Filling in the Broadband Gaps:

The Role of the California Emerging Technology Fund in Closing California's Digital Divide

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Ana Alicia Bradshaw
Telecommunications Staff to Commissioner Rachelle Chong
California Public Utilities Commission
aabradshaw@berkeley.edu
(415) 703-3700

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Executive Summary

Overview

Efforts to close the Digital Divide in California have been ongoing for more than a decade. In March of 2006, 84 million homes in the United States had broadband service.[2] There still, however, is a large portion of the population that does not have home broadband. With a California focus, this paper surveys broadband usage statistics, seeks to understand why gaps in broadband coverage exists, and reviews five California programs including lessons learned.

A review of academic and market studies demonstrate that individuals who possess one or more of the following characteristics are less likely to have broadband in the home:

- Over age 65.
- Household income less than $35,000.
- No high school degree.
- Resides in a rural area.
- Non-English speaking or limited English proficient.
- Disabled.

While there are many potential explanations for why "gaps" in usage exist, these explanations essentially fall into three broad categories. These categories are as follows: (i) issues concerning access, (ii) issues concerning affordability, and (iii) issues concerning applications and content.

Various projects have sought to close these three observed usage gaps by using a range of strategies to reach out to underserved populations. These projects have produced mixed results, but a review of all projects supports the following general conclusions:

- Goal setting is crucial to determine who and where you want to serve, how you want to do so, and what resources are needed.
- Strategic planning of initiatives to expand the use of broadband must be an iterative process, whereby strategies to expand the use of broadband in part are based upon results of prior efforts.
- Metrics for success must be established to determine whether goals are met.
- Public relations and outreach programs are critical to reaching underserved populations.

The projects' successes and failures both may be useful to the California Emerging Technology Fund (CETF) Board, as it considers how to achieve its mandated purpose of ensuring ubiquitous broadband access throughout the state.

Recommendations for Next Steps

Based on these general lessons learned from individual projects, this paper makes the following recommendations for "next steps" to be taken by CETF:

[2] John B. Horrigan, *Home Broadband Adoption 2006*, Pew Internet & American Life Project ii (28 May 2006), *at* http://www.pewinternet.org/PPF/r/184/report_display.asp.

1. **Partnership Building**
    - CETF should strive to serve as an intermediary between existing networks of community leaders concerned with broadband deployment.
2. **Project Funding**
    - CETF should not limit itself to funding only pilot projects.
3. **Additional Research**
    - A portion of CETF resources should be allocated to collecting and analyze data on the broadband usage of Californians.
4. **Strategic Planning**
    - An expert working group should be recruited to develop a strategic plan for the future of CETF.

I. Broadband Usage Statistics

Quick Facts

Home Broadband 2006	
US Homes with Broadband (2005)	60 Million (30%)
US Homes with Broadband (2006)	84 Million (42%)
% Change	40%
Race/Ethnicity	
Caucasian	42%
African-American	31
Latino (English Speaking)	41
Age	
18-29	55%
30-50	50
50-64	38
65+	13
Educational Attainment	
Less than High School	17%
College +	62
Household Income	
< $30,000	21%
$75,000 +	68
Community Type	
Urban	44%
Suburban	46
Rural	25
Average Price	
DSL	$32
Cable	$41
Dial-up	$18

Great strides have been made to get more Americans access to cutting-edge information technology. Nationwide more than 84 million homes were using broadband in March 2006, as compared to 60 million in March 2005 – a 40 percent increase in usage in just one year.[3] In California's Central Valley 66 percent of residents reported having Internet access, and of those users, 50 percent reported using the Internet often.[4]

Despite this growth, a Digital Divide still exists with respect to broadband Internet usage.5 Certain segments of the population continue to face significant barriers in acquiring service. This section, based on demographic factors, provides and overview of individuals who

[3] *Id*.
[4] Mark Baldassare, *PPIC Statewide Survey June 2006: Special Survey of the Central Valley*, Public Policy Institute of California with Great Valley Center 17 (June 2006), *at* http://www.ppic.org/main/publication.asp?i=696.
[5] The FCC divides broadband into two categories: Basic and Advanced. Basic is defined as having a minimum speed of 200kbps, and Advanced is defined as having a minimum speed of 200kbps in both directions. For purposes of this paper, "broadband" applies to either.

use broadband in California. Correspondingly, this section also attempts to provide a demographic profile of broadband non-users in California.

A. Age

While all ages groups have experienced growth in the percentage of users that has broadband access, age continues to play a large role in the decision to adopt broadband technology. Teenagers and young adults under 30 are far more likely to have access to broadband applications than any other age group. A 2003 survey of young people ages 10-17 living in Silicon Valley found that not only had 96% gone online, but also that the majority felt that they knew more about the Internet than their parents.[6] Parents, however, are taking cues from their more technologically savvy children. Eighty-three percent of adults with a minor child at home go online, compared to 60 percent of adults without a child living at home.[7]

More children are gaining access to advanced technology in school, because of public and private sector initiatives. Experts agree that it is vital for students to learn how to use these technologies in order to complete in the global economy.[8] By 2003, 98 percent of California schools had broadband connections, and 90 percent of classrooms had broadband connections.[9] Schools that still are not connected usually are impacted by other demographic factors, such as location. Remote rural areas, which will be discussed in greater detail in section I-E, face special difficulty in gaining broadband access because of infrastructure challenges.

Broadband adoption is lowest among those 65 and older.[10] A recent survey found that only 13 percent of these seniors had broadband services at home.[11] While this figure was 63 percent higher from that of the previous year, this usage rate palls in comparison to the 55 percent of Americans ages 18-29 who have broadband access at home.[12]

Seniors who go online at home are much more likely to access the Internet with a dial-up connection. In 2004, 72 percent of online seniors used dial-up connections, as compared to only 54 percent of younger Americans.[13] In many cases, seniors do not own a computer, or if they live in a household with access, they feel intimidated by and lack training to properly use the technology. A large portion of seniors also are constrained from investing in technology, because they survive on fixed incomes. Technology often is viewed as a luxury and is ignored due to a lack of income for discretionary spending.[14]

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[6] *Growing Up Wired: Survey on Youth and the Internet in the Silicon Valley*, San Jose Mercury News & Kaiser Family Foundation 7 (May 2003), *at* http://www.kff.org/entmedia/20030518a-index.cfm.
[7] Susannah Fox, *Digital Divisions*, Pew Internet & American Life Project 2 (5 Oct. 2005), *at* http://www.pewinternet.org/PPF/r/165/report_display.asp.
[8] Jennifer Hoar, *The Digital Divide 2.0: Competing Involves More Than Just Computing*, CBSNEWS.COM, June 15, 2006, *at* http://www.cbsnews.com/stories/2006/06/09/gentech/main1699023.shtml.
[9] Donald R. Tetreault, *Summary of Year 2003 School Technology Survey Findings*, California Technology Assistance Project & California Department of Education 10 (Oct. 2003), *available at* http://www.cde.ca.gov/ls/et/rs/techsurvey.asp.
[10] For purposes of this report, those sixty-five and older herein will be referred to as "seniors."
[11] Horrigan, *supra* note 2, at 3.
[12] *Id.* at 3.
[13] Susannah Fox, *Older Americans and the Internet*, Pew Internet & American Life Project 3 (25 Mar. 2004), *at* http://207.21.232.103/PPF/r/117/report_display.asp.
[14] *Id* at 2.

