

Statewide Broadband Summit



BACKGROUND REPORT

- Summit participants urged to read this report before the event.
- Summit details: August 3, 2012, Albuquerque Marriott, Albuquerque, NM

CONVENER

New Mexico State Library's Fast Forward New Mexico project

FUNDER

A grant from the U.S. Department of Commerce include grant # and language – get from Marcie

FACILITATOR

New Mexico First



BROADBANDUSA
CONNECTING AMERICA'S COMMUNITIES



Report developed by
New Mexico First
On contract for the
New Mexico State Library

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FORWARD

Purpose of the Event

The August 2012 *Statewide Broadband Summit* will ascertain key needs in the area of statewide internet access and use. The event builds on important past work, including the *New Mexico Information Technology Strategic Plan of 2011-2013*¹ and various other initiatives throughout the state. The summit will focus on identification of the ongoing barriers and immediate next steps needed to help ensure internet broadband access throughout New Mexico. To do this we will be deliberating on six tracks:

1. **Digital Literacy**, which will focus on building the skills necessary to operate technology and access the internet for all New Mexicans, especially those who are no longer in a school setting. These efforts often tie into public libraries.
2. **Education Sectors**, which will focus on technology applications in education, such as online courses for students and online resources for educators, as well as whether educational institutions have adequate infrastructure and access to deliver such coursework.
3. **Economic Development**, which will focus on broadband needs to grow local economies. The discussion may also address technology applications that assist businesses in a variety of ways.
4. **Health**, which will focus on telehealth applications and infrastructure, including sharing medical expertise online and online medical records, as well as emergency response assistance.
5. **Governance/Collaborative issues**, which will focus on issues related to building infrastructure and recent Federal Communications Commission changes that impact telecom companies.
6. **Tribal**, which will focus on all five previous tracks as they relate specifically to the tribal communities.

Each of these tracks will develop its own platform of three to five priority recommendations, which will be submitted to the New Mexico State Library for future consideration. The recommendations will also contribute to ongoing statewide strategic planning by the New Mexico Department of Information Technology.

Convener and Funder

The *Statewide Broadband Summit* was convened by the New Mexico State Library, as part of its Fast Forward New Mexico (FFNM) project. FFNM has provided two levels of digital literacy training at 20 libraries in communities around the state. In addition to the basic level skills, such as setting up an e-mail account, a second level of training covers small business information. Public libraries are important community anchors for broadband, providing “access to all” and assistance to searchers. The FFNM project is funded by a grant from the U.S. Department of Commerce.

Facilitator

New Mexico First engages people in important issues facing their state or community. Established in 1986, the public policy organization offers unique town halls and forums that bring together people from all walks of life to develop their best ideas for policymakers and the public. New Mexico First also produces nonpartisan public policy reports on critical issues facing the state. These reports – on topics like water, education, healthcare, the economy, and energy – are available at nmfirst.org.

Our state’s two U.S. Senators – Jeff Bingaman and Tom Udall – serve as New Mexico First’s honorary co-chairs. The organization was co-founded in 1986 by Senators Jeff Bingaman and Pete Domenici (retired).

¹ (New Mexico Department of Information Technology)

Report Authorship

This report was prepared by Elizabeth Perrachione and edited by Heather Balas of New Mexico First. The following research committee helped frame the report, provided information, and reviewed the document. We thank them for their time and effort.

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A number of other individuals contributed information and reviewed sections of the report. We thank them for their time and effort.

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INTRODUCTION

The majority of New Mexicans, like people throughout the country, expect access to and efficiency of utilities such as electricity, water, and heat. Fast becoming a lynchpin issue, broadband internet access is seen by many to be as important a utility as those listed above. According to research done by the Organization for Economic Cooperation and Development, the United States ranks an average of 16th in broadband penetration, speed, and price.² In his 2012 executive order, *Accelerating Broadband Infrastructure Deployment*, President Obama said, “Broadband access is essential to the nation’s global competitiveness in the 21st century, driving job creation, promoting innovation, and expanding markets for American businesses. Broadband access also affords public safety agencies the opportunity for greater levels of effectiveness and interoperability.”³

An Overview of Broadband

Defined as “a transmission medium that enables high speed internet access,”⁴ broadband is faster than dial-up, which uses a modem connected to one’s computer to access the internet. Unlike dial-up, broadband is always on. Various technologies are used to transmit broadband, including:⁵

- DSL (Digital Subscriber Line) using copper wire (much of which already exists for telephone service)
- Cable modem using existing coaxial cable, which delivers cable TV service
- Fiber optic, which converts electric signals to light that can be sent along transparent glass fibers
- Wireless broadband, which uses either a radio link or microwave technology
- Mobile broadband using cell phone networks

² (Organization for Economic Co-operation and Development) There are many different reports ranking broadband penetration, speed, and price and none of them agree on exactly where the U.S. ranks. They all do, agree, however, that the U.S. is not in the top ten.

³ (Obama)

⁴ (Salway)

⁵ (Salway)

- Satellite broadband, which sends and receives signals from satellites orbiting the earth

Each of the technologies listed above has advantages and limitations. Fiber optic currently offers the fastest broadband connection, but can also be the most expensive to install. Satellite broadband is most useful for rural locations where running conduit may be too difficult or even impossible due to the landscape. However, the infrastructure to establish satellite connections is costly, and satellite is often less reliable than a wired connection.

When measuring broadband speed, bandwidth refers to the size of the conduit or pipe the wire travels through, and speed refers to the rate at which data is transmitted. Because it is impossible for providers to know the specific demands being placed on their network at any given time, they advertise speeds that fall into specific ranges. These speeds affect how quickly a customer can open web pages, download and upload files, as well as send and receive email.

Broadband Access in New Mexico

A CURRENT PICTURE OF NEW MEXICO

According to the 2010 U.S. Census, the national average for broadband use is 80%. By comparison, 58% of New Mexicans use broadband at home, ranking our state 46th out of 50. Additionally, slightly more New Mexicans use dial-up services compared to the national average (5% for New Mexico versus 3% for the national average). Regarding those who do not use the internet at all, New Mexico is also higher than the national average (26% for New Mexico versus 20% for the national average).⁶

To chart broadband internet access in New Mexico, the New Mexico Department of Information Technology (NMDoIT) has been working with New Mexico telecommunications providers to create a broadband

⁶ (U.S. Census Bureau)

map showing the amount and type of coverage available across the state of New Mexico.⁷

The New Mexico Broadband Map on this page shows that the entire state has access. However, the yellow, orange, and aqua areas are covered by wireless or satellite services, which may not be as reliable as wired service. Some people worry about the accuracy of the map, especially regarding mobile wireless coverage on tribal lands (the orange areas of the map), according to John Badal, of Sacred Wind Communications.⁸

In response to these concerns, Gar Clarke of NMDoIT said, “The map is a work in progress, one we’re very excited about and proud of. We are still very focused on collecting and analyzing the data that informs this map, and we are reviewing the comments we receive. We will make changes as more information becomes available.”⁹

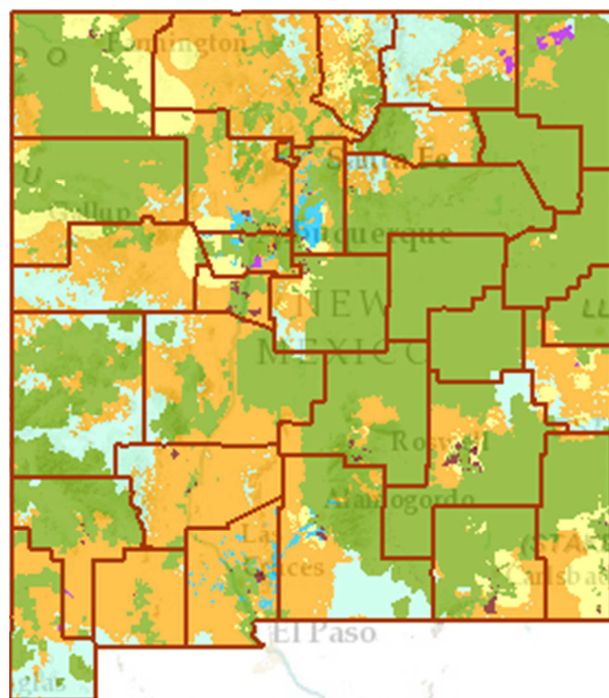
Rural, low-income, or indigenous people are particularly impacted by a lack of broadband access. In remote locations, this problem is mainly caused by the economic and engineering challenges of laying conduit across remote terrain. Another challenge is the lack of line density, which refers to the number of customers served by a given section of broadband wire (usually measured in miles). The same amount of infrastructure that would serve thousands in urban areas serves only hundreds when built in more remote locations. While the majority of our state’s land is rural, the majority of our residents live in urban areas. Of the roughly two million people living in New Mexico, 77% are located in urban areas while 23% are located in rural areas.¹⁰ This translates to roughly 500,000 New Mexicans who have potential challenges accessing broadband due to their location.

⁷ The interactive NM Broadband map is available at <http://nmbbmapping.org/mapping/>. Funded by a grant from the National Telecommunications and Information Agency (NTIA) State Broadband Data and Development Grant Program (SBDDG), the NM Broadband map is part of a national effort to map the country’s broadband access.

⁸ (Badal)

⁹ (Clark)

¹⁰ (U.S. Census Bureau)



NM Broadband Map: green=DSL, dark red=cable, purple=fiber, blue=copper, yellow=fixed wireless, orange=mobile wireless, and aqua=satellite.

Source: NM Department of Information Technology

WHY DIGITAL INCLUSION IS IMPORTANT

Ultimately, digital inclusion is an issue that has the capacity to either widen the socio-economic gap or help close it. According to the Social Science Research Council, “Broadband access is increasingly a requirement of socio-economic inclusion, not an outcome of it – and residents of low-income communities know this.”¹¹

“While broadband will not bring immediate economic transformation to rural America, regions that lack broadband will be crippled,” explained Sharon Strover, an expert in economic impacts of telecommunications, especially in rural communities.¹² Digital inclusion determines how easily a person can access job opportunities, information, healthcare, and educational opportunities. Government jobs in New Mexico, which account for almost a quarter of the jobs available in the state, are one such example. Many of these job announcements and applications are only available

¹¹ (Daily, Bryne and Powell)

¹² (Strover p. 3) Strover is the Philip G. Warner Regents Professor in Communications at the University of Texas

online.¹³ This is also true of minimum wage jobs at companies like Wal-Mart.¹⁴

THE BROADBAND TRIAD

Affordable and reliable access, digital literacy, and online content are the three key pieces of the broadband triad. Each of these factors are constantly growing and expanding. Increasingly sophisticated, data-heavy media content drives the need for faster access. As content becomes more readily available (especially in the economic development, telehealth, and education sectors), the need to ensure widespread online access grows. Digital literacy is necessary to ensure this access, helping individuals navigate the overwhelming content available.

