognize the need for 'follow-up' with teachers to keep the momentum going in a reform effort and to provide support to teachers as they embark on new teaching methods using sometimes unfamiliar content. Currently, MINTS is keeping in touch with teachers through VA Pen. This is cumbersome and provides only textual information. The equipment provided in this proposal would allow scientists and museum personnel to routinely

go outside the museum and use collections within the museum to update and provide new information in a visual as well as textual manner.

We will demonstrate and evaluate the learning, teaching and cost advantages of this innovative distance learning model. Integration of network resources into the curriculum will be accomplished through the following training and support activities:

- Design and deliver workshops on networking for VQuest "Lead Teacher" training
- Support an online conference list for follow-up information exchange with in-service and pre-service VQUEST teachers
- Design and deliver re-certification credit courses and publication projects for participating teachers to be developed by VT
- Design and deliver curriculum integration workshops and in-class help for teachers to be led by Montgomery County Public Schools with assistance from BEV
- Perform formal evaluations of impact and use of networking in schools, and role of community involvement in education

County government: We will provide government information, forms and information for citizens throughout the county (using email, newsgroups and conference lists). Integration of network resources will be accomplished through the following training and support activities:

- Design and deliver training workshops for trainers from city and county government to be led by Montgomery-Floyd Regional Library (MFRL)
- Design and deliver online tutorials and hard copy manuals on network skills
- Design and deliver online and hard copy documentation on the "how-to's" of creating and maintaining government and community information databases
- The Town of Blacksburg will assist Town of Christiansburg in establishing local government information
- Evaluate the use and impact of network information and electronic communication with county citizens using online and hard copy survey instruments and focus group interviews

Public Access: During the TIIAP grant period, the Montgomery Floyd Regional Library (MFRL) will replicate the success of the existing program at its other two area branches: Christiansburg and Floyd. For the past year, the Blacksburg branch has provided free Internet access (free BEV electronic mail accounts, WWW, gopher, FTP, newsgroups) and training to the Blacksburg community. This program has been a key component in the success of the Blacksburg Electronic Village, with nearly 2000 Internet uses/week, and nearly 1000 citizens trained through the library Internet seminars. The library also delivers custom seminars for targeted groups, such as government employees and businesses. MFRL will also assist community organizations through Montgomery county in posting and maintaining information on the Library's World Wide Web and gopher servers.

Replicating the BEV Model in other Communities

The replicability of the BEV model will be demonstrated and evaluated with Radford, Virginia. Radford has been chosen for three reasons. First, Radford represents a more typical rural community than Blacksburg with a broader and less technically sophisticated mix of local users. Second, the City of Radford has indicated that they intend to support an electronic village effort vigorously. Finally, Radford is geographically close to Blacksburg, which will

allow resource sharing, especially staff members, during the startup and test phases of the Radford effort.

The BEV will provide representatives of Radford (Council members, City Manager and staff, public school administrators and teachers, public library, community organizations) with technical assistance, training, a technical services blueprint, and other documentation. This material will describe the management, support and development of a community network infrastructure, including the communications infrastructure (network management software, system administration software, and various other tools and utilities needed to manage the site and run a local information server). Radford City government has allocated the staff time required to perform local information management activities. The private sector will manage and operate the associated infrastructure of the Radford Electronic Village. (See the addenda for a more detailed description of how BEV will assist with this effort.) In addition to the replicability demonstration and evaluation in Radford, BEV is engaged in long range planning with southwest Virginia regional groups, New Century Communications Network, Inc., (NCCN, Inc.) to assist with educational networking. Dr. Andrea Kavanaugh, Director of Research for BEV is on the Board of Directors and serves as Vice-Chair of NCCN, Inc. (see addenda).

A model for community networks

The Blacksburg Electronic Village has been designed and developed from its inception to serve as a model for other communities, particularly in rural areas. The mere existence of a community network does not make it a model; a model is a representation of something else in a form that is transferable to others. Other communities can learn from the Blacksburg experience because the project has begun to establish itself as an online clearinghouse for information, sample forms, technical assistance and other important materials detailing the specific tasks and solutions associated with establishing, operating and cultivating a community network.

The development and dissemination of documentation has already begun, with presentations of papers and research at professional meetings, demonstrations of BEV at numerous symposia and conferences, and the distribution of training documentation, user guides, installation guides, tutorials, reference texts, FAQs, and help sessions, in hard copy and on the BEV gopher and World Wide Web sites (gopher . bev . net and <http://www.bev.net>). Documentation regarding how to use the Internet to support rural community development will continue to be posted online with additional support from TIIAP to assist with associated costs (staff time, printing, communications).