B. Income

While the price of broadband service has fallen steadily over the last few years, disparities in broadband penetration still arise among various income groups. In 2003, a family with an income greater than $75,000 per year was almost four times more likely to use the Internet and eight times more likely to live in a broadband household than a family earning less than $15,000 annually.[15] An econometric analysis found that income, second only to age, was the largest determining factor in home broadband access.[16]

The middle class is quickly closing the broadband gap between it and the wealthy. From March 2005 to March 2006, the largest broadband home usage growth rate (59%) was reported in the middle household income range of $30,000-$50,000.[17] This increase possibly could be attributed to the declining price of computers and broadband service or the availability of new applications (i.e., online banking, photo sharing, e-commerce, etc.).

With the average monthly DSL bill around $32 and the average monthly cable modem bill about $41, it appears obvious why families with little disposable income often opt to remain unconnected or continue to use less expensive dial-up service.[18] Dial-up service averaged about $18 per month at the end of 2005.[19] Strangely, though, surveys have produced mixed reports on the importance of price to consumers. A 2005 Pew survey, found that only five percent of those who do not subscribe to any type of Internet service report that they are not online is because it is "too expensive."[20] Conversely, a different survey found that almost 40 percent of those without home broadband attributed failure to subscribe to service price.[21] Regardless of how many people say that broadband is prohibitively expensive, however, income frequently correlates with other factors that can lead to lower broadband usage.

C. Education

College graduates lead the way when it comes to broadband usage. In 2003, they were almost six times more likely to be Internet users or live in a broadband household, as compared to those who never received a high school diploma.[22] By 2006, individuals who never attained a high school degree had narrowed the broadband gap, but the percentage of these individuals with home broadband – 17 percent – still lags behind the more educated.[23]

D. Race & Ethnicity

While the broadband usage gap has closed for some, it still persists for a number of minority groups. Often English proficiency plays a larger role than minority status. The three

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[15] *A Nation Online: Entering the Broadband Age*, A-1 US Department of Commerce Economics and Statistics Administration and National Telecommunications & Information Administration (September 2004), *at* http://www.ntia.doc.gov/reports/anol/index.html [hereinafter *A Nation Online*].
[16] Caroline J. Tolbert & Karen Mossberger, New Inequality Frontier: Broadband Internet Access 4 (Jan. 2006) (unpublished manuscript, on file with the Economic Policy Institute) *at*: http://www.epi.org/content.cfm/wp275.
[17] Horrigan, *supra* note 2, at 3.
[18] *Id* at 6-7.
[19] *Id* at 6-7.
[20] Fox, *supra* note 7, at 4.
[21] *A Nation Online, supra* note 15, at 14.
[22] *A Nation Online*, *supra* note 15, at A-1.
[23] Horrigan, *supra* note 2 at 3.

principle minority groups within California – Latinos, African-Americans, and Asian-Americans – are discussed in further detail below.

1. Latinos

Latinos are the largest ethnic group in California.[24] On the surface it appears that Latinos have all but closed the broadband gap between themselves and their Caucasian counterparts. A 2006 Pew survey found that 41 percent of English speaking Latinos had home broadband service, a statistic that places them only one percentage point behind Caucasians.[25] Furthermore, the same survey found that English speaking Latinos were more likely to post content online than Caucasians or African-Americans.[26]

While English speaking Latinos have the closed the broadband deployment gap, non-English speaking or limited English proficient Latinos nevertheless remain largely unconnected. Currently Internet and broadband usage by non-English speaking Latinos is not tracked as thoroughly as English speakers, but non-English speaking Latinos or those with limited English proficiency tend to be less affluent, receive less formal education, and live in rural areas – all features that suggest lower usage rates.

Computer and Internet usage rates among Latinos in California's Central Valley are lower than what the nationwide findings suggest they would be. A 2006 Public Policy Institute of California (PPIC) survey found that fifty-five percent of Central Valley Latinos reported that they do not use a computer at home, work, or school. Almost two-thirds (66%) reported not owning a home computer. Just over one-third (36%) of those surveyed said that they used the Internet, but only 22 percent reported that they did so on a regular basis.[27] This data suggests that the Pew survey results may overestimate the actual percentage of Latinos with home broadband

2. African-Americans

African-Americans continue to trail behind Latinos and Asian-Americans in Internet and broadband usage. Less than one-third of African-Americans (31%) have home broadband access. Yet last year African-Americans had the highest growth rate in broadband access among Caucasians, Latinos, and African-Americans. From 2005 to 2006, 121 percent more African-Americans gained broadband access at home. [28]

3. Asian-Americans

English speaking Asian-Americans have succeeded in closing the broadband gap. By 2003, almost one-third of Asians had home broadband service. This percentage led all racial and ethnic groups, including Caucasians.[29] Now most data on the Digital Divide does not include Asian-Americans, because on the surface, it appears that they are just as connected as their Caucasian counterparts.

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[24] *California QuickFacts*, US Census Bureau, *at* http://quickfacts.census.gov/qfd/states/06000.html (July 17, 2006).
[25] Horrigan, *supra* note 2, at 3.
[26] *Id* at 13.
[27] Baldassare, *supra* note 4, at 17.
[28] Horrigan, *supra* note 2, at 3.
[29] *A Nation Online*, *supra* note 15, at A-1.

Most data on Asian-Americans, however, does not delineate between English speaking and non-English speaking or limited English proficient Asians. Based upon usage patterns of non-English speaking Latinos, one could extrapolate that usage rates among non-English speaking Asians are less than usage rates among English speaking Asians.

E. Rural

Rural communities continue to lag behind urban and suburban areas in home broadband adoption. Only one-fourth of rural homes use broadband, as compared to almost half of urban and suburban homes.[30] It is difficult to determine whether this lower usage rate is a result of lack of broadband availability in rural areas, or a result of other factors that contribute to lower broadband usage rates. Rural resident tend to be older, less educated, and less wealthy – all characteristics that contribute to lower Internet and broadband usage.[31]

Dial-up service is more widely used in rural areas as compared to urban and suburban areas. Twenty-nine percent of rural residents use dial-up, versus 21 percent of urban and suburban residents.[32]

Nevertheless, with respect to why they do not use broadband, there are significant similarities among urban and rural residents. The most popular response among both rural and non-rural residents (41% and 45%, respectively) was that they "didn't need it or were not interested."[33] The next most common response was that broadband was "too expensive." This second response was slightly more favored by urban residents. Forty-two percent of urban respondents claimed broadband. was too expensive, as compared to 31 percent of rural respondents.[34]

The biggest disparity between rural and urban responses came in the number of rural residents who reported that service unavailability was their main reason for not having home broadband. Twenty-two percent of rural residents reported that broadband was unavailable in their area, in contrast to less than five percent of urban residents.[35]

The extent to which accessibility is a problem is debatable. In California, there currently is no way to verify whether the survey responses of rural and urban residents accurately reflect actual broadband availability. Currently broadband providers are required to give semiannual reports to the Federal Communications Commission (FCC), via Form 477, on the zip codes where they serve at least one customer. According to the most recent FCC Form 477 data, 98 percent of all U.S. zip codes had at least one broadband provider, and 99 percent of the U.S. population resides within these zip codes.[36] A report issued by the Government Accountability Office (GAO), however, questions the accuracy of this form of reporting, because companies fail to report a number of other important statistics. These unreported statistics include the following:

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[30] Horrigan, *supra* note 2, at 3.
[31] Memorandum from John Horrigan, Associate Director, and Katherine Murray, Research Associate, Pew Internet & American Life Project 3 (Feb, 2006) (on file with author).
[32] *Id* at 2.
[33] *A Nation Online*, *supra* note 15, at 14.
[34] *Id* at 14.
[35] *Id*.
[36] *High-Speed Services for Internet Access: Status as of June 30, 2005*, Federal Communications Commission Industry Analysis and Technology Division Wireline Competition Bureau 4-5 (Apr. 2006), *available at* http://www.fcc.gov/wcb/iatd/comp.html.