What New Mexico Hopes to Build

A number of organizations in New Mexico received Federal American Recovery and Reinvestment (ARRA) grants regarding broadband. (See table on next page.)

The State Library's FastForward New Mexico project, which provides digital literacy training, was in the first round of these ARRA grants. Concurrently, NMDoIT is involved with a number of initiatives, many in collaboration with the institutions listed in the table on the next page.

Federal money is available to develop and expand broadband initiatives. Continued networking and dialogue, through efforts such as this *Statewide Broadband Summit*, help to maximize collaborative efforts. Research for this report found that there were three main barriers and one overarching solution common to all six tracks:

Overarching Barriers

Contributors to this report in all six tracks identified the following barriers to statewide broadband deployment.

- Access to reliable, fast broadband internet connections
- Geographic challenges to building infrastructure, including: breadth of area to be covered and low population density, as well as the ruggedness of the landscape
- Cost of access for many, including: services, computers, software, peripherals
- Lack of the digital literacy skills necessary for many diverse New Mexicans to function most effectively with online technology

Statewide Collaborations

Increased collaboration between broadband entities was one potential strategy offered by contributors to this report in all six tracks. Collaborating groups might include private organizations, nonprofits, businesses, the public sector, anchor institutions such as libraries, universities, telecom companies, and the community. While not true across all tracks, several contributors to this report recommended a statewide strategy for broadband deployment. The *New Mexico Information Technology Strategic Plan FY 2011-2013* offered a number of strategies that would promote efforts on the statewide level:¹⁵

- Develop a statewide broadband network that integrates voice, video, and data transmission and takes advantage of investments in high-speed network services including digital microwave and fiber.
- Integrate the state's fiber network with the overall broadband plan to enable high-speed connectivity.
- Provision and maintain the Rio Grande / I-25 Corridor Fiber.
- Complete the Southeast Quadrant and provision the connection as part of the broadband plan as appropriate.

¹³ (U.S. Census Bureau)

¹⁴ (Daily, Bryne and Powell p. 68)

¹⁵ (New Mexico Department of Information Technology p. 36-38)

- Establish the northeast fiber connection between Santa Fe and Raton and provision the connection as appropriate.
- Continue the conversion of the Digital Microwave Network (DMW) from analog to digital.
- Continue to expand and upgrade the state’s core network, ensuring all DoIT network equipment and operating systems are kept up to date and meet industry standards.
- Continue to upgrade two-way radios to narrow banding as required by the FCC by 2013 through a phased five-year approach to meet the federal requirement.
- Establish and implement the Voice-Over-Internet-Protocol (VOIP) strategic plan for the state as part of the broadband plan.
- Develop a plan for communication interoperability between DoIT and the Department of Homeland Security and emergency responders.
- Develop a plan to offer consolidated Enterprise Interactive Voice Response (IVR) services to state agencies.

The result of a year-long process among NMDoIT and a variety of telecom providers, the Strategic Plan provided a comprehensive strategy for the build-out of broadband statewide. Marlin Mackey, former Director of NMDoIT, explained that “the federal grant guidelines came out after we had completed this planning process, and the guidelines called for individual grants as opposed to a statewide plan.”¹⁶ In response, Mackey put together a team of reviewers to assess each individual company’s piece of the overall plan. “The federal government provided grants for two phases. For each phase we determined which company’s grant application best aligned with the statewide strategy, and recommended those plans for federal funding.”¹⁷ Some of these projects were funded, and some were not. Regarding next steps, Gar Clark, current Director of NMDoIT, shared “Through the vehicle of the New Mexico Broadband Map, we are determining what areas of the state still need broadband infrastructure development. We have also put together a working group that consists of key

broadband stakeholders in each sector defined in this report. This working group, informed by public recommendations through processes like this summit, will update and move forward the initial work done previously by the state and the telecom providers.”¹⁸

Grantee	Total Award	Type
Communication Service for the Deaf Inc.	\$14,988,657	Sustainable Adoption
ENMR Telephone Cooperative, Inc. dba ENMR-Plateau	\$16,460,815	Infrastructure
ENMR Telephone Cooperative, Inc. dba ENMR-Plateau	\$11,252,066	Infrastructure
Mission Economic Development Agency	\$3,724,128	Public Computer Centers
Navajo Tribal Utility Authority	\$32,190,067	Infrastructure
New Mexico Department of Information Technology	\$4,762,287	Broadband Data & Development
New Mexico Department of Information Technology	\$38,699,997	Infrastructure
New Mexico State Library	\$1,457,488	Sustainable Adoption
North Central New Mexico Economic Development Districts	\$10,565,792	Infrastructure
One Economy Corporation	\$28,519,482	Sustainable Adoption
Santa Fe Civic Housing Authority	\$176,400	Public Computer Centers
University Corporation for Advanced Internet Development	\$62,540,162	Infrastructure
ZeroDivide	\$1,384,242	Sustainable Adoption

¹⁶ (Mackey)

¹⁷ (Mackey)

¹⁸ (Clark)

DIGITAL LITERACY AND LIBRARIES

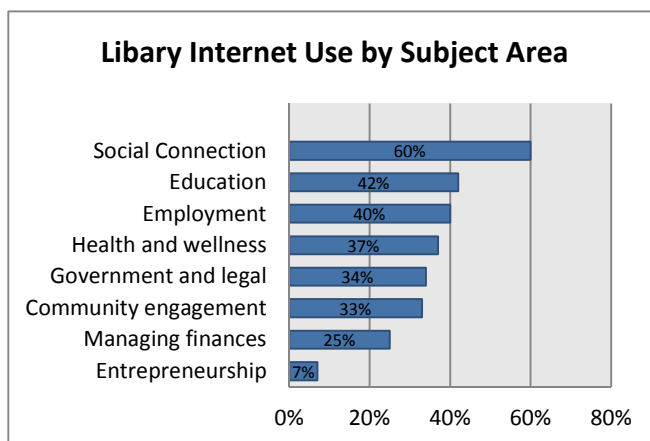
Overview

Digital literacy is “a lifelong learning process of capacity building for using digital technology, communications tools, and networks in creating, accessing, analyzing, managing, integrating, evaluating, and communicating information in order to function in a knowledge-based economy and society.”¹⁹ This skill-set includes accessing information about jobs, healthcare, education, and government social services. Digital literacy also helps increase the safety of internet users by educating them on potential threats and dispelling myths.

All technology users need these skills, but there are gaps that require unique understanding relating to age, culture, and disability. “Working with our multi-cultural and multi-lingual population is one of the unique challenges we face in New Mexico,” said Eva Artschwager of UNM-Los Alamos. “Over 40% of New Mexicans are Spanish or native language speakers, and many know English as their second language.”²⁰

LIBRARIES

Libraries, as anchor institutions in communities, are a key digital literacy resource. Almost 70% of the U.S. population uses libraries.²¹ “Libraries often offer the only way for people to get online, especially in rural communities or for the underserved,” said Artschwager. “Along with offering that access, librarians help people navigate technology and make sense of the content they are viewing.”²² New Mexico State Librarian Devon Skeelee added, “Libraries have traditionally provided communities with access to print and non-print content such as books, periodicals, recorded music, maps, etc. In continuing that important role of providing access to information, libraries provide information in digital format such as



Source: Opportunity for All: How the American Public Benefits from Internet Access at U.S. Libraries

subscription databases, e-books, and digitized content from libraries, museums and archives.”²³

The report *Opportunity for All: How the American Public Benefits from Internet Access at U.S. Libraries* documented the first systematic study of how patrons use technology in libraries.²⁴ “Internet access is now one of the most sought after public library services, and is used by nearly half of all visitors. Over the past year, 45% of the 169 million visitors to public libraries connected to the internet using a library computer or wireless network during their visit, even though more than three-quarters of these people had internet access at home, work, or elsewhere.”²⁵ The report goes on to cite the key reasons library patrons are accessing the internet:²⁶

- Libraries offer a “technological lifeline to children and families in need” (especially those that do not have access elsewhere).
- Technology draws teens to the library, with homework being one of the most common reasons reported.

²³ (Skeelee)

²⁴ (Becker, Crandall and Fisher p. 1) Note: the two charts on this page are taken from this report.

²⁵ (Becker, Crandall and Fisher p. 1) Note: the two charts on this page are taken from this report.

²⁶ (Becker, Crandall and Fisher p. 2-4)

¹⁹ (Digital Literacy Pathways in California p. 3)

²⁰ (Artschwager)

²¹ (Becker, Crandall and Fisher)

²² (Artschwager)

- Patrons use library computers for both life-changing and routine tasks, relying on this access to “take fundamental steps in their lives” (e.g. find work, apply to college, secure government benefits, or learn about critical medical treatments).
- People turn to libraries in extreme conditions, such as natural disasters, when they have nowhere else to go for information.

The report also cited access to government agencies and extending the nation’s education system as key factors that drew patrons to libraries. Also recognized was the changing role of librarians, who are “serving as informal job coaches, college counselors, test monitors, and technology trainers for the growing number of patrons navigating government aid, the job market, and all levels of education on library computers.”²⁷

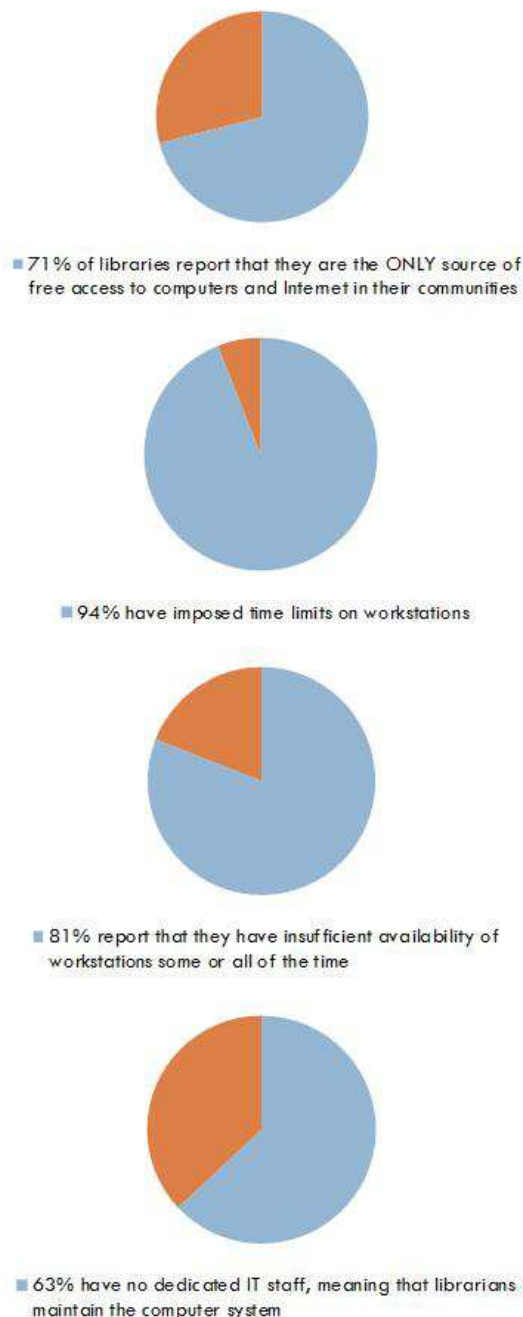
Barriers and Solutions

BEYOND RELEVANCY

A 2010 Pew Research Center report indicated that one barrier to digital literacy is “relevancy” (individuals not understanding how they would use computers or the internet in their daily lives).²⁸ While this lack of understanding may be an issue for some people, a more recent report by the Social Science Research Council indicated that relevancy is not a key barrier. Their report said people understand that technology and online applications hold great potential, but they are not accessing these resources because they:²⁹