Our Qualifications and Partners

The Blacksburg Electronic Village staff has two years experience in building and maintaining a community network, including training and evaluation. The project has been engaged in a year of planning with the Montgomery County Public School (MCPS) system with support from the National Science Foundation. The purpose of the proposed project is to extend the successes of the services and training largely concentrated in Blacksburg to the rural county surrounding Blacksburg, through the public schools, the public libraries and public servants in county government. In addition to the qualifications of partner organizations noted below, please see the addenda for the qualifications of key personnel.

BEV, Incorporated

The Blacksburg Electronic Village, Incorporated is a non-profit organization with representation on its Board of Directors from all aspects of community life, including local government, health care, K12 and higher education, business, law, industry, and public service. The list of members is included in the addenda. BEV, Inc. was established to direct the project with assistance from the three core partners: Town of Blacksburg, Virginia Tech, and Bell Atlantic-Virginia. Each of these partners also contributes resources and expertise.

Town of Blacksburg

The Town of Blacksburg (TOB) has built and maintains a database of local government information, forms and documentation to help increase citizen participation in government through greater access to information and opportunities for feedback and evaluation (URL: <http://www.bev.net/government/>). The TOB will assist other government entities (Montgomery County and Radford) in establishing and maintaining their own government databases and citizen communications.

Bell Atlantic-Virginia

Bell Atlantic expedited and augmented the upgrade of its cable plant and local switching infrastructure to support advanced network services. The company has also contributed in-kind services to specific project initiatives. A Bell Atlantic staff person works part-time on the BEV project, and Bell Atlantic has a representative on the Board of Directors of BEV, Inc. Bell Atlantic has not made any direct cash contributions during the life of the project to support the BEV office, network operations, or research initiatives.

Virginia Tech

Virginia Tech brings multidisciplinary expertise to BEV, specifically in educational technology, multimedia facilities, human factors research facilities, communications studies, and ethnography. VPI&SU Information Systems provides network design, evaluation of network services, staff time; software development and testing, and network/systems management.

The MINTS science education project provided by the Virginia Tech Museum of Natural History is in its third year and has won two national awards: Promising Practices in Math and Science by the national Eisenhower Program in the Department of Education and selection as a model for biology teaching by the American Association for the Advancement of Science for its 1993 national conference on teaching. Designed primarily for use in upper elementary schools, MINTS is also being used in the V-Quest Pre-service and In-service project.

The College of Education at Virginia Tech brings access to their extensive teacher training and certification program, and will ensure that for-credit classes on network tools for K12 education can be used by teachers in pursuit of advanced teaching degrees and certificates.

Busch Entertainment Corporation (BEC)

BEC has a vast store of educational materials that it is testing with the help of the BEV (<http://www.bev.net/education/SeaWorld/>). They will work in close collaboration with teachers from Montgomery County, in a series of workshops over the grant period. We will test and evaluate these materials and the success of their integration into existing curricula in the four rural schools. The Busch materials include teacher guides, class guides, student study material, and pointers toward supplementary materials. The information has been extremely popular, with users from all over the country accessing the material. The materials receive an average of 4100 requests/day, indicating a very high interest in well-designed materials that are "teacher-ready."

Who Benefits?

County and Radford residents will benefit from increased access to local government information like that currently provided in Blacksburg. They will also have greatly increased access to education and adult training opportunities at the local libraries and schools. The efforts to educate local government officials will indirectly benefit all residents by providing additional channels for interacting with those officials (email, surveys, etc) as well as making it easier to obtain government information and permits as more of that becomes available electronically. The local governments of Blacksburg, Radford, and the county have all committed staff time, equipment purchases, and telecommunications costs to support the project.

The Blacksburg branch of the Montgomery Floyd Regional Library (MFRL) has provided (since January 1994) free access to Internet, including e-mail, and regular free workshops and training for the general public (WWW: <http://www.bev.net/library/>). With all three branches of the library offering free access, residents from all areas of the county will have access to local information services as well as non-local Internet resources. The library has committed significant staff time and budget to support this project.

The Montgomery County School System serves a diverse population of learners from isolated, remote areas of the county (WWW: <http://www.bev.net/education/>) as well as Blacksburg. The school district is eager to mobilize resources to overcome disparity among schools within the district. Riner Elementary, Auburn Middle and High Schools and the Christiansburg High School have network infrastructure and connectivity in place, as well as several lead teachers trained during the past year. Support for this project will allow us to expand teacher training and integrate network resources into the curriculum at K12 levels in additional classes. Additionally, the proposal includes funds for a computer lab in Auburn High School that will be open during evenings and weekends for access by parents and residents of the area. The school system has committed teacher release time, computer purchases, network infrastructure, and staff time to support the project.