(i) the number of subscribers served, (ii) whether those subscribers are business or residential, and (iii) the number of zip codes providers could serve, but currently do not.[37]

Some states, such as Kentucky and Michigan have undertaken efforts to provide a more accurate picture of broadband deployment within their state. The Kentucky broadband initiative, known as ConnectKentucky, is utilizing GIS mapping technology along with Census tract data and data from broadband providers to create a comprehensive inventory of broadband infrastructure within the state.[38] These maps are being utilized to encourage broadband providers to speed up deployment.

F. Disability

Because a disability can affect an individual's ability to use a keyboard to access the Internet, the use pattern of the disabled deserves special study. Disabled seniors' Internet usage rates range from 8 to 26 percent, depending upon the type of disability.[39]The homebound and those with multiple disabilities have the lowest Internet usage rates (11% and 8%, respectively). Home broadband usage among disabled seniors is even lower: These usage rates range from 6 to 11 percent.[40]

The key to connecting the disabled to broadband applications is the availability of adaptive technology. Such technology allows the disabled population to communicate and stay connected with the non-disabled world. Cost is an additional concern, because the average income of a disabled person usually is below that of a person without a disability.[41] One issue that should be addressed is the fact that current telecommunications equipment programs administered by the CPUC are limited to wireline telephone equipment, and does not allow equipment for Internet access or wireless technologies.[42]

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[37] *Broadband Deployment Is Extensive throughout the United States, but It Is Difficult to Assess the Extent of Deployment Gaps in Rural Areas*, United States Government Accountability Office 14 (May 5, 2006), *at:* http://www.gao.gov/docsearch/repandtest.html [hereinafter *Gaps in Rural Areas*].

[38] A Census tract is defined by the U.S. Census Bureau, as a neighborhood that contains an average of about 3,000-4,000 people.

[39] *A Nation Online*, *supra* note 15, at A-2.

[40] *Id*.

[41] *Broadband Deployment in California*, California Public Utilities Commission 13 (May 5, 2005), *available at:* http://www.cpuc.ca.gov/static/telco/reports/broadbandreport.htm.

[42] This issue has been raised in the PUC's recent Order Instituting Rulemaking regarding Universal Service Public Policy Programs, R.06-05-028.

II. Why "Gaps" in Usage Exist

Academics and industry experts have begun to seek explanations for why gaps in broadband usage exist. It is impossible to pinpoint any one explanation, but this paper discusses three primary factors below: (i) access, (ii) affordability, and (iii) applications and content.

A. Access

California has challenges to obtain broadband access due to its large size and varied terrain (i.e. mountain, desert and costal terrain). Given the geographic diversity of the state, however, there are certain areas for which broadband accessibility is limited or not available because there is no infrastructure connecting the customer's premises to the existing Internet backbone. This issue is commonly known as the "last-mile" problem.

The GAO report on rural broadband deployment states that potential broadband providers evaluate two key market conditions when determining whether to provide service to an area: the costs associated with building their infrastructure, and the likely demand for their service.[43] In areas with a low population density, it is more costly to provide broadband service, because of the distances that must be covered to connect individual houses or businesses. Issues with terrain, especially mountainous and heavily forested, also can pose challenges to providers.[44] Broadband providers may be hesitant to deploy in areas with low demand, because it will be more difficult to recoup the costs associated with deployment.[45]

There are several potential solutions to problems concerning accessibility, but most are in the early phases of deployment. One of the more popular alternatives to DSL and cable is satellite broadband. A study found that the primary advantage of satellite broadband technology is that it is available to any U.S. residents who have a direct view of the southern sky.[46] In California's remote deserts, an unobstructed view of the southern sky is easy to obtain. An obvious limitation of satellite broadband is that areas without a direct view of the southern sky are unable to use this service.

Satellite broadband also is significantly more expensive than DSL and cable. Satellite broadband prices range from $50-$100 per month. In addition to this monthly fee, there are separate equipment and installation fees that can be costly. Total setup costs can approach $1,000, including $650 for equipment and $250 for installation.[47]

There also are concerns about the total amount of bandwidth and upload speeds provided by satellite service. One satellite broadband provider's website reported that the upload speed could be as high as 128Kbps, and the average peak upload speed was around 70-80 Kbps, only slightly faster than the standard 56Kbps dial-up modem.[48] As satellite service becomes more

[43] *Gaps in Rural Areas*, *supra* note 37 at 19.
[44] *Id*, at 19.
[45] *Id*, at 20.
[46] *Broadband Deployment in California*, *supra* note 41, at 24.
[47] Betsy Schiffman, *Satellite Internet Access Up In The Air*, FORBES.COM, May 3, 2001, *at* http://www.forbes.com/2001/05/03/0503satellite.html.
[48] *Frequently Asked Questions*, Hughes Network Systems, LLC, *at* http://www.hughesnet.com (July 24, 2006).

popular, there are additional questions about the total number of customers that can be served without having to deploy more satellites.[49]

Other emerging technologies such as Broadband over Powerlines, Broadband In Gas, and wireless solutions such as WiMAX are still being developed.[50] These technologies eventually may help provide ubiquitous broadband, but at present they are still in the early phases of development or trial, with the exception of WiMax.

B. Affordability

As noted above, the average price of broadband has decreased over time. In 2005, the average price for DSL was $32, $7 less than it was in 2004.[51] Some incumbent telephone company providers have now advertised DSL service as low as $12.99 per month.[52] The price of individual cable broadband service has remained constant at an average of $41 per month, but some consumers now can purchase it at a price of $33 per month when the service is bundled with television and phone service.[53] Yet even these reduced prices may be above what some California families can afford. Almost 14 percent of Californians live below the poverty line, and households wanting to use broadband need both a home computer and a subscription to broadband service.[54]

Only 21 percent of families earning less than $30,000 annually have home broadband service.[55] Experts suggest that decreased use of broadband may reflect the fact that many middle and lower income families opt to purchase dial-up Internet service, where they sacrifice speed for a significantly lower price. At the end of 2005, the average reported price of dial-up Internet service was $18 per month – almost half the price of the average DSL bill.[56]

Families also need to have the capital to invest in a computer and its upkeep before going online. Yet falling computer prices are making it possible for more families to purchase new computers. In 2005, the average computer price was $744, down almost 30% from 2002 prices. Some manufacturers have begun to offer budget-priced PCs for as low as $299.[57] Additionally non-profits for some time now have offered low-cost, refurbished computers to low-income families. It is yet to be determined, however, if this non-profit activity will result in more families going online. Even with non-profit services and rapidly falling computer prices, in 2003 only 41 percent of families with incomes less than $25,000 owned a computer.[58]