- Can not afford it, but are not comfortable saying so
- Do not know how to use computers and the internet
- Do not think they would be able to learn how to use computers and the internet

Library Limitations for Serving Patron Broadband Needs



Source: *Opportunity for All: How the American Public Benefits from Internet Access at U.S. Libraries.*

²⁷ (Becker, Crandall and Fisher p. 4)

²⁸ (Smith p. 3)

²⁹ (Daily, Bryne and Powell)

These findings are consistent with what Artschwager found in the field. “When I bring trainings to tribal and rural communities, my classrooms are filled and there are 30 more on the waiting list. Everyone understands how important the internet is to his or her lives. They just don’t know how to use it, or they can’t afford it.”³⁰

ACCESS

To take full advantage of online resources, people need broadband access. Explained Richard Lowenberg from 1st Mile Institute, “The FCC defines broadband as being a certain number of megabits for download and a different number of megabits for upload. I believe in a more realistic and usable definition of broadband, which is being able to do what you need to do when you need to do it.”³¹

Connectivity in rural and tribal areas is limited, often unreliable and slower due to a lower bandwidth. The low adoption rate of broadband users in rural areas is a disincentive for telecom companies to build-out access to less densely populated areas. According to the U.S. Department of Commerce, only 57% of rural households purchased internet service.³²

COSTS

Regarding the cost barrier, which impacts low-income individuals in all regions of the state, broadband service is only one of many factors. Additional costs include a computer with enough capacity and speed, and peripherals (e.g. software, a printer, mouse, etc.).

There are also challenges unique to disabled populations who need specialized equipment and software. For example, there are roughly 60,000 New Mexicans who are blind or severely visually-impaired.³³ Software programs that enlarge text, read text on the screen, or translate it into Braille range from \$800 to \$15,000.³⁴

³⁰ (Artschwager)

³¹ (Lowenberg)

³² (Economics and Statistics Administration and National Telecommunications and Information Administration p. 17)

³³ (American Foundation for the Blind)

³⁴ (Daily, Bryne and Powell p. 55)

WIDE RANGE OF NEEDED SKILLS

Another barrier is the assumption that teaching digital literacy is as simple as showing someone how to turn on a computer, send an email and create a word processing document. Artschwager explained, “It’s like saying that if you teach someone the rules of French grammar, a few French songs, and how to order dinner at a French restaurant, one knows French. While we hope teaching these things would generate a sense of accomplishment and help feed an ongoing interest in learning more about the language, we wouldn’t want to say that once they’d mastered these skills, they had mastered the totality of the language itself.”³⁵

Given the range of knowledge on the digital literacy scale, a multi-tiered approach is imperative when teaching people to use technology.

- Those with basic technological competence need digital literacy trainings focused on how to wisely navigate the breadth of information available on the internet.
- People who are not currently computer literate need to be given a context in which to understand basic computer symbols and terms.
- Each training group’s knowledge should be assessed so that the correct information is provided.
- These assessments should include awareness of cultural and language differences, as well as physical or cognitive disabilities.

Examples of successful models can be helpful. Since its inception in 2010, FastForward New Mexico has delivered digital literacy trainings to roughly 3,500 individuals in libraries throughout the state (including urban, rural, and tribal locations). Preliminary findings show that more than 85% of trainees cited an increase in ability, improved understanding of technology applications, and greater comfort and confidence with technology.³⁶

³⁵ (Artschwager)

³⁶ (Artschwager, State Library BTOP Assessment)

Example of Key Content for a Basic Literacy Training

Basic: Understanding computer hardware and software

- Basic skills - on/off, keyboard/mousing,
- Basic skills - working with Windows - opening, closing, moving, Start menu
- Introductory Word processing - creating, editing, saving, retrieving a document; storing on portable devices

Internet: Understanding concepts and tools (browsers)

- Understanding websites, home pages, menus, links, web addresses, domains
- Using Google and search engines, focusing searches, evaluating search results and websites
- Finding important information about health, education, and employment online
- Using email to communicate: processes, attachments, Netiquette

Selecting and Maintaining a Computer - Style and component requirements

- Connecting to the Internet and selecting an ISP
- Security software, updates, cleaning files, back up

Security and Safety in the Digital Age

- Basic behaviors and guidelines
- Keeping personal and financial information safe
- Recommendations for email and social media interactions

Provided by Eva Artschwager, Training Coordinator/Development Specialist at UNM Los Alamos and contributor to FastForward New Mexico's curriculum and training programs

CHILDREN TEACHING PARENTS

With digital literacy skills, it is often the case that children are teaching parents. One community organizer said, "That means the kids are controlling what parents access. It is great to have intergenerational teaching, but when the kids want to use the computer, they want to use it for things other than helping other family members out. They know how to play a game, but they don't necessarily know how to look for a job. It's a pretty heavy responsibility for the children to translate so much. The language of getting jobs, or getting health information, is the language of adults, not of kids."³⁷

Questions to Consider

The following questions may help summit participants as they prepare for the *Statewide Broadband Summit*:

- How do we ensure that broadband is accessible and affordable to all libraries and citizens throughout the state?
- How do we create more of the collaborations necessary to develop access?
- What approaches and services would be beneficial to establishing/increasing digital literacy in specific communities?
- To what extent can research and best practices from the field of traditional literacy inform our understanding, practices and approach to digital literacy?
- How do we build a digital literacy community that provides a long-term continuum of support to the ongoing user and learner?

³⁷ (Daily, Bryne and Powell p. 22)

K-12 AND HIGHER EDUCATION

Overview

According to the report *Impact of Broadband in Education*, “Among the many technologies that have been heralded as a transformative solution for education in the United States (e.g. radio, television, and the computer), broadband has perhaps the greatest potential.”³⁸ Jamai Blivin of Innovate-Educate expanded on this idea. “Broadband applications represent a fundamentally different potential to transform education over previous ‘add-on’ technologies by enabling unprecedented interaction with educational resources, other learners, and mentors outside of the traditional classroom. The ability for learners to be active participants through technology rather than passive consumers is a potential factor in how successful they can become in a technology-driven society and economy.”³⁹

FAST, RELIABLE BROADBAND IN SCHOOLS

To teach computer skills on the K-12 level, and to deliver a 21st century education in colleges, all schools need adequate and reliable access. Yet on a national level, nearly 80% of schools reported that their broadband connections were inadequate to meet current needs.⁴⁰ Data was unavailable regarding the number of schools with adequate broadband infrastructure in New Mexico. Our state has a widely distributed network of high-bandwidth access portals to educational resources (located at schools, libraries, colleges and universities).⁴¹ Furthermore, based on the *New Mexico Broadband Map* (see introduction), one can assume that all educational institutions in the state have some level of connectivity. The upcoming *Statewide Broadband Summit* may yield additional information on this subject.

³⁸ (Davidson p. 1)

³⁹ (Blivin)

⁴⁰ (Fox)

⁴¹ (New Mexico Math and Science Advisory Council p. 56)

LEGISLATION

Important legislation has passed over the last several years in New Mexico, supporting technological advances in education, including:⁴²

- SB209/HB201 (2007) created the statewide **Cyber Academy** provided through IDEAL-NM⁴³, establishing requirements for distance learning programs and beginning implementation of statewide eLearning courses. This legislation also specified that school districts cannot restrict student access to online courses, and allowed for the creation of full-time, multi-district online schools.
- Additional distance learning rules were approved in 2008, which set requirements for IDEAL-NM and allowed public schools (including charters) to provide online learning courses to students in any district.
- Several provisions of the SB0561 (the **High School Redesign** bill) came into effect in 2009-2010, requiring schools to offer health courses, make algebra available to all 8th graders (online or in class), and require at least one of the 24 units for graduation to be Advanced Placement, honors, dual enrollment, or a distance learning course.
- SB427 (2011) provided **options to students in failing schools** to choose online alternatives, with funding for those courses coming from the underperforming districts.⁴⁴

K-12 EDUCATION

In addition, the *Keeping Pace with K-12 Online Learning 2011* report recognized New Mexico as one of the first states to “provide a statewide learning management system (LMS) by which online K-12,

⁴² (Watson p. 127-128)

⁴³ IDEAL-NM (Innovative Digital Education and Learning New Mexico) “provides eLearning services to PK-12 schools, higher education institutions, and government agencies.” <http://ideal-nm.org/>

⁴⁴ IDEAL-NM and district online programs offer courses for grades 6-12 only. Therefore, students in grades K-5 that are in failing schools do not have this option.

higher education, and state agency training courses are delivered, referred to as P-20+.”⁴⁵ Blivin said that about 83% of districts in New Mexico have taken advantage of the statewide LMS.⁴⁶

However, accessing these courses requires basic computer and internet skills. These skills are essential not only in the classroom, but in our increasingly global marketplace. Nationally, 92% of K-12 students access online courses at school, with 78% accessing courses from home.⁴⁷ In response to these numbers, which focus solely on online learning, Blivin emphasized that “blended learning” (a highly qualified educator coupled with digital technology) is being implemented at an even faster and greater rate.⁴⁸ Blivin noted, “Blended learning allows for increased access to high quality digital learning experiences with supportive, local, publicly available services. Statistics show that this model of learning has a more successful impact.”⁴⁹

There are also cost savings associated with online learning. The average cost per pupil for a traditional school model is \$10,000, whereas blending traditional and online models cost an average of \$8,900 per student.⁵⁰ Given that there are about 335,000 K-12 education students in New Mexico, this shift can translate into significant savings.⁵¹ Further cost savings are incurred as schools move to online educational resources that “create a pathway to deliver engaging, customized, and up-to-date content to students much faster and more cost-effectively” than traditional textbooks.⁵² New Mexico State Librarian Devon Skeelee elaborated on this point. “Students with a range of interests and abilities can effectively find materials

in a variety of media to support differentiated learning via the internet and online databases.”⁵³

HIGHER EDUCATION

New Mexico universities, like those throughout the nation, offer online resources such as publications, classes, and other information. About a third of American college students take at least one course online, and a number of universities are shifting large, entry-level classes to the internet.⁵⁴ This shift is not without controversy, however. Some people believe online courses are not as high quality as face-to-face instruction, while others champion the approach as being more cost-effective and equally educational.^{55 56} Many online college courses use the same blended learning approaches described above.