In Blacksburg, use of local network services is easily monitored with tools built-in to information tools like gopher and World Wide Web. Interest in particular documents, services, and other information can be measured directly with statistics like requests/day and cumulative requests on a weekly and monthly basis. It has been found very effective to include easy-to-use feedback forms with many kinds of information; this encourages users to write directly to the information providers with comments. The Town of Blacksburg reports they receive many email notes suggesting changes and additions to their government information.

Monitoring information use electronically raises important privacy concerns, and the project never has and never will permit any statistics to be divulged that provide any clue to the identity of information consumers. Since the beginning of the project, a sophisticated authorization server has provided secure individual access to the network and services like email. This system is constantly maintained and upgraded to ensure high levels of security and to guarantee individual privacy.

Evaluating the Success of the Project

The initial effort to connect the citizens of Blacksburg together and to the world has been a huge success. A third of the community is directly on the Internet at home or at work, and every day, over a thousand people use the BEV home page on the World Wide Web as a jumping off place to obtain services and information.

But we do not feel that this is enough. The real challenge is to replicate this success in other communities, with less sophisticated users, who do not have the support of a major research university. We believe we have learned enough (and made enough mistakes) to be effective communicating to others how to do this. A large part of our evaluation will be one simple question: "How many people in Montgomery County and in the City of Radford use the Internet?" In the first 18 months of the BEV project, a third of the community became connected. In the 18 months of the grant period, we think we can bring a quarter of those communities online.

We will employ quantitative and qualitative techniques (survey research, focus group interviews, interviews with key community participants, online surveys, and participant observation) to measure the use and impact of community networking in the area. Online surveys and feedback to local officials have already become a way of life for many Blacksburg residents. The needs of users in the county are anticipated to be different than those of Blacksburg, and the education process will show new users how to use email and online surveys to convey their interests and needs to the project managers. Paper-based surveys are used in Blacksburg to augment online instruments, and will be used with county residents as well.

The project evaluation seeks to determine whether networking;

- increases participation and discussion in community activities and issues;
- increases attachment to and involvement in community;
- assists with integration of network resources in daily activities.
- increases the amount of local businesses offering services and advertising online

The V-Quest project has identified several relevant criteria that will be used to gauge the success of our educational programs, including:

- increased availability of science teachers (which would be facilitated by the network)
- increased use of the network to support discovery-based and collaborative learning
- increased understanding in the community of science and math programs and new instructional strategies (facilitated by increased communications among teachers, students, and parents on the network)
- increased community action in support of education (facilitated by the network and increased accessibility of information about the schools)
- better access by teachers to professional development and training

Finally, many of the education initiatives proposed can be measured directly by the number of people who participate or take advantage of the resources, including:

- participation in training workshops and use of online training guides;
- use of online documentation for replication by others

Special attention will be paid in the evaluation to differences between rural and suburban responses to network services. We expect our isolated county schools and communities—in the heart of Appalachia—to be affected differently by networking, and to have very different requirements for acculturation. It is necessary to deploy an interdisciplinary team to evaluate the use and impact of community networking as it occurs in a variety of settings (classroom, public library, government department, residential setting) and in a variety of formats (basic email, newsgroups, automated listservs, database and catalog searches, gopher, WWW).

Instruments to be employed

We will continue to employ a user profile survey instrument which was developed and tested with support from the Council on Library Resources in 1993. This instrument, developed in collaboration with Professor Scott Patterson, was beta tested and revised in Summer 1993, and has been the basis of a data set of user demographics, computer and network literacy, and interest in various services and applications since October 1993. We will also run a series of focus group interviews for each user group (schools, government, citizens), as well as participant observation, to assess the effectiveness of networking in achieving project goals (stated above). Other surveys underway and planned include: survey of non-users, survey of general population, survey of the business community, and survey of K12 Montgomery County teachers). The addenda contains additional information on our survey instruments and results.

Dissemination of information

BEV will disseminate information, materials and research findings through presentations at professional meetings, publications in journals, and hard copy and electronic copies (posted on BEV gopher and WWW sites). BEV has already published and posted numerous documents and research papers in the literature and on the Internet. We will continue to post presentations, data sets, and documentation regarding BEV and other community network information (<http://www.bev.net/project/subjindex.html>).