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[49] *Broadband Deployment in California, supra* note 41, at 24.
[50] Broadband In Gas (BIG) involves ultra high bandwidth wireless communications through active natural gas service lines. BIG uses spectrum that is isolated from FCC-regulated spectrum within natural gas pipelines, allowing high transmission powers.
[51] Horrigan, *supra* note 2, at 7.
[52] Marguerite Reardon, *DSL Strikes a Chord with Frugal Shoppers*, CNET NEWS.COM, June 16, 2006, *at* http://www.cnet.com/2001-1_1-0.html?tag=hdrgif.
[53] Horrigan, *supra* note 2, at 7.
[54] *California QuickFacts*, US Census Bureau, *at* http://quickfacts.census.gov/qfd/states/06000.html (July 17, 2006).
[55] Horrigan, *supra* note 2, at 3.
[56] Horrigan, *supra* note 2, at 7.
[57] Michael Kanellos, *Dell Whacks Prices on Select Notebooks, Desktops*, CNET NEWS.COM, May 1, 2006, *at* http://news.com.com/2001-1_3-0.html?tag=hd_ts.
[58] Jennifer Cheeseman Day, Alex Janus, & Jessica Davis, *Computer and Internet Use in the United States: 2003*, US Census Bureau 2 (Oct. 2005), *available at* http://www.census.gov/population/www/socdemo/computer.html.

C. Applications & Content

In the past, rhetoric on the Digital Divide has centered on the principle that there were "haves" and "have-nots." In this binary world, the primary objective was to supply underserved populations with technology so that all would be on a level playing field.[59] Some have begun to view the Digital Divide as more of a Digital Spectrum, with varying degrees of connectedness. [60] In the Digital Spectrum, usage ranges from the "truly unconnected," to home broadband users with "net evaders," "net dropouts," and "intermittent users" scattered in between.[61]

While it may not be possible to get the "truly unconnected" online, some potential exists in getting "net evaders" and "net dropouts" online through the availability of applications and content that would be relevant to these populations. Data support this notion in that 32 percent of non-users say that they are "just not interested in going online."[62] Consequently increasing broadband adoption has become a factor of providing potential users with not only the tools to access the Internet, but also with applications and content that relate to their lives.

Little Internet content reaches out to populations least likely to be online. Few sites in the United States offer content to persons with limited literacy skills or English proficiency. Of a sample of 20 websites recommended by the Children's Partnership for their "relevant, useful content," only one included content that comprehensible to a person with limited reading skills and less than half (nine websites) offered content in a language other than English.[63]

Research also has shown that in order to increase interest in going online, more culture and community-specific content should be created. Many individuals born in other countries, including Latinos, prefer to acculturate rather than assimilate into a new country, so providing culturally-specific content online will provide more opportunities for minorities to make the Internet a part of their lives.[64]

Community-specific content is one of the most promising methods of reaching out to underserved populations, yet it is one most underutilized methods. This failure may be partially blamed on the challenges associated with creating and updating online content. Yet community-specific content may play an important role in keeping residents informed of community happenings as well as providing job and housing listings and information on local schools.[65]

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[59] Linda A. Jackson, Gretchen Barbatsis, Alexander von Eye, Frank Biocca, Yong Zhao & Hiram Fitzgerald, *Internet Use in Low-Income Families: Implications for the Digital Divide*, 1 IT & SOCIETY 141, 142 (2003), *at:* http://www.stanford.edu/group/siqss/itandsociety/v01i05.html.

[60] Amanda Lenhart & John B. Horrigan, *Re-Visualizing the Digital Divide as a Digital Spectrum*, 1 IT & SOCIETY 24, 24-26 (2003), *at* http://www.stanford.edu/group/siqss/itandsociety/v01i05.html.

[61] "Net evaders" are characterized as persons who live in an Internet household, but do not use it themselves based on personal preferences. "Net dropouts" have used the Internet in the past, but since have stopped. "Intermittent users" are persons who were offline for an extended period of time, but eventually return to the Internet when circumstances permit.

[62] Fox, *supra* note 7, at 4.

[63] Wendy Lazarus & Laurie Lipper, *Online Content for Low-Income and Underserved Americans: The Digital Divide's New Frontier*, The Children's Partnership 11 (June 2002), *available at* http://www.childrenspartnership.org//AM/Template.cfm?Section=Home.

[64] Elsa E. Macias & Einat Temkin, *Trends and Impact of Broadband in the Latino Community*, The Tomás Rivera Policy Institute 16 (Oct. 2005), *available at* http://www.trpi.org/update/publications.html.

[65] Lazarus & Lipper, *supra* note 63, at 9.

Practical Internet applications have the potential to increase usage among more than just residential end-users. The small business community has lower Internet and broadband usage rates when compared to larger enterprises, but its reasons for being offline are unique when compared to those of residential end users. A recent survey found that 27 percent of small business owners do not subscribe to any type of Internet service.[66] In an interview, California Small Business Association President Betty Jo Toccoli estimated that 50 percent of California small business owners used a computer at work and 25 percent of those who owned a computer accessed the Internet at work.[67] There is little data to explain why small business owners are offline, but Toccoli suggested that procuring Internet service and using it were low priority issues to small business owners.[68] Many owners are not aware of the applications that are available or lack the time to receive the necessary training to utilize these tools. To remain economically competitive, however, many small business owners need to gain access to Internet applications in a manner that meets their unique needs.

[66] Stephen B. Pociask, *A Survey of Small Businesses' Telecommunications Use and Spending*, TeleNomic Research, LLC for United States Small Business Administration ii (Mar. 2004), *available at* http://www.sba.gov/advo/research/chron.html#2004.
[67] Telephone Interview with Betty Jo Toccoli, President, California Small Business Association (June 13, 2006).
[68] *Id.*

III.Programmatic Review

A number of programs across the state have attempted to close California's Digital Divide. This section provides a sample of these technology programs across the state. While each program has different target populations and methods of reaching the populations, all share the same overarching goal of filling in gaps associated with the Digital Divide. After the programs are described, lessons learned from the program's experience are set forth.

BeSchoolReady – Mexican American Opportunity Foundation

Location: Los Angeles County

Primary Sponsor: AT&T Inc.

Overview

Funded by a $25,000 grant from AT&T, the Mexican American Opportunity Foundation (MAOF) launched a pilot of the BeSchoolReady program at three of its ten preschool locations in March 2006. BeSchoolReady is an interactive, Web-based application that was created by the Reality Works Company. The application works with children ages three to five to develop their cognitive skills prior to entering elementary school. Children complete online activities, ranging from use of the mouse to matching and basic reading and math. Periodically reports are generated by the program for teachers and parents. These reports detail each child's progress and include areas that the child has mastered and areas where the child has a deficiency.

Children at MAOF's three centers spend no more than 20 minutes per day completing the self-paced BeSchoolReady online activities supervised by their teachers. At the present time BeSchoolReady application are only offered in English, but according to MAOF Chief Development Officer Alicia Pentz-Lopez, the children have excelled despite the fact that about 90 percent of the children come from homes where the primary language spoken is Spanish.[69] In addition only approximately 25 percent of the children have computer and Internet access at home, and the average participating family income is less than $25,000.