Noted Blivin, “Community colleges are moving forward many courses and instructional strategies using broadband, and the recent \$2.7 million Department of Labor grant created the SUN (Skill Up Network) that will allow course-sharing across all colleges through broadband access.”⁵⁷ In addition, SUN will enable New Mexico community colleges to provide rapid response to employers’ needs and use skills-based assessment systems.⁵⁸

Barriers and Solutions

DIGITAL AND RURAL DIVIDE

Online courses only work if students can access them. Dr. Kate Massengale, University of New Mexico-Los Alamos, said, “New Mexico is moving away from building more brick and mortar schools. Rural areas may even lose campuses and/or existing services at some of their campuses. However, the lack of affordable broadband or the necessary level of bandwidth in so many rural areas makes accessing

⁴⁵ (Watson)

⁴⁶ (Blivin)

⁴⁷ (International Association for K-12 Online Learning p.

1)

⁴⁸ (Blivin)

⁴⁹ (Blivin)

⁵⁰ (International Association for K-12 Online Learning p.

2)

⁵¹ (National Center for Education Statistics)

⁵² (International Association for K-12 Online Learning p.

2)

⁵³ (Skeelee)

⁵⁴ (Burnsed)

⁵⁵ (Burnsed)

⁵⁶ (Whitaker)

⁵⁷ (Blivin)

⁵⁸ (Santa Fe Community College p. 5)

online courses troublesome and in some cases impossible to pursue.”⁵⁹

Citing another barrier, Massengale said that online education can create a digital divide for specific underrepresented groups.⁶⁰ This divide was highlighted in the report *Broadband Adoption in Low Income Communities*, which included an Albuquerque focus group of minority high school students. Several students said they had difficulty getting enough computer time at school to complete their assignments. “One student indicated that an Advanced Placement teacher announced on the first day of class, ‘If you don’t have your own computer and home internet access, don’t take this class.’”⁶¹

EDUCATOR PERSPECTIVES

Though educators are increasingly integrating technology into their teaching methods, some K-12 teachers are still reluctant to embrace resources available online. A U.S. Chamber of Commerce report indicated that 57% of faculty members who teach in ‘smart’ classrooms (those equipped with advanced technologies) fail to use the technology on a daily basis.⁶²

The report noted the following barriers:⁶³

- Lack of access to an adequate number of computers
- Inadequate broadband speed
- Lack of ongoing educator training, to keep up with changing technology
- Lack of technical support, especially in lower income communities

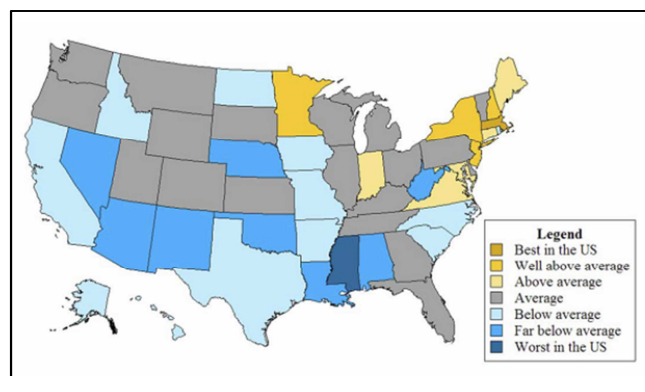
MATH AND SCIENCE

Finally, there has been increasing attention across the nation regarding the importance of math and science skills. In the U.S., 15-year-olds ranked 25th among peers from 34 countries in math and scored in the middle in science.⁶⁴ In the American Institute of

Physics ranking by state, New Mexico K-12 students ranked far below average in preparedness for science and engineering degrees.⁶⁵ The state’s strategic plan for math and science education, *Project 2012*, devotes a chapter to the importance of high-bandwidth connectivity. It points to the need for expanded distance learning programs and establishing systems for collaboration between the state’s Math and Science Bureau, IDEAL-NM, the New Mexico Computing Applications Center, and all the state’s schools of higher education.⁶⁶

CREDIT RECOVERY

Online learning is especially important for “credit recovery” for classes missed or failed.⁶⁷ This is particularly relevant in urban schools, with 81% citing this as being one of the top reasons their district makes online learning available. However, such content recovery courses must be effective. To that end, the International Association for K-12 Online Learning is working with leading curriculum developers to establish outcomes-based standards to access the effectiveness of online courses.⁶⁸



State Outcomes in Math & Science Education: The map illustrates that New Mexico is far below average in K-12 preparation for science and engineering careers. **Source:** *Statistical Research Center at the American Institute of Physics*

⁵⁹ (Massengale)

⁶⁰ (Massengale)

⁶¹ (Daily, Bryne and Powell p. 20)

⁶² (Davidson p. 28)

⁶³ (Davidson p. 28)

⁶⁴ (Hechinger)

⁶⁵ (American Institute of Physics)

⁶⁶ (New Mexico Math and Science Advisory Council)

⁶⁷ (International Association for K-12 Online Learning)

⁶⁸ (International Association for K-12 Online Learning p. 4)

STATE POLICY AND LEADERSHIP

Another solution is leadership on the state level. The State Education Technology Directors Association recommended that “all states provide direct leadership in the development and implementation of programs to provide adequate and equitable bandwidth to K-12 schools, homes, and publicly accessed institutions, such as libraries and community centers. State leadership could entail expanding broadband coverage via the implementation of cost-effective state broadband networks and working in partnership with school districts to leverage federal and public-private partnership programs in support of a state’s broadband needs.”⁶⁹

Recommendations from the New Mexico First Town Hall #34 also suggested a solution by establishing “a statewide high-speed digital network infrastructure to support learning and collaboration,” with many specific recommendations, including a task force to plan, create, and activate a network infrastructure to support collaborative P-20 education, workforce development, and business and industry. The effort should build a distance learning infrastructure, facilitate collaborations, provide faculty training, and develop appropriate courses at all educational levels.⁷⁰

STATEWIDE STRATEGY FOR ONLINE EDUCATION

New Mexico, said Blivin, “lacks a statewide plan to move forward an innovative statewide strategy that will allow blended learning to transform the classroom.” She said that this kind of strategizing would advance the implementation of core and remediation classes, and support students who may fail otherwise. “With new testing in 2013, the projected number of [K-12] students who will fail in New Mexico is as high as 50%.”

⁶⁹ (Fox p. 3) Regarding broadband speed, SETDA recommends that all K-12 schools have an external internet connection to the Internet Service Provider of at least 100 Mbps per 1,000 students and Internal wide area network connects from the district to each school and among schools within the district of at least 1 Gbps per 1,000 students by the 2014-15 school year. By the 2012-18 school year SETDA recommends the external internet connection be at least 1 Gbps per 1,000 students and the WAN connections be at least 10 Gbps per 1,000 students.
⁷⁰ (New Mexico First)

“Prior efforts to expand digital learning in New Mexico through various formations of clearinghouse entities” are part of the solution, explained Blivin. “These include the New Mexico Virtual School, the New Mexico Virtual College (NMLN), IDEAL-NM (which was influenced by a New Mexico First town hall recommendation), and more recent efforts by community colleges with SUN (Skill Up Network).”⁷¹

COLLABORATIVE EFFORTS

Collaborations between the public and private sectors, and among private institutions, are also key in developing a range of solutions. On the university level, collaborations to build supercomputing networks are breaking down access issues to broadband for all New Mexico users. One such example is the New Mexico Computing Applications Center, which began as an initial collaboration among the University of New Mexico, Sandia National Laboratories, Los Alamos National Laboratories, New Mexico Tech, and New Mexico State University. Among other things, the project aims to support science and technology education in our state, and to build a pipeline of scientists and engineers.⁷²

Other examples of key collaborations include the following multi-institution initiatives.⁷³

- **Albuquerque GigaPop**, a project of UNM in collaboration with NM Institute of Mining and Technology, NMSU, NM Council for Higher Education Computing Services, and the NM State Agency of IT, that provides high bandwidth network accessibility to state of NM.
- **Western Regional Network**, a multi-state partnership between Washington, Colorado, New Mexico, and California that provides advanced, robust high-speed networking for research, education and related uses.
- **City of Albuquerque Collaboration**, that funds, develops and manages broadband initiatives aimed at expanding educational and economic opportunities for the community.

⁷¹ (Blivin)

⁷² (Behrmann, PMP p. 5)

⁷³ Information about the following collaborations can be found at: <http://cio.unm.edu/initiatives/broadband.html>

- **Albuquerque Public Schools and Albuquerque GigaPoP**, a collaboration that furthers higher speed network connectivity to educational institutions throughout New Mexico.
- **Rio Grande Optical Network**, a collaboration among NMSU, NM Institute of Technology, and the NM State Department of IT, that provides high speed networking between the institutions along the Rio Grande corridor, connecting them to the Texas LEARN network.

Questions to Consider

The following questions may help summit participants as they prepare for the *Statewide Broadband Summit*:

- How do we ensure that broadband is accessible and affordable to all educational institutions throughout the state?
- How do we create more of the collaborations necessary to develop access?
- How do we help foster learning environments that embrace the full potential of what online access has to offer to a wide range of students?
- What needs to happen on the state level to better embrace the technological tools that will help keep New Mexico schools competitive?
- What needs to happen on the state level to better assist in building a robust, reliable, and affordable broadband network?

ECONOMIC DEVELOPMENT

Overview

People want to live in New Mexico, but they cannot always find jobs to support themselves and their families. Broadband internet access has the capacity to change this, offering the potential to diversify the economic landscape, bring new employment to New Mexico, and increase New Mexican's access to existing jobs. Mariann Johnston of Los Alamos National Laboratory said that high speed broadband could affect economic development in the following ways:⁷⁴

- Making New Mexico more accessible to professionals who are *location neutral* (meaning they work remotely and do not need to live in a specific location) and rely on the internet to do their job
- Broadening the market of potential buyers for entrepreneurs and New Mexico small businesses (including artists)
- Keeping businesses connected to key information that is increasingly online only
- Increasing citizens' ability to access job information that is online only

Broadband is particularly key in rural locations to ensure continued development of resources and the economic livelihood of small towns. Charlie Ferrell of the New Mexico Exchange Group explains: "Our food and energy needs (oil, gas, and renewables) are developed in rural locations, and this makes rural communities the lifeblood of our nation. If you don't keep rural areas financially viable and fully accessible, then everyone will move to the cities. And who will be responsible for growing our food and ensuring we have oil?"