Outcomes

According to Pentz-Lopez, the program has been met with approval by parents, teachers, and most importantly the children. Parents are thrilled that their children are gaining access to technology at such a young age and will be more prepared to enter school. Teachers enjoy using the program to supplement classroom instruction, and BeSchoolReady helps the children become computer literate. Since the start of the pilot, most participating children have achieved 80 to 100 percent on the BeSchoolReady objectives. While becoming more technology savvy, participating children enjoy the colorful, interactive activities and have a sense of accomplishment by being able to use a computer by themselves. Word of this success has spread to parents of children in the seven other MAOF preschool centers, and these parents have begun to inquire about when their children will get to use BeSchoolReady too.[70]

[69] Telephone Interview with Alicia Pentz-Lopez, Chief Development Officer, Mexican American Opportunity Foundation (July 6, 2006).
[70] *Id*.

Challenges

Despite the early success of the program, there have been many challenges. Pentz-Lopez reported that there were infrastructure problems for which the center was unprepared. Since the program is targeted at young children, custom computer desks had to be ordered that accommodated the children's smaller sizes and protect computers from accidental damage. Pentz-Lopez also reported that the administration offices of the centers lacked the sufficient printing equipment needed to produce the reports made for each child.[71]

Another challenge was the lack of home Internet access among participating families. According to Pentz-Lopez, this lack of home Internet access is a "missed opportunity" to unite families and supplement learning outside of the school, because parents and children can access BeSchoolReady's Web-based content by going online from remote computers. Pentz-Lopez did report, though, that administrators are working with parents to link them to the nearest location where they can access the Internet.[72]

Finally, funding is a significant issue for BeSchoolReady. While AT&T funded the initial pilot, MAOF has not secured funding necessary to continue and expand the program.

What Can CETF Learn From This Project?

- Effective applications can help bridge gaps created as a result of other factors (such as income or English proficiency).
- Parents are more willing to use the broadband technologies if the parents are shown the potential information technologies have to positively influence their child's future.
- The need for specialized computer furniture and equipment and peripherals such as printers and related supplies should not be neglected.
- CETF grant recipients should be prepared to become self-sustaining after the term of the grant expires, *or* the CETF grant structure should be constructed to include the possibility of multi-year grants to programs that prove worthy of additional funding.

Round Valley Indian Health Center, Inc

Location: Covelo (Mendocino County)

Primary Sponsors: The Technology Opportunity Program & California Telemedicine and eHealth Center

Overview

The Round Valley Indian Health Center (RVIHC) sought to create a replicable model for the implementation of a range of telemedicine and e-Health services in a rural community. RVIHC is the only local medical provider on the Round Valley Indian Reservation. The nearest hospital is more than an hour away, and many specialty services require more extensive travel.

In this project, live video telemedicine services sought to connect patients to providers of specialty services not available in Round Valley. The goal was also to have e-Health and telemedicine services provided at several locations throughout Round Valley in order to bring

[71] *Id.*
[72] *Id.*

medical services to rural residents who needed them. Project founders further intended for kiosks to be established at community locations in order to make health information more available.[73]

Outcomes

Despite many major infrastructure barriers and a delayed launch date, the RVIHC eventually did succeed in launching its telemedicine program. The program's vision had to be restructured to account for difficulties encountered, and its focus was narrowed to serving areas with the most need, including tele-ophthalmology, tele-endocrinology, and tele-mental health services. The plan of creating kiosks with RVIHC was modified and instead RVIHC developed separate Community Telehealth Centers.

In its first two years of operation, from November 2001 through June of 2003, RVIHC served almost 250 clients using telemedicine services.[74] For patients and healthcare providers involved, RVIHC constituted their first experience with telemedicine services. Most patients received either ophthalmology or endocrinology services. A large portion of the Reservation residents are diabetic, and diabetes-related issues accounted for 14 percent of all medical visits to RVIHC.[75]

Challenges

For RVIHC, one major infrastructure challenge precipitated many other challenges. When the possibility of providing telemedicine services at RVIHC was discussed, it was well known that the Center lacked the infrastructure required to provide such services; upgrade efforts were already underway. The building's electrical system had to be improved to prevent losses in power that could interfere with computer operation, and six months prior to applying for funding, RVIHC had begun the process to have a T1 line installed. The extent of these infrastructure challenges, however, was unknown to RVIHC founders. Federal purchasing procedures slowed the process of installing the T1 line. It ultimately took almost two years to complete installation of the line, and the T1 connection was not established until June 2001.[76] Mismatched specifications also led to difficulties connecting to the California Office of the Indian Health Service, from which connections to specialty service providers are made. RVIHC faced further difficulties when contracting for telemedicine services, but eventually tele-endocrinology service began in November 2001.[77]

Aside from infrastructure challenges, RVIHC encountered difficulty when attempting to get clients to attend their telemedicine appointments. Thirty-four percent of appointments for tele-endocrinology appointments were missed by clients.[78] As a result, RVIHC reorganized personnel assignments to shift responsibility from clinic staff to community health representatives in an effort to more regularly bring in community members for telemedicine appointments.

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[73] EVALUATION OF THE CALIFORNIA TELEHEALTH AND TELEMEDICINE CENTER, #141-5 2 DENNIS ROSE & ASSOCIATES FOR THE CALIFORNIA TELEHEALTH AND TELEMEDICINE CENTER (JUNE 2002), *at* http://www.cteconline.org/eval.html [hereinafter EVALUATION].

[74] ROBERT QUADE, CALIFORNIA INDIAN EHEALTH STUDY: INITIAL DATA REPORT 102-104 DENNIS ROSE & ASSOCIATES FOR THE CALIFORNIA TELEMEDICINE AND EHEALTH CENTER (AUGUST 2004), *at* http://www.cteconline.org/eval.html.

[75] EVALUATION, *supra* note 73, at #141-8.

[76] *Id*. at #141-6.

[77] *Id*. at #141-7.

[78] *Id*. at #141-7.

Every patient who received telemedicine services at RVIHC was surveyed after his or her appointment in effort to gauge individual reactions to the service. As expected all had strong opinions, but the reactions were not all positive. Patients could be divided into two basic subgroups: (i) those that consistently had high opinions of the service, and (ii) those who found their experiences to be less than satisfactory.[79] Evidence points to general cultural conservatism or fear of confidentiality being breached as the main reason for the dissatisfaction of some patients.

What Can CETF Learn From This Project?

- Efforts to provide broadband infrastructure to remote rural areas may meet unanticipated barriers – so persistence is needed to succeed.
- Broadband has the potential to eliminate barriers created by rural locations and can serve as a conduit for delivering services to populations who would otherwise not have access to them.
- Cultural differences should be taken into account when providing technology to certain groups. Appropriate expectations should be set by advance outreach to populations served.
- CETF grant recipients should be prepared to be flexible, in order to account for unexpected challenges. CETF should provide oversight when such problems arise and not allow the problems to persist for extended periods of time.