Chris Dunkeson of Comcast Cable Operations in New Mexico agreed with the need to keep small towns viable. "I live in New Mexico and want us to have a healthy economy. I want young people in small towns to have access to jobs. There may be a threshold for

what is achievable in terms of connecting to rural communities, but we need to be sure our small communities are served."⁷⁵

FEDERAL INVESTMENTS

State-level activities that build-out broadband for economic development purposes align with federal priorities. The International Economic Development Council reported, "Last year [2010] the U.S. broadband stimulus program finished awarding public, private and nonprofit organizations over \$7 billion to build new broadband infrastructure, create public computing centers and implement broadband adoption programs. Concurrently, hundreds of millions have come from private and other public sources for broadband. Improving economic development is a driving force behind these investments."⁷⁶ The report acknowledged that it is early in the process to determine definitive benefits from this funding. The report also offered initial data to show potential for broadband impact on economic development, "particularly in underserved urban and rural communities."⁷⁷ National findings include:

- Rural economic developers appear to be well ahead of their urban counterparts in the area of planning, and 58% of rural respondents either have broadband strategies and tactics worked into their economic development plans, or are writing plans currently with these elements. Only 39% of urban respondents have done the same.
- "Finding a job" is one of the most frequently cited personal economic benefits of broadband for low-income people. Economic development professionals rate it at the bottom of the list of potential economic outcomes.
- Not all wired broadband technologies are equal. Whereas fiber networks are clearly viewed by more people as having a greater impact than wireless on a range of economic outcomes, cable is viewed as only slightly more effective than

⁷⁵ (Dunkeson)

⁷⁶ (Settles p. 2)

⁷⁷ (Settles p. 2)

⁷⁴ (Johnston)

wireless despite the industry's PR and marketing efforts.

- 7% of respondents only have dialup as their broadband option, and 13% of rural respondents say they do not expect to ever have broadband sufficient enough to impact economic development.

An earlier White Paper from Intel on The Economic Impact of Broadband projects that “ubiquitous broadband deployment across the U.S. would produce as much as \$460 billion in economic growth per year.”⁷⁸

LOCAL EXAMPLES

Eva Artschwager offered examples of broadband impact on economic development, drawn from her experiences as a trainer for FastForward New Mexico. “Many students attended class because they had reached a ceiling in their jobs due to their lack of computer skills.” She noted that some people felt they were losing promotion opportunities to younger professionals with more technology experience.⁷⁹ Students included oil and gas field workers who needed to improve Excel skills, professionals who needed produce monthly schedules for work, and police officers who took computer classes as professional development units required for their jobs.⁸⁰

Digital literacy skills can also impact non-traditional professions. One of Artschwager's colleagues, a Dine translator, taught computer classes on the Navajo reservation. Many of the students wanted the skills to market and sell goods online, such as family jewelry or their artwork. Prior to gaining these skills, they had to relinquish a large percentage of the sales amount to business owners. “By selling online, people could realize almost the full amount of the sale.”⁸¹

Additional examples follow:⁸²

⁷⁸ (The Economic Impact of Broadband: Best practices enable developing nations)

⁷⁹ (Artschwager)

⁸⁰ (Artschwager)

⁸¹ (Artschwager)

⁸² (Fast Forward New Mexico)

- High Mountain Furniture, owned by Jonathan Helf, of Vanderwagen, New Mexico, used the skills he gained in his digital literacy training to grow his business from part-time to full-time. “I didn't know there were so many different (website) links a business could use,” he said. The trainings helped him identify his current target market and as well as other markets to better enable business expansion.⁸³
- Bruce Ashburn, of the Silver City Small Business Development Center, attended internet classes. “Social media has exploded in the last 10 years. It's become a necessity in any business marketing program,” said Ashburn. “I see advantages that I would have loved to have been able to utilize when I was in business; the flexibility, the speed, and instantaneous feedback offered by social media marketing are enormous.”⁸⁴
- New Mexico's small business development centers (SBDC's) provide small businesses with real-world mentoring and tools. Alice Loy, of the Global Center for Cultural Entrepreneurship, noted that, in every community Fast Forward New Mexico trains, it also partners with the local SBDC.⁸⁵

⁸³

http://www.fastforwardnm.org/sites/default/files/SuccessStoryJHelf_0.pdf

⁸⁴

<http://www.fastforwardnm.org/sites/default/files/SuccessStorySilverCity.pdf>

⁸⁵

<http://www.fastforwardnm.org/sites/default/files/SuccessStorySilverCity.pdf>

Barriers and Solutions

ROUGH, LARGE TERRAIN

As noted previously in this report, New Mexico's size and rural nature are major barriers to widespread broadband access. (This challenge exists for all the tracks in this report.) "There are areas in the northeastern section of the state that do not even have a dial-up connection to the internet. Others in that area have internet access, but it is via satellite, which is not very affordable or reliable, or DSL, which is not very fast,"⁸⁶ explained Tim Armor, New Mexico Economic Development District.

STATEWIDE "BACKBONE" STRATEGY

Just as educators in the previous chapter called for a statewide strategy in distance learning, economic developers want an overarching plan for broadband infrastructure. "There is no statewide strategy for building the backbone of a network throughout New Mexico," Armor explained. "Thus far it is being done piecemeal."⁸⁷ This "piecemeal" solution adds to another challenge: the process of obtaining rights of way permissions to lay new fiber. Said Armor. "Each federal and state organization, such as the Forest Service or Department of Transportation, has different processes and forms in order to build-out broadband wire on their land. Further, each of the pueblos and tribes in New Mexico are their own sovereign nation, with their own contacts, processes and forms."⁸⁸

If a statewide strategy were in place, it might assist with easing the process to obtain rights of ways, which would make broadband network construction faster and less costly. RediNet – a regionally owned broadband network – found a solution, as explained by Armor: "Part of our agreement with the pueblos and counties was that a piece of their contribution to the project would be their right of way access – so we addressed that issue up front."⁸⁹

The need for strategic planning extends to the national level as well. President Obama's recent executive order

charges federal agencies to adopt a uniform approach for allowing broadband carriers to build networks on and through federally owned properties and roads.⁹⁰

AGING INFRASTRUCTURE

Armor, who also directs the community broadband network RediNet, said that physical infrastructure is an issue as well. "Once we did get access to run cable along existing infrastructure, we found that we had to spend more of our resources on replacing poles than we'd initially estimated. The current infrastructure in the United States, like electrical poles, is old and needs maintenance and sometimes replacement."⁹¹

COLLABORATION

As is true throughout all the tracks in this report, collaboration is a crucial element in building solutions. RediNet serves as an example of this. Owned by three counties, one town, the North Central New Mexico Economic Development District, and five Pueblos, Armor explained that RediNet's network "will be leased out to companies like Cybermesa, Agave, Century Link, Windstream, Comcast, and others."⁹² Still in the building phase, RediNet has no data yet regarding the profitability of their collaborative effort. "When RediNet applied for stimulus funds to build the infrastructure" explained Armor, "we developed a business plan that showed potential not only for sustainability, but profits. Now that we are halfway through the project, we are in the process of revising our business plan. We still anticipate profits, and plan on using them to develop more infrastructure."⁹³ The city of Taos, in collaboration with Kit Carson Electric Coop, is working on a community owned network as well (see p. 30).

Another example of a collaboration that could lead to greater industry in the state is the New Mexico Computing Applications Center (see p. 30), which promotes economic development by bringing researchers, universities, and national laboratories together to incubate new, innovative businesses.⁹⁴

⁸⁶ (Armor)

⁸⁷ (Armor)

⁸⁸ (Armor)

⁸⁹ (Armor)

⁹⁰ (Obama)

⁹¹ (Armor)

⁹² (Armor)

⁹³ (Armor)

⁹⁴ (Behrman, PMP p. 5)

NMCAP's goal is to "establish New Mexico as a global leader in targeted areas of scientific discovery and technological innovation." As new products result from the development of new technologies, the hope is that "the state will have a basis of attracting the manufacturing of those new products."⁹⁵

Questions to Consider

The following questions may help summit participants as they prepare for a *Statewide Broadband Summit*:

- How do we ensure that broadband is accessible, affordable, and an easy tool to use for economic development?
- How do we ensure that people understand what economic development tools are available to them online once they have the access?
- How do we create more of the collaborations necessary to develop access?
- How do we work with the state to make the need for a statewide strategy understood, and to assist with developing that strategy

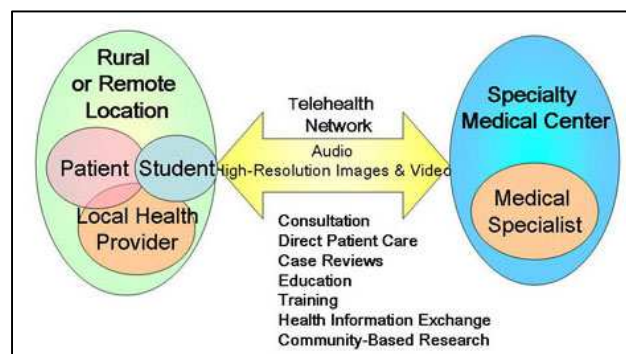
⁹⁵ (Behrmann, PMP p. 5)

HEALTH

Overview

Telehealth is “the use of electronic information and telecommunications technologies to support long-distance clinical healthcare, patient and professional health-related education, public health and health administration.”⁹⁶ In 2004, the state legislature passed the New Mexico Telehealth Act, officially recognizing information technology as a strategy to deliver medical services and information in rural and other medically underserved areas.⁹⁷ Though this act strongly encouraged the use of telehealth, it did not require providers, health insurers or others to include telehealth in their offerings.⁹⁸ In 2005, the New Mexico Telehealth Commission Act was passed. This created a telehealth commission, administratively connected to the Department of Health, to build a “single, coordinated statewide effort to create a telehealth system.”⁹⁹

Telehealth is a potential solution for providing customized, cost-effective healthcare throughout New Mexico. “We’re the fifth largest state, and we’re rural,” explained Dale Alverson, UNM School of Medicine. “We’re seeing a whole spectrum of diverse populations and cultures, and I think the technology provides ways that we can customize care better to address their cultural perspectives.”¹⁰⁰ This customized care is achieved by electronically connecting patients with information and specialists that may help their situation. Telehealth can also be used to monitor patient information from home (e.g. diabetic glucose levels and blood pressure), removing the need for frequent travel to medical offices.



Telehealth Network: Broadband connects patients, students, and local healthcare providers with specialists in medical centers across the United States.

Source: University of New Mexico Medical School.

Currently, there are over 50 communities and close to 100 sites in New Mexico that are part of a telehealth healthcare provider network.¹⁰¹

The “Menu of Health Services” on the UNM Health Sciences Center website lists close to 30 options for clinical and consulting services available via teleconferencing. Some of them include:¹⁰²

- The Asthma & Pulmonary Clinic provides educational presentations from clinicians.
- The Chronic Pain & Headache TeleECHO Clinic incorporates a team of specialists to help primary care clinicians in rural communities manage pain.
- Child psychology services are offered for children with brain injury and metabolic disorders and their families.
- Diabetes consultations allow specialists to discuss patient cases that are presented by community clinicians throughout the state.
- Obesity and nutrition consultations link pediatric sub-specialists with primary care clinicians to care for overweight children and adolescents.

“Healthcare providers in rural areas can feel isolated in terms of information, training, and support from their urban colleagues,” said Arturo Gonzales of Sangre de

⁹⁶ (University of New Mexico School of Medicine)

⁹⁷ (New Mexico Telehealth Act 2004 p. 1)

⁹⁸ (New Mexico Telehealth Act 2004 p. 4)

⁹⁹ (New Mexico Telehealth Commission Act p. 1)

¹⁰⁰ (Alverson)

¹⁰¹ (University of New Mexico School of Medicine)

¹⁰² (University of New Mexico School of Medicine)

Cristo Health Partnership. “Telehealth enables them to stay connected, increasing the retention rate of health providers in rural locations.”¹⁰³ Alverson said, “As the baby boomer generation gets older, we are increasingly faced with the issue of an aging population and a shortage in providers. Telemedicine, which has the potential to distribute our resources more effectively, will be part of the solution.”¹⁰⁴

Other developments in telehealth include allowing patients to access their records online and uniting emergency service providers, such as first responders, to make them more effective at the scene of an accident.

Barriers and Solutions

Two main barriers to telehealth adoption are – as is true for all the tracks – access to fast, reliable broadband and the need for a digitally literate workforce.

“BUY-IN”

For telehealth to be most effective there must be buy-in from all facets of the healthcare industry (e.g. patients, clinicians, hospitals and clinics, insurance providers, emergency medical technicians, etc.). “People with expertise and knowledge must be on board, otherwise the content of the care people find online will not be legitimate – and damage could be done,” explained Alverson.¹⁰⁵

Alverson noted that “buy-in” from all facets of the healthcare industry is essential to making telehealth work. One way to garner support is to provide comprehensive data on the benefits and cost-savings of telehealth. Examples of benefits include:

- A web portal for neurosurgeons enabled them to review head scans prior to a patient being transported to New Mexico’s only Level 1 trauma hospital. With roughly one-third fewer neurosurgeons than other states with a similar

population,¹⁰⁶ New Mexico was considered an ideal state for the use of such technology. It was predicted that reviewing the scans beforehand would result in 25% of the transfer requests being avoided.¹⁰⁷ In reality, 44% of the transports were avoided.¹⁰⁸ This reduction resulted in an estimated savings of half a million dollars, while keeping beds at the Level 1 trauma hospital available for others.¹⁰⁹

- Project ECHO (Extension for Community Health Outcomes) focuses on rural and underserved areas.¹¹⁰ One study found that “fewer than 1,600 New Mexico residents had received treatment for hepatitis C and chronic liver diseases before Project ECHO began its pilot program in 2003. By March 2011, 298 Project ECHO teams had collaborated on more than 10,000 consultations for hepatitis C and other chronic conditions.”¹¹¹

COLLABORATIONS FOR TELEHEALTH

The lack of central coordination for the implementation of broadband telehealth is another challenge, according to Gonzales.¹¹² Organizations that act as umbrellas, bringing together people within the healthcare industry, can help. Examples follow:

- The **New Mexico Health Information Collaborative** brings together “important New Mexico stakeholders representing healthcare providers, payers, employers, state agencies and consumers.”¹¹³
- The **New Mexico Telehealth Alliance** contributes to a collaborative spirit among providers. Its mission is to “provide a forum for individuals and organization to improve the health of New Mexicans through the collaboration and sharing of health resources statewide.”¹¹⁴

¹⁰⁶ (Moya, Valdez and Yonas p. 945)

¹⁰⁷ (Moya, Valdez and Yonas p. 945)

¹⁰⁸ (Moya, Valdez and Yonas p. 947)

¹⁰⁹ (Alverson)

¹¹⁰ (University of New Mexico School of Medicine)

¹¹¹ (New Mexico Telehealth Program Shows Promise for Chronic Illness Care)

¹¹² (Gonzales)

¹¹³ (New Mexico Health Information Collaborative)

¹¹⁴ (New Mexico Telehealth Alliance)

¹⁰³ (Gonzales)

¹⁰⁴ (Alverson)

¹⁰⁵ (Alverson)

- In the arena of substance abuse, the **Sangre de Cristo Community Health Partnership** has worked with the New Mexico Department of Health to create a screening, intervention, and referral initiative. The goal of this partnership is “to create a statewide telehealth system for substance abuse prevention, intervention, and treatment.”¹¹⁵
- The **Southwest Telehealth Access Grid** is “building a \$15.5 million high speed network for telehealth to ... create a telehealth access grid of networks of rural healthcare telemedicine systems.”¹¹⁶

LICENSING

When dealing with the sharing of medical information and personnel intrastate, barriers can be created due to licensing issues between states and compensation of clinicians. Healthcare assistance offered at the state and federal levels can also be slow to adopt and pay for new methodologies.

BROADBAND MAINTENANCE

Gonzales worries about affordable maintenance of connectivity for sites once they are implemented. “Our organization provided equipment, as well as monthly connectivity for a number of healthcare and school sites. But after two years, we couldn’t afford to continue paying for the access.”¹¹⁷

PUBLIC SAFETY

Telehealth also provides solutions in the area of public safety. The Emergency Management Group is building a network to respond to emergencies more quickly and effectively.¹¹⁸ The Critical Response and Emergency Systems Training Preparedness Training Institute offers online courses and other resources for those working on the frontlines of emergency situations.¹¹⁹

Questions to Consider

The following questions may help summit participants as they prepare for the *Statewide Broadband Summit*:

- How do we ensure that broadband is accessible, affordable, and an easy tool to use for telehealth?
- How do we ensure that people understand what telehealth tools are available to them?
- How do we create more of the collaborations necessary to develop access?
- How do we continue to create buy-in among the various entities throughout the state that are part of the New Mexico healthcare system?

¹¹⁵ (Sangre de Cristo Community Health Partnership)

¹¹⁶ (University of New Mexico School of Medicine)

¹¹⁷ (Gonzales)

¹¹⁸ (Gonzales)

¹¹⁹ (CREST Critical Response & Emergency Systems Training)

GOVERNANCE AND COLLABORATION

Overview¹²⁰

THE COST OF CONNECTING RURAL AMERICA

The United States telecommunications network began with the telegraph in the mid 1800s¹²¹ and the telephone in the late 1800s.¹²² Widespread expansion of the telecommunications network was predicated on the belief that a network is most valuable when a maximum number of people are connected. Infrastructure costs for running wires (first for telephone and now for broadband) were easily offset in urban areas, where large customer bases quickly compensated for initial expenditures. In rural areas, however, there were far fewer customers to reimburse infrastructure costs.

Regarding broadband infrastructure expenses, Jeff Lanning of Century Link explained, “A commonly used industry rule of thumb is that it costs roughly \$30,000 to install a mile of fiber or copper wire.”¹²³ In rocky landscapes, this number can be higher. John Badal of Sacred Wind Communications further explained that “the ‘brains’ of our communications operations – a central office switch that houses the computers, routers, and servers – cost about one million dollars. Because we are on rural/tribal lands, that switch provides service to about 2,000 customers. That same switch could provide service to 40,000 customers in Santa Fe or Albuquerque.”¹²⁴

These figures demonstrate the economic barrier of ensuring broadband in less densely populated or remote locations. Jeff Gardner of Windstream Communications summed up the challenge. “We cannot earn an adequate return on our investment in these areas without an effective government program

¹²⁰ This overview was drafted based on extensive conversations with Research Committee members Charlie Ferrell, Brian Harris, and Mike Ripperger, and Clint Highfill

¹²¹ (Mary Bellis)

¹²² (History of the AT&T Network)

¹²³ (Lanning)

¹²⁴ (Badal)

to bridge this gap. This is a microcosm of the problem confronted in the National Broadband Plan. Indeed, the plan concludes that most unserved areas in the country would be money-losing projects.”¹²⁵

REGULATION AND SUBSIDIES: A BRIEF HISTORY

From the onset, government intervention – through subsidies and regulation – was necessary to ensure “universal service” in less densely populated rural areas. Universal service, as Brian Harris of the New Mexico Attorney General’s Office explained, “refers to the federal policy of assuring that all Americans have access to telephone service.”¹²⁶ Further, this policy stipulates that service to consumers in “low income, rural, insular, and high cost areas” be charged rates that are reasonably comparable to those in urban areas.¹²⁷ The issue of achieving universal service for the telephone network began in the early 1900s, when the federal government determined that AT&T had a “natural monopoly.”¹²⁸ “To address the lack of investment incentive for wiring rural America,” explained Harris, “rate-of-return” regulation was instituted as a regulatory tool to allow the company to earn an adequate return on the entire network, serving both rural and urban areas. To pay for this, urban [and business] customers were charged far above the cost of service, and these funds helped extend and support universal service.”¹²⁹

CURRENT FCC SHIFTS

As previously noted, broadband is becoming as important a utility as phone service, and the FCC regulations and subsidies programs are shifting

¹²⁵ (United States. Government Printing Office. Senate Hearing 111-1021)

¹²⁶ (Harris)

¹²⁷ (AT&T: History)

¹²⁸ Natural monopoly refers to a type of monopoly that exists as a result of the high fixed or start-up costs of operating a business in a particular industry. Because it is economically sensible to have certain natural monopolies, governments often regulate those in operation, ensuring that consumers are treated fairly. Source:

www.investopedia.com

¹²⁹ (Universal Service)

accordingly. “Regulations and subsidies were built for a telephone program, and the FCC is currently trying to convert the phone program to a broadband service program”¹³⁰ explained Highfill. Shifting from the natural monopoly once held by AT&T to the competition created by other telecom companies building infrastructure and offering telephone and broadband service also drives the need for change. Currently, FCC regulatory and subsidy shifts are expected to include:

- Replacing rate of return regulation with price cap regulation. With price cap regulation, the federal government will dictate the maximum that a telecom company can charge for their services. It will then be up to each company to make their operations work on the amount of money they earn.
- Factoring universal service subsidies at new rates.
- Ending the Safety Net Fund, which assisted companies with building infrastructure.
- Shifting from implicit to explicit charges for subsidies. Currently the subsidies each end consumer pays is implicit within other costs associated with phone and broadband rates. The FCC is considering making these subsidy costs explicit, so that all telephone and broadband users know how much they are paying into the fund.

Barriers

POSSIBLE CUTS IN FCC SUPPORT

Lack of clarity regarding FCC changes to regulations and subsidies – and the challenge of getting clear information from the federal government – is a barrier to more widespread broadband adoption in the state of New Mexico, especially during this uncertain time. Because the FCC is in the midst of these shifts, there is no final information to offer regarding the changes. However, there is educated speculation on how New Mexico telecom companies could be impacted.