SeniorNet – Norman Park Senior Center

Location: Chula Vista (San Diego County)

Primary Sponsor: The City of Chula Vista, SeniorNet

Overview

Founded in 1986, SeniorNet is a non-profit organization that was the product of a research project funded by the Markel Foundation. SeniorNet's mission is to "provide older adults education for and access to computer technologies to enhance their lives and enable them to share their knowledge and wisdom."[80] Twenty years after its founding, SeniorNet now supports over 240 Learning Centers across the United States and in Sweden, Malaysia, and Japan. These Learning Centers allow adults over 50 to participate in computer classes that range from basic computer operations to Internet and email usage and digital photo sharing. SeniorNet classes are taught entirely by volunteers, many of whom are seniors themselves. Within California, SeniorNet supports 21 Learning Centers, which are housed in various locations including community centers, senior centers, and universities.

Since 1999, the Norman Park Senior Center in Chula Vista, California has been home to a SeniorNet Learning Center.[81] Chula Vista is located just south of downtown San Diego, and 11 percent of its residents are over age 65. More than fifty percent (52.6%) of the people who live in Chula Vista speak a language other than English at home.[82] At the SeniorNet Learning Center,

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[79] *Id*. at #141-9.
[80] *About SeniorNet*, SeniorNet, *at* http://www.seniornet.org/php/default.php?PageID=5005 (July 27, 2006).
[81] Telephone Interview with Karen Harvell, Recreation Supervisor II, City of Chula Vista Recreation Department (July 27, 2006).
[82] *Chula Vista, California Fact Sheet*, US Census Bureau, *at* http://factfinder.census.gov (July 27,2006).

computer classes have a maximum enrollment of six, due to a limited number of broadband-ready computers available. Each class has two instructors who guide students through the SeniorNet curriculum. Classes are offered in Spanish, but text is only available in English. Six to seven courses are offered each month. Each course consists of four weekly three-hour sessions.[83]

In addition to funding received from SeniorNet, the SeniorNet Learning Center is also sponsored by the City of Chula Vista. According to Norman Park Senior Center Recreation Supervisor Karen Harvell, the City performs computer maintenance and replaces the computers about every five years.[84] The City also provides the Learning Center with a part-time employee who performs administrative functions.

Outcomes

As a result of the SeniorNet classes available in Chula Vista, the City's senior population has had the opportunity to gain computer skills not possessed by most other seniors. According to Harvell, an average of 15 new students enroll each month in the introductory level course.[85] Students enjoy the "hands-on" training that they receive, and their newfound ability to communicate via email and the Internet. The Norman Park Senior Center actively advertises the classes in hopes of attracting new students, especially students over 75, whom Harvell finds are the least computer and Internet proficient.[86]

Harvell also touted the benefits the program has had for its volunteers, especially the volunteers who are seniors. Volunteers enjoy being able to share their knowledge, and as Harvell said it gives some of them a "purpose."[87]

Challenges

Despite the relative longevity of the program, Harvell explained that the SeniorNet Learning Center faces many challenges associated with providing services to seniors. Students entering the program often do so only to learn how to use email. Students sometimes are unwilling to put in the required time to practice what they are taught, and they can slow down the progress of the classes. This behavior frustrates instructors who want to move on, but instead must reteach previous lessons.

Due to a lack of volunteers, computer lab hours are limited, as are the course offerings. According to Harvell, fewer than half of students have a computer available to them at home, so there is an additional strain placed on lab resources.

Some potential students may not be able to afford SeniorNet classes because of the fees required by both SeniorNet and the Norman Park Senior Center. In order to enroll in a course, students must be member of SeniorNet ($40 per year), and class fees at the Norman Park Senior Center range from $20-25, depending on residency. Use of the lab during non-class times is free, but if a person is not computer literate and cannot afford to attend a class, their computer activities are more limited than other seniors who have received computer training.

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[83] Telephone Interview with Karen Harvell, *supra* note 81.
[84] *Id.*
[85] *Id.*
[86] *Id.*
[87] *Id.*

What Can CETF Learn From This Project?

- Providing seniors with the knowledge of how to use a computer and the Internet can result in seniors incorporating information technologies into their everyday life.
- Seniors are interesting in learning how to use the Internet to communicate via email.
- Price, no matter how much, affects whether seniors will adopt new technologies.
- Developing a good supply of volunteers is important to have enough program instructors and lab volunteers.
- Working within established technology networks promotes program longevity.
- CETF grant recipients should have a clear knowledge of who they are serving and how to make technology relevant to those users.

Signature Learning Project – Latino Issues Forum

Location: San Francisco

Primary Sponsors: AT&T

Overview

Recognizing a need for computers in underprivileged urban neighborhoods, the Latino Issues Forum (LIF) sought to create a groundbreaking model that trained teachers, students, and students' families in computers skills. The result was the Signature Learning Project (SLP), which was founded in 1996 as a three year pilot project. A particularly noteworthy feature of SLP was that families who completed its twelve-hour training course receive a computer that they can use at home for the duration of a school year. LIF selected Fairmount Elementary in the outer Mission District as the location for SLP pilot for several reasons: (i) most students came from low-income households; (ii) the school had a history of poor communication between parents and teachers; (iii) the majority of the student population was either Latino or African-American.[88]

Parents and other family members received training on how to use computers to assist their children's learning and improve their own employment and parenting skills. The training curriculum, offered both in English and Spanish, taught parents skills ranging from word processing and Internet applications to how to resolve computer problems. In addition to providing in-class training, LIF also gave each family a comprehensive training packet that was sensitive to language, literacy, and cultural barriers.[89] Additional training and assistance were provided at nearby established community-based organizations (CBOs).

Upon completion of the training, teachers and families took home an Internet-ready computer and printer. They also received one year of free Internet service.[90]

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[88] Addressing the Digital Divide at the Front Lines, Latino Issues Forum (1999-2002) (unpublished manuscript, on file with Latino Issues Forum) [hereinafter Addressing the Digital Divide].
[89] *Id*.
[90] *Id*.

Outcomes

LIF targeted 260 families and 22 teachers to receive equipment and training. As the project entered its third year in 1999, 234 families and 22 teachers had completed the training. LIF estimates that the project impacted almost 400 children.[91]

Teachers of children whose families received the training and computers noted an improvement the children's writing abilities. Standardized tests scores for students whose families received computers increased significantly. These children's scores were well above the 50 percent quartile, which was noticeably better than their usual position in the lowest quartile.[92]

Parents also reaped benefits from computer access. Seventy-six percent of participating parents had not completed high school, but some participating parents subsequently went on to take additional computer classes and obtained better jobs as a result. Many parents began to communicate with their children's teachers via email. PTA participation increased among these families too. More parents now volunteer at the school. Participating parents reported feeling more comfortable helping their children with school work, especially if it involves using the Internet to do research. Thirty-six percent of families reported using their home computer more than five hours per week.[93]

Challenges

SLP was plagued by two challenges throughout its three-year pilot. According to LIF Director of Technology and Consumer Education Ana Montes, the first challenge resulted from giving the equipment to families.[94] The older, refurbished computers that were donated to LIF had limited memory capacity and were unable to support newer versions of Windows software. Thus, only a limited set of applications could be used on the computers. Many parents complained that they could not use Web browsers or install programs that used CD-ROMs.[95]

The second type of problem that plagued SLP was a lack of communication between the school and parents. Despite the fact that all 22 teachers underwent the training, these teachers were hesitant to use the technology to communicate with parents.[96] Parents reported being frustrated by the lack of communications. Some felt deceived, because originally the project had promised to make parents more connected to their children's school. Both teachers and administrators were blamed for the lack of communication.[97]

In addition to these two large challenges, several other minor challenges arose. Some parents were disappointed at the level the training classes were taught. Parents, however, could not agree as to whether classes were too difficult or too simple. Other parents were disappointed at the level of technical support available. Finally, and ironically, some parents declared that computers had negative consequences for their home life. Parents reported that use of the

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[91] *Id*.
[92] *Id*.
[93] *Id*.
[94] Email from Ana Montes, Director of Technology and Consumer Education, Latino Issues Forum (July 10, 2006, 2:52 PDT) (on file with author).
[95] Addressing the Digital Divide, *supra* note 88.
[96] Email from Ana Montes, *supra* note 94.
[97] *Id*.

computer subtracted from family time. Some wanted to return to the life they had before they were introduced to computers and the Internet.[98]

What Can CETF Learn From This Project?