Regarding subsidies, Lanning explained that the “mid-size and larger carriers are most hurt by the current system, because it assumes that they can use extra

profits generated in low-cost areas to cross-subsidize high-cost areas. Due to competition, this is no longer possible. Qwest, for example, was getting subsidy support. However, they needed it to maintain existing voice service in their high cost areas. They were not receiving enough money to build more infrastructure to rural areas.”¹³¹

Smaller telecom carriers, however, were often able to benefit from the current system. “Many companies, especially the smaller ones, were successfully using phone subsidies to build fiber optic so they could provide fast broadband service to rural locations,” stated Windstream’s Highfill.¹³² However, the resulting networks built by smaller companies do not serve all rural areas. Gardner explained, “About two-thirds of all housing units without broadband are located in the service territory of larger companies like Windstream, Frontier, CenturyLink, Qwest, and AT&T. If Windstream had access to the same per-line support levels as the 800 small companies and co-ops, we too would be able to deliver higher speeds and serve more of our customers with broadband.”¹³³

While CenturyLink and Windstream remain cautiously optimistic about the shifts currently happening with FCC subsidies and regulations, some smaller carriers are concerned.^{134 135} Charlie Ferrell said, “These shifts are most significant for the small local companies, especially those that serve rural New Mexico. Rural telecom companies invested \$216 million from 2006 through 2011 to improve the networks and services they provide to their customers. If the FCC makes too drastic a reduction in infrastructure support to these small companies, they will not be able to finish building their networks. This will render them unable to meet current and future FCC requirements, which could put these companies out of business. How it impacts each of these companies depends on how close they are to completing their networks, how overstretched they are in terms of the loans they’ve

¹³¹ (Lanning)

¹³² (Highfill)

¹³³ (United States. Government Printing Office. Senate Hearing 111-1021)

¹³⁴ (Lanning)

¹³⁵ (Highfill)

¹³⁰ (Highfill)

taken out to build infrastructure, and how close they are to maxing out their capital expenditures.”¹³⁶

Badal offered an example of the potential cuts “Initially, the FCC’s first round of reductions in the universal service fund program would have resulted in around a 33% decrease of our support over the next couple of years. Right now, [based on the FCC’s amended numbers] we are looking at anywhere from a 5-10% decrease. Since reductions in rural company support are to be made over the next 6-9 years, no one knows what the total impact will be.”¹³⁷

END OF THE SAFETY NET FUND

On the federal level, Ferrell said that the choice to end the Safety Net Fund is doing damage to smaller companies, who took out loans to build infrastructure based on qualifying for the fund. “Now they won’t have the money to pay back the loans. And this is going to create a climate where it becomes even harder for the smaller telecom companies – even those doing well – to obtain new loans.”¹³⁸ “For the first time, a rural carrier who can’t pay their bills could go bankrupt, leaving a section of the network dark,” explained Mike Ripperger of the New Mexico Public Regulation Commission.¹³⁹

FRUSTRATIONS ON THE STATE LEVEL

There are other frustrations with shifts, not only with the FCC but also on the state, level. Badal noted, “Sacred Wind Communications was denied eligibility for a significant source of universal service funds revenue from the state, due to our start-up date (in 2006). Given the poverty rate on the Navajo Nation, which is the population we serve, we consider ourselves to be among the companies that need subsidies the most. We appealed the decision with the Public Regulation Commission almost two years ago, and just recently received a response. We were denied any support at all.”¹⁴⁰

¹³⁶ (Ferrell)

¹³⁷ (Badal)

¹³⁸ (Ferrell)

¹³⁹ (Ripperger)

¹⁴⁰ (Badal)

A POTENTIAL BACKLASH

Ferrell illustrated a concern shared by others. “I’m constantly reading blogs about telecom related issues, and invariably there will be a host of comments to the effect of ‘if people want access, they should move to where the access is.’”¹⁴¹ A shift from implicit to explicit subsidy charges might create a backlash of urban dwellers who do not like the idea of paying for rural services.

REGULATORY SHIFTS

Focusing more on the impacts of regulatory shifts, Mike Ripperger explained that moving “away from a PSTN based environment shifts regulatory jurisdiction away from the states to the federal government. As a result, states have limited power to monitor the actions of telecom companies and solve issues that arise, particularly in the IP and wireless sectors. It is frustrating when I lack the authority to directly address issues people have, either with getting broadband service, or with their broadband service providers. Though the FCC will be delegating some authority to the statewide level to approve and monitor telecom companies that receive federal subsidies to build out broadband networks in the future, it is unclear at this time how this evolution of authority will ultimately look.”¹⁴²

Solutions

KNOWLEDGE IS POWER, POTENTIALLY

Telecom companies need to be aware of how state and federal level activities could impact them. So does the consumer, explained Ripperger: “Individuals need to know what telecommunications and broadband services are available to them. To that end, the New Mexico Broadband Map (see p. 7) is a huge help. Though imperfect, it is much more accurate than the federal map. Next you need to think about what you actually want for your community. And begin working with others – community members, providers, other groups – to find out about resources that might exist in helping your community get what it needs.”¹⁴³

¹⁴¹ (Ferrell)

¹⁴² (Ripperger)

¹⁴³ (Ripperger)

Another source of information is the New Mexico Exchange Carrier Group map that shows which telecom companies serve which regions. The map can be accessed on their website:

<http://nmecg.com/page3/page3.html>.

COLLABORATION IS KEY

Building on this idea of collaboration, Harris believes that private/public partnerships offer a compelling solution. “Our current telecommunications infrastructure was not a function of the market, but of government policy,” he explained.¹⁴⁴ “Until the Telecom Act was replaced, the United States had the best network in the world – the most reliable, cheapest, and farthest reaching. This is a perfect example of how government and private institutions can work together to best serve the people.”¹⁴⁵ When this collaboration is not working effectively, Harris uses his role to ensure that private companies act responsibly, as is evidenced by his work in the litigation against CenturyLink that resulted in more access to rural locations. “One of the things we argued was that broadband is akin to electricity and fresh water – in other words, building blocks of what, in America, we call the ‘good life.’ The New Mexico Public Regulation Commission agreed, and imposed a broadband investment requirement on Century Link. The amount was lower than I wanted, but Century Link responded and there are rural communities that now have broadband access as a result of this process.”¹⁴⁶

REGIONAL COLLABORATION PROJECTS

Two projects are underway to encourage regional collaboration and private/public partnerships. Both fall under the umbrella of the New Mexico Broadband Mapping grant, reported Susan Oberlander, a contractor for the New Mexico Department of Information Technology.¹⁴⁷ One project will help regional groups address broadband infrastructure issues and adoption. This project will facilitate a process for communities who wish to form local technology planning teams for the purpose of assessing and aggregating broadband demand. The second goal of the

project is to provide technical assistance to the teams as they negotiate with both incumbent and new providers, often using innovative technology solutions, to deliver local broadband. A second project will provide a Community Broadband Master Plan Guidebook for the use of any interested local entities. The guidebook will give a comprehensive overview of the issues facing a community as it considers all possible broadband options.

COLORADO EXAMPLE

One example of the use of local technology teams is unfolding in Colorado. In the San Luis Valley, a local team worked to aggregate local demand that clearly shows possible profits to an interested telecom company.¹⁴⁸ In addition, they have enlisted local resources, such as right of way, and encouraged alternative technologies and solutions, such as a carrier neutral location at Adam’s State College, to allay capital costs and to encourage last mile provider entry.

In the San Luis Valley case, the local team attracted several new public/private projects. A four Gbps (gigabits per second) “middle mile”¹⁴⁹ route will provide service to seven small communities. Another private sector multi-Gbps middle mile route over high elevation pass is now operational. Neither of these new builds were grant-funded, nor are they owned by local government. In addition, the local team is serving as a buyer’s co-op for large quantities of bandwidth for Adam’s State College, the city of Alamosa, healthcare providers, and local service providers.¹⁵⁰

COMMUNITY OWNED NETWORKS

Regarding the shifts in FCC regulations and subsidies, Richard Lowenberg, Director of the 1st Mile

¹⁴⁴ (Harris)

¹⁴⁵ (Harris)

¹⁴⁶ (Harris)

¹⁴⁷ (Oberlander)

¹⁴⁸ (Oberlander)

¹⁴⁹ “Middle mile” is the expensive segment of a telecommunication network that links the core network to the local network plant.

¹⁵⁰ (Colorado Office of Information Technology)

Institute,¹⁵¹ said, “There is a lot of change on the federal level that impacts the state and local levels, but the federal regulations aren’t going to be solidified anytime soon, and the states have to react to the federal regulations. Therefore, the area where we can have the most impact is on the local level.”¹⁵² One of the solutions on the local level, according to Lowenberg, is through carefully thought-out open networks. Rather than being owned by a telecom company, open networks are owned and operated through community collaborations.

The Kit Carson Rural Coop is one example. A member-owned Electric Distribution Cooperative that added fiber and other modes of broadband access to its list of offered services in response to a member mandate “to explore the possibility of diversifying into like businesses that were at that time not meeting the needs of the membership.”¹⁵³ RediNet, explained in the Economic Development section of the report, is another example.

BRINGING IT ALL TOGETHER

Finally, Lowenberg believes that “as a nation and state we need to integrate our energy, transportation, and broadband infrastructure deployments. The energy grid, transportation network of highways, and conduit for broadband wires all use the same path, the same rights of ways, and we are wasting money digging up the same area over and over again for different purposes. Workers also wind up cutting lines because they lack accurate maps, which results in costly repairs.”¹⁵⁴

Questions to Consider

The following questions may help summit participants as they prepare for the *Statewide Broadband Summit*:

- How much is it going to cost to get broadband everywhere that we have phone service? And how can we pay for it?
- How does the consumer (especially in rural areas) keep informed of what companies are servicing their broadband, and how state and FCC regulations may be impacting those companies?
- What do rural communities in New Mexico need so that they can better advocate for getting infrastructure brought to their location?
- How do we foster collaboration among the many entities necessary to ensure both access and digital literacy so that communities have connection and maximize the benefits of that connection?
- How can you negotiate rights of way officially and quickly in a state with so many jurisdictions?

¹⁵¹ The name of Lowenberg’s organization, the 1st Mile Institute, is a play on the reference to the “last mile” which is how the telecom industry describes the running of wire from the service providers to the homes. Believing in the importance of ensuring broadband connection for rural areas, where this “last mile” is often the most arduous and costly to invest in, Lowenberg chose to name his organization the “1st mile.”

¹⁵² (Lowenberg)

¹⁵³ (Kit Carson Electric Cooperative)

¹⁵⁴ (Lowenberg)

TRIBAL

Overview

There was a deliberate choice to have a separate tribal track during this summit, which would give Native American attendees an opportunity to network regarding their own unique broadband challenges. This choice was validated by Brian Tagaban, Navajo Nations Telecommunications Regulatory Committee, who believed it would be useful to bring the tribes and pueblos together to discuss broadband access.¹⁵⁵ Joe Garcia, Head Councilman for Ohkay Owingeh, agreed.¹⁵⁶ This report contains a few of the many tribal perspectives that exist in the state. Overarching generalizations are provided as a starting point for continued conversation, rather than as definitive statements on what every tribe or pueblo believes about broadband in their community.

According to the report, *New Media, Technology and Internet Use in Indian Country*, “Native Americans are among the last citizens to gain access to the internet, with access to broadband often unavailable or overly expensive in native communities. Beyond that challenge, there is a fundamental lack of qualitative or quantitative empirical research on Native American internet use, adoption, and access, stifling the native voice in broadband and media policy.”¹⁵⁷ Tagaban reinforced this concern by sharing that the Navajo Nation does not have comprehensive data on internet access or use, and said that it would be extremely useful to have resources to collect this information.¹⁵⁸

The New Media report, which claimed to contain the first valid and credible data on technology use, access, and adoption in Native American lands,¹⁵⁹ indicated that “broadband deployment in Indian Country is at less than a 10% penetration rate while analog telephone reaches only one in three families in many tribal communities.”¹⁶⁰ While broadband deployment was a

challenge, survey respondents (all of whom were Native American and were from six states) were more connected than the national average. A vast majority (96%) used computers at work, 91% used them at home, and roughly one-third used computers in schools and tribal/community centers.¹⁶¹ “Survey respondents were also far heavier internet users than the national average, with over 90% reporting at least daily use.”¹⁶²

People in the survey primarily used the internet for these reasons:

- Searching for online directions
- Shopping online
- Looking for new information about politics
- Accessing state, local, or federal government websites for information

Though the New Media study did not include tribes from New Mexico (the tribes covered all had radio stations, and were located in California, Minnesota, Washington State, Idaho, Wisconsin, and Montana), it is the first comprehensive set of data collected about tribal broadband use. People interviewed for this report believed New Mexico’s adoption is not as high as the averages cited in the New Media Study.¹⁶³ Therefore, the data was included for two reasons. First, it may be useful to see that other parts of the country are actively solving the challenges of tribal broadband access. Second, these findings show that these tribal communities understand and appreciate the relevance of technology applications and broadband internet access.

Tagaban verified that this appreciation is true within the Navajo Nation as well, with one important caveat. “We conducted a series of town halls in communities around the Navajo reservation. We found that communities that had all of the ‘basics,’ such as running water and electricity, viewed access to the internet as a high priority. But communities that did not

¹⁵⁵ (Tagaban)

¹⁵⁶ (Garcia)

¹⁵⁷ (Morris and Meinrath)

¹⁵⁸ (Tagaban)

¹⁵⁹ (Morris and Meinrath p. 4)

¹⁶⁰ (Morris and Meinrath p. 5)

¹⁶¹ (Morris and Meinrath p. 11)

¹⁶² (Morris and Meinrath p. 12)

¹⁶³ (Garcia)

have these basics did not consider internet and broadband high priorities.”¹⁶⁴

According to the Native American Broadband Organization, “Broadband allows tribal leaders to communicate with their members and vice versa. Students can get lessons about their language, culture and history. Older tribal members can easily train for new jobs as the economy evolves. Tribal medical facilities can send and receive electronic medical records, including CT scans and MRIs whenever they are needed.”¹⁶⁵

Regarding economic development, the Native American Broadband Organization reported three ways to create employment on tribal lands:¹⁶⁶

- Jobs associated with installing the broadband facilities
- Maintenance personnel and engineers to manage the systems and install new software and technologies as the technology evolves
- Setting up business to provide broadband services to other tribes

The Navajo Nation is building their own network, and plans to lease the use of it to internet service providers. Further, while Tagaban did not feel there would be a “tidal wave of economic development from more widespread broadband,” he believed more tribal members would access applications to jobs and government programs.¹⁶⁷

Other ways Tagaban felt his tribe would benefit from greater access to broadband included participation in the social networking and entertainment arenas. “We see a lot of satellite dishes, and if we had broadband access, I anticipate that there would be cost savings that would lead to the economic betterment of people’s lives.”¹⁶⁸ Regarding social networking, Tagaban explained, “A lot of my relatives relocated away from my grandmother’s home, but we still keep in contact

through Facebook. One of the major reasons why I go online every day is to feed that contact. If other Navajo families experienced this, they would be able to stay in contact with relatives that had to leave home for economic reasons. And this would be a powerful motivator for getting people to adopt broadband.”¹⁶⁹

Barriers and Solutions

TRIBAL AND RURAL ISSUES NOT THE SAME

Given the rural location of many tribal lands, there are strong commonalities between many tribal and rural barriers. These include issues of access and cost discussed previously in this report. However, Marcie Davis of Davis Innovations, cautioned against relying too heavily on this overlap. “I work on a rural grant with the federal government, and tribal is very different than rural. There is a difference when it comes to the diversity of cultural and language needs. The largest piece to consider is jurisdictional. Each tribe has its own government, its own jurisdiction. They are very separate and it is insulting to assume they all have the same needs, or to simply lump tribal issues in with rural issues.”¹⁷⁰

Another key barrier unique to tribes, therefore, includes the lack of available and/or accurate data regarding broadband access and usage. “The Navajo Nation does not have a good statistical count for adoption rate of home computer usage,” explained Tagaban. Often, in the vacuum created by this information, tribal issues wind up getting rolled into rural issues.

RESEARCH ON TRIBAL NEEDS

One solution is to obtain more information about tribal broadband access and adoption. One of the ways to obtain this information is through collaborations, such as the one between the Navajo Nation, partnering with Sacred Wind Communications and Frontier Communications, and assisted by Richard Lowenberg of 1st Mile Institute. These groups filed an application with the FCC to conduct a broadband pilot project on Navajo lands. The project will test whether price discounts and digital literacy trainings help induce

¹⁶⁴ (Tagaban)

¹⁶⁵ (Native American Broadband Organization)

¹⁶⁶ (Native American Broadband Organization)

¹⁶⁷ (Tagaban)

¹⁶⁸ (Tagaban)

¹⁶⁹ (Tagaban)

¹⁷⁰ (Davis)

households to subscribe to broadband.¹⁷¹ Explained Tagaban, “The Navajo Nation is hoping to learn more about the Navajo people through that survey. With solid statistics, we could then set goals for broadband adoption.”¹⁷² The Navajo Nation also wants to partner with the telecom industry and the state.

EACH TRIBE UNIQUE

In addition to tribal and rural issues being different, each tribal government faces its own unique challenges. “The Navajo Nation will be unique from any other tribe,” said Tagaban. “For example, the Apache tribe can directly serve their community through the ownership and operation of their own phone company – and we do not have that on the Navajo Nation. We do have several private entities that provide broadband and telecom services, such as Sacred Wind Communications and Frontier Communications. Our goal is to create competition to help drive the prices down. With 85% of Navajo Nation’s households below the median income, pricing is our biggest barrier.”¹⁷³ Garcia agreed, explaining that pricing was an issue with the Ohkay Owingeh as well.¹⁷⁴ It is unclear whether or not pricing is an issue for other tribes in the state.

DIGITAL LITERACY

Digital literacy is another key barrier, agreed both Garcia and Tagaban. “It is great that we have broadband,” explained Garcia, “but when you talk to a layperson in the pueblo they sometimes don’t even know what broadband is, or they are intimidated by it.”¹⁷⁵ Tagaban agreed. “Sometimes our tribal members don’t understand the relevance of computers outside of the internet. The terms ‘Word,’ ‘pdf,’ or ‘browser’ are intimidating to them.”¹⁷⁶ There is also a generational divide. “Lots of our kids are on mobile devices. The generations that are older tend not to embrace

broadband unless they have a good experience and have a good reason for adopting it.”¹⁷⁷

There are a number of potential strategies to support digital literacy and widespread adoption:

- Use Skype, so the users can see each other.¹⁷⁸
- Have young people teach key skills to their parents and grandparents.¹⁷⁹
- Since many people cannot afford digital literacy training, encourage local internet service providers to pay for them. (This strategy is a potential win-win for the company and the community, since it grows the customer base while delivering needed skills.)¹⁸⁰

The Ohkay Owingeh found a different solution for increasing access to its members. Garcia said, “We received a platform grant through the U.S. Department of Agriculture to get wireless service to the tribal government, and we use that service as a backbone to provide it to other members.”¹⁸¹ Ohkay Owingeh is also one of the four pueblos that is part of the RediNet project (see Economic Development section).

CULTURALLY RELEVANT TRAINING

It is important that content in digital literacy training is culturally relevant for tribal members. For example, FastForward New Mexico conducted two trainings for people on the Navajo Nation. The first was led by a trainer from outside the community, with a Navajo interpreter. Learning from this experience, the second training utilized someone from within the community to lead the training in the tribe’s language.

The second training was much more successful. “Not only did participants understand this trainer, but they trusted him more than they did the outsider who led the first training,” said Eva Artschwager, of UNM Los Alamos. “We also ensured that all examples and references used within the training were meaningful

¹⁷¹ (Badal)

¹⁷² (Tagaban)

¹⁷³ (Tagaban)

¹⁷⁴ (Garcia)

¹⁷⁵ (Garcia)

¹⁷⁶ (Tagaban)

¹⁷⁷ (Tagaban)

¹⁷⁸ (Tagaban)

¹⁷⁹ (Garcia)

¹⁸⁰ (Badal)

¹⁸¹ (Garcia)

within the context of the tribe's language and culture.”
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REGULATORY ISSUES

“The Navajo Nation has been proactive in the FCC changes and we have been very happy with how things are turning out,” said Tagaban. He said the Navajo Nation is a member of the International Telecom Union, which has helped with FCC changes and regulatory issues.¹⁸³ The Ohkay Owingeh is also part of the International Telecom Union.

Questions to Consider

The following questions may help summit participants as they prepare for the *Statewide Broadband Summit*:

- What approaches and services would be beneficial to establishing/increasing digital literacy in tribal communities?
- How do we build a digital literacy community that provides ongoing support?
- How do tribal leaders and consumers keep informed about which companies are servicing their broadband, and how state and FCC regulations may be impacting those companies?
- What infrastructural needs exist in tribal communities in New Mexico?
- How do we foster collaboration among the many entities necessary to ensure both access and digital literacy so that communities have connection and maximize the benefits of that connection?

¹⁸² (Artschwager)

¹⁸³ (Tagaban)

CONCLUSION

Broadband has the potential to connect all of New Mexico's varied communities – from tribal and rural, to our various educational and anchor institutions, to our telehealth and first responder networks, our businesses, and nonprofits – with each other and with others across the globe. It drives the need for increased digital literacy so that New Mexicans can take full advantage of the educational, economic, and telehealth options available to them. In order for all of this to happen, New Mexicans from every corner of the state must work together.

Just as the August 2012 *Statewide Broadband Summit* will build on previous work done by individuals and organizations on the Statewide Information Technology Strategic Plan, recommendations from this summit will inform work done by the State Library of New Mexico and in the building of the statewide broadband strategic plan. Information gathered here will also help inform future gatherings as New Mexico continues to work to ensure the state is well positioned to take its rightful place on the information superhighway.

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