- Providing computers and Internet access to underserved minority, and limited English proficient populations can be successful if the requisite training and support is provided for the school, administrators, teachers, parents and students.
- Schools provide an excellent opportunity to introduce computers and the Internet to low income families.
- Communication between the school community and parents is vital to the success of a project.
- CETF grant recipients, if providing hardware, should invest in new, state of the art computer hardware whenever possible in order to run applications.
- CETF should look to existing CBOs for opportunities to sponsor promising projects, because CBOs have established leaders within the community who can facilitate projects and their acceptance within a community.

Street Tech

Location: San Pablo

Primary Sponsors: Wells Fargo Bank, Microsoft, Verizon, JP Morgan Chase, Comcast, Cisco, many different foundations, and Contra Costa Community Development Block Grant

Overview

Established in 2000, Street Tech was created in response to a need for qualified computer technicians in the Bay Area. The non-profit organization provides low cost computer training and job placement assistance to adults from underserved communities in the Bay Area. Students receive three to six months of intensive computer training at Street Tech's San Pablo training center. This training results in students' becoming certified computer technicians. Students also must take life skills classes to prepare them for the rigors of the professional world.

One hundred percent of Street Tech students come from disadvantaged backgrounds. Many students have spent time in the criminal justice system, and many have never held a job.[99] Students who cannot afford to pay tuition are required to work with the agencies that fund Street Tech. All students must volunteer 24 hours of time through Street Tech's Give Back program.

In 2004, Street Tech expanded to include a new service, ReliaTech, which provides low cost technical support and computer repair services to consumers, small businesses, and non-profit organizations. Services range from on-site dispatched technical support to walk-in computer repair at ReliaTech's lab storefront. According to Street Tech Executive Director Barrie Hathaway, ReliaTech serves two important functions: (i) it provides valuable work

[98] Addressing the Digital Divide, *supra* note 88.
[99] E-mail from Barrie Hathaway, Executive Director, Street Tech (July 26, 2006, 10:45 PDT) (on file with author).

experience for students, which makes them more marketable upon completion of Street Tech, and (ii) it generates income that is used to expand Street Tech services and resources.[100]

Outcomes

Street Tech has enrolled nearly 500 students since its first class in 2000.[101] Current retention rates are well over 80 percent.[102] The cumulative student job placement rate since the first graduating class is 70 percent. The 2005 graduates, however, had an 86 percent placement rate.[103] Not only do most graduating students find jobs, but they find jobs that pay well and have benefits. Hathaway mentioned that one recent graduate from the Computer Apprenticeship Program accepted a job with a starting salary of $21 per hour plus benefits. She was most proud, though, of simply having the confidence to apply for such a job.[104]

Former Street Tech students also are returning to be instructors for the next generation of Street Tech students. According to Hathaway, former students can make some of the most effective teachers at Street Tech, because they understand the circumstances of the current students. He noted, though, that the other instructors are highly qualified and sensitive to the backgrounds and circumstances of the students.[105]

ReliaTech has proved to be a highly successful venture. It is currently self-funded, and this year it is projected to produce a nominal net income. The current strategic plan calls for a 50 percent contribution from ReliaTech profits to cover Street Tech operating expenses by 2008.[106]

Challenges

One challenge reported by Hathaway was the inability of Street Tech to continue expanding services due to a lack of funding. Other related opportunities could include creating more internship positions for students, and hiring and additional staff personnel dedicated to cultivating partnerships with businesses that might hire Street Tech graduates. Street Tech also has been unable to increase its staff so that it can provide more life skills courses.

Another challenge is conveying the rigors of the Street Tech program to incoming students. Because of the difficult backgrounds students come from, many are overwhelmed by the Street Tech curriculum and the required time commitment. Staff is working to remedy this problem by making sure that students are prepared for the program's challenges and by devising tactics that help students overcome obstacles. As a result the dropout rate has decreased.

What Can CETF Learn From This Project?

- By providing adequate training almost anyone can learn to use computers and their applications.
- Former students can become very good future teachers in the program.
- Training has a positive effect on more than just the students who receive the training; the students' community also benefits.

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[100] *Id*.
[101] *Id*.
[102] E-mail from Barrie Hathaway, Executive Director, Street Tech (Aug. 3, 2006, 2:38 PDT) (on file with author)
[103] E-mail from Barrie Hathaway, *supra* note 99.
[104] *Id*.
[105] *Id*.
[106] *Id*.

- CETF grant recipients should be prepared to show that they have sufficient staff and enough funding to complete projects.
- CETF grant recipients should have a strategic plan to guide how money will be spent and how the program can become self-sustaining.

IV. Recommendations

Based on lessons learned from the cases outlined, above the following recommendations were developed as possible "next steps" to be taken by CETF.

1. Partnership Building

CETF should strive to serve as an intermediary between existing networks of leaders concerned with broadband deployment.

In his groundbreaking work *Diffusion of Innovations*, Everett Rogers develops a model for which innovations can be adopted at a greater rate. One of the key players described in the book is the "change agent" who, according to Rogers, "influences clients' innovation decisions in a direction deemed desirable by the change agency."[107] In this model, CETF would serve as the change agent that would not only influence decisions, but also would provide a communication link among networks of leaders who are concerned with broadband deployment.

As the change agent, CETF also would work to develop a diffusion system. A typical diffusion system is highly centralized, and ideas in the system flow from top to bottom, without an opportunity for ideas to flow in the opposite direction.[108] In the context of broadband deployment, a traditional diffusion system would have CETF deciding how it wanted to deploy broadband, and then CETF would pass its ideas on to opinion leaders in communities, who would in turn pass ideas on to adopters. The obvious problem of this diffusion model is that CETF would never receive input from the adopters at the lowest levels. The model, therefore, likely never would be perfectly in tune with the adopters' needs and wants.

An alternative to this centralized form of diffusion is a more decentralized model. In this model, new ideas flow horizontally among local innovators, who in turn spread those ideas to the adopters who can provide feedback to local innovators.[109] The change agent's role in this system is less visible, but more important than its role in the centralized model. The change agent facilitates the diffusion of information within and among groups by ensuring that sufficient communication exists. California Business, Transportation & Housing Agency Partnership Manager Jeff Newman compared the role of the change agent to that of a body's lymphatic system.[110] The lymphatic system is charged with monitoring all of the other body systems to ensure they are working correctly, independently and in conjunction with the other systems. The change agent receives less credit for its work in this model, as its control shared with the local innovators. Yet without links created by the change agent, diffusion would be vastly limited.

As a change agent, CETF would be responsible for facilitating discussions among stakeholders involved in broadband deployment, including community, industry, and academic leaders from across the state. By developing an understanding of varying points of view, parties will be able to work together and effectively eliminate the barriers that previously have precluded them from coordinating efforts. Stakeholders will benefit from learning what works and more importantly what does not work, lessons that will help prevent repeated mistakes.

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[107] EVERETT M. ROGERS, DIFFUSION OF INNOVATIONS 335 (4th ed. 1995) (1962).
[108] *Id*. at 364.
[109] *Id*. at 365.
[110] Telephone Interview with Jeff Newman, Partnership Manager, California Business, Transportation & Housing Agency (July 31, 2006).

2. Strategic Planning

Recruit an expert working group to develop a strategic plan for the future of CETF.

There are many experts within California who have devoted their careers to studying the Digital Divide and exploring opportunities created by having ubiquitous broadband available throughout the state.[111] CETF should capitalize on expertise of these individuals by using them to develop a strategic plan that will carry CETF forward. This plan will be able to leave a lasting blueprint once CETF is disbanded.

This expert working group should include members from academia, representatives from CBOs, industry experts, and CETF. Once recommendations for a strategic plan are developed by the working group, the CETF Board and Executive Director will have the final decision on how they envision the future of CETF. In order to ensure that a quality product is produced, CETF should consider providing compensation to this group. While the working group process may take time, it is well worth the effort to ensure the longevity and productivity of CETF projects. Many officials emphasized that it is unwise for an organization, such as CETF, to "lead with money" without doing the requisite planning.[112]

3. Additional Research

Allocate a portion of CETF resources to collecting and analyze data on the broadband usage of Californians.

As shown by this paper's discussion of broadband usage statistics, vast inconsistencies exist in demographic data available on broadband usage. Data are collected infrequently and small sample sizes limit what can be extrapolated from results. Often large diverse groups (i.e., seniors, Latinos, small business owners) are combined into one group, and the data that result fails to take into consideration differences that exist within these populations. Consequently policymakers often are unable to get a clear picture of who is on the other side of the Digital Divide, and why they have been left behind. Having an accurate representation of the demographics can aid in the development of a strategic plan for the future of CETF.

By creating a comprehensive and accurate map of broadband using GIS software along with provider data and U.S. Census tract data, ConnectKentucky has been able to leverage providers to speed up broadband deployment in underserved areas across the state. Broadband providers receive some value from this mapping because it allows them to identify areas where there is inadequate broadband service. Currently, Kentucky ranks first in the country in broadband expansion with more than 350,00 new households with broadband access since the October 2004.[113] Preliminary efforts to create a GIS map of California broadband data are underway, but at this point in time there is no scheduled date of completion.

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[111] A list of expert contacts can be found in **Appendix 1: Useful Contacts**.

[112] Telephone Interview with Peter Pennekamp, Executive Director, and Kathleen Moxon , Chief Administrative Officer, Humboldt Area Foundation (June 22, 2006).

[113] *Are We There Yet?* ConnectKentucky, *at* http://connectkentucky.org/projects/bbexpansion/yet.htm (Aug. 7, 2006).

4. Project Funding

CETF should not limit itself to funding only pilot projects.

All of the projects described in section III, perhaps with the exception of SeniorNet, are based on a pilot model. In this model, an organization selects an area to test a program, and based on the results, the organization attempts to modify and scale up or replicate a program elsewhere. As shown case studies above, results of pilot projects are mixed.

While mixed results are to be expected with unique pilot projects, there are special hazards associated with the pilot project model more generally. One challenge is finding leadership that can take a project from its infancy to a larger scale operation. Talent often is attracted to the challenge of operating a new pilot program, but it may be more difficult to find the similar quality leadership needed for future copies of a program. Pilot projects also tend to be very idiosyncratic to the needs of their individual communities. Thus, the extent to which a project can be replicated is limited.

Pilot projects tend to have reasonably high failure rates. Continually funding projects that fail can have a negative effect on CETF's credibility and may detract potential investors. By utilizing the decentralized diffusion system, however, CETF will tune in with what Californians need, and the probability of funding a successful project will increase.

Conclusions

CETF is in a unique position to influence the future of broadband deployment throughout the state. But along with this influence, CETF has the responsibility to use its resources effectively. This analysis establishes that the following lessons are important to CETF's success:

- Goal setting is crucial to determining whom and where you want to serve, how you want to serve, and what resources are needed for this effort.
- Strategic planning must be an iterative process.
- A metric for success should be established so that Board members can determine whether CETF and its grant recipient are meeting their goals.
- Effective use of public relations is necessary to reach out to underserved populations.

In the long run, CETF will reap long-run rewards from being prepared for the challenges associated with providing broadband to the underserved populations of California.

Appendix 1: Useful Contacts

There are many experts, a number of which are based in California, who specialize in issues pertaining to broadband and the Digital Divide. The contacts below by no means constitute an exhaustive list of experts, but they are meant to serve as a starting point for dialogue as to the future CETF.

Assistive Technology

Mary Lester
Executive Director
Alliance for Technology Access
(707) 778.3011
marylester@ATAccess.org

Community Project Implementation & Technology Policy

Ana M. Montes
Director of Technology & Consumer Education
Latino Issues Forum
(415) 284-7208
anamontes@lif.org

Richard Chabran
Chair
California Community Technology Policy Group
(213) 439-9640, Ext 19
chabran@cctpg.org
Also: Technology in Libraries

Communications Law

Professor Allen S. Hammond
Director
Broadband Institute of California
Santa Clara University
(408) 554-4078
ahammond@scu.edu
Also: Digital Divide

Grant Making

Tony Wilhelm
Former Director
Technology Opportunities Program – NTIA
(202) 772-5267
awilhelm@usac.org

Partnership Building

Jeff Newman
Partnership Manager
CA Business, Transportation & Housing Agency
(626) 422-5581
jnewman@bth.ca.gov

Race and the Digital Divide

Dr. Robert W. Fairlie
Associate Professor of Economics
University of California, Santa Cruz
(831) 459-3332
rfairlie@ucsc.edu

Research & Demography

Dr. Mark Baldassare
Director of Research, PPIC Statewide Survey
Public Policy Institute of California
(415) 291-4427
baldassare@ppic.org

Rural Technology

Peter Pennekamp
Executive Director
Humboldt Area Foundation
(707) 442-2993
peter@hafoundation.org

Small Business Technology

Dr. Esteban Soriano
Director of Research
California Small Business Education Foundation
(310) 642-0838

Telemedicine

Speranza Avram
Executive Director
Northern Sierra Rural Health Network
(530) 470-9091
speranza@nsrhn.org

Youth & Technology

Wendy Lazarus
Founder and Co-President
The Children's Partnership
(310) 260-1220 Ext. 11
wlazarus@childrenspartnership.org

Michael Funk
Executive Director
Sunset Beacon Center
(415) 759-3690
mfunk@snbc.org

Appendix 2: Recent Broadband Studies and Reports

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