ASR ANALYTICS

National Telecommunications and Information Administration

Broadband Technology Opportunities Program Evaluation Study

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NTIA

Case Study Report

Round 2

Cambridge Housing Authority

Public Computer Center

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Executive Summary

> *"I think we have been able to demonstrate, and the computer centers have been part of this, that the place where you can break the cycle of poverty isn't so much with adults, but with kids. We're doing that with our Work Force program and those kids are moving on and moving out of public housing. They're moving into the middle class."* – Cambridge Housing Authority Director of Resident Services

The Cambridge Housing Authority (CHA) has provided affordable apartments and rental assistance to low-income families and individuals in the city of Cambridge, Massachusetts for seventy-five years. Its mission is to develop and manage safe, quality, affordable housing in a manner that promotes citizenship, community, and self-reliance. CHA offers a range of services for residents of all ages, including a full array of wellness, education, workforce, and life skills training. CHA provides public computer centers to aid residents in improving their computer and Internet skills. The goal of providing these services is to promote residents' upward social and economic mobility. CHA opened its first computer centers, Jefferson Park and Windsor Street Center, in 1998 and 1999, respectively, using federal, state, and private funding. Because of Massachusetts state budget cuts, CHA was forced to shut down its Jefferson Park and Windsor Street facilities in July 2009.

On February 1, 2010, the National Telecommunications and Information Administration (NTIA) awarded CHA a Broadband Technology Opportunities Program (BTOP) Public Computer Center (PCC) grant for $698,924 to implement the Community Computer Center project. This project was designed to rehabilitate and improve CHA's broadband training by reopening and expanding three PCCs to serve approximately 10,000 public housing residents, including low-income households, immigrants, seniors, and minorities. CHA proposed the following, with the results shown:

- Replace 24 workstations and add 16 new workstations at the centers to provide an expected 420 new users per week with access to broadband, computer courses, job training, and literacy programs. From grant inception through the end of 2012, the CHA PCCs served an average of 151.5 users per week.[1]

- Reinstate CHA's educational programs, including workforce skills training, test preparation, literacy, and English for speakers of other languages (ESOL) courses. CHA resident services programs use the PCCs for training. Programs include Gateways ESOL training, Strictly Computers digital literacy training, Work Force college and career preparation, and Parents Reading on Computers with Kids (Parents ROCK) early childhood literacy training. From grant inception through the end of 2012, CHA conducted more than 62,000 hours of digital literacy and education training.

- Collaborate with the Cambridge Public Schools and the Cambridge Community Learning Center (CLC), the city's adult basic literacy education agency, to provide education and employment services at the centers. CHA has continued to leverage and strengthen these relationships over the course of the grant period. CHA used grant funds to open a fourth PCC in Cambridge Rindge and Latin High School. CHA installed a total of forty-six new and upgraded workstations across the four PCCs.[2]

CHA grant activities are conducted primarily within the three census tracts where the upgraded PCCs are located. Most computer center users are residents of nearby public housing complexes. Residents of the census tracts surrounding the public computer centers generally have lower incomes, are more likely to speak a language other than English at home, and are more likely to be non-White than the residents of the city of Cambridge or the nation.[3]

CHA housed approximately 10,057 low-income individuals with an average income of $20,514 in 2010.[4] Nearly 10 percent of the city of Cambridge's population resides in 5,333 units of public and Section 8 housing. Thirty-eight percent of all CHA households and sixty-six percent of those in family developments are minorities. At least 59 percent of assisted families and 84 percent of elderly residents have no Internet access.[5] CHA's residential survey results show that more than 50 percent of residents responding to the survey have no more than a high school diploma or general equivalency diploma (GED) and 24 percent have less than a high school education.[6] The survey also revealed that 56 percent of respondents indicated someone in their home owned some type of computer (50 percent laptops, 46 percent desktops, 2 percent notebooks, and 2 percent smart phones), and 54 percent of respondents had Internet access in their home (of those, 89 percent had a high-speed connection, and 11 percent had dial-up).[7]

This case study is one of fifteen performed by ASR Analytics, LLC (ASR) on a sample of eight PCC and seven Sustainable Broadband Adoption (SBA) grants. It is part of a larger mixed-methods evaluation of the social and economic impacts of BTOP.

The purpose of this case study is to:[8]

- Identify how the grantee maximized the impact of the BTOP investment.
- Identify successful techniques, tools, materials, and strategies used to implement the project.
- Identify any best practices, and gather evidence from third parties, such as consumers and anchor institutions, as to the impact of the project in the community.

This report further investigates the initial impacts reported by the grantee during the first round of visits and identifies additional impacts that occurred in the time between the site visits. The results presented in this report reflect the evaluation study team's observations at the time of the second site visit. This report includes both qualitative and quantitative components. It is intended to serve as a basis for *Interim Report 2*, which will analyze data from fifteen case studies.

This case study is primarily qualitative, as limited data availability prohibited quantitative analysis. ASR collected the information presented here during two field visits to evaluate the social and economic impact of the CHA project. The evaluation study team originally met with representatives of CHA over a two-day period in July 2011, visiting administrative offices and the three computer center locations funded under the grant. ASR conducted a second site visit with the grantee and program staff from March 4-5, 2013. The second site visit focused on the PCCs that were included in the first site visit: Roosevelt Towers, 119 Windsor Street, and Jefferson Park.

In total, the evaluation study team performed five case study site visit interviews. ASR transcribed these discussions. This information, and other information and reports provided by the grantee, were supplemented by Quarterly Performance Progress Reports (PPR), Annual Performance Progress Reports (APR), and other publicly available information.

The evaluation study team observed the following major impacts of the grant:

- **The Gateways program** leverages grant-funded equipment to provide ESOL students with access to more effective language-learning programs (previously not supported by CHA equipment). The grant-funded computers and the digital literacy skills gained through the Gateways program improve participants' ability to connect with their children's schooling and monitor their academic progress. The acquisition of digital literacy and English skills enhances users' ability to pursue career objectives and participate in community activities. Through the end of 2012, 692 students had participated in 35,066 hours of Gateways training.
- **Strictly Computers** course participants gain basic Internet skills and learn to use Microsoft Office applications. Upon completion of the course, students receive a certificate listing the skills obtained in class, which they can use to verify their digital skill set to a potential employer. CHA delivered 19,541 hours of Strictly Computers training to 585 participants.[9]

- **The Work Force program** integrated grant-funded equipment into its curriculum, enhancing the capacity of Work Force students to keep up with digital innovations in the college application process. The grant-funded PCCs provide students with the ability to work on college applications and essays and receive guidance from staff outside of school. Grant-funded computer labs allow the Work Force program to support students with the college search and application process, much of which requires Internet access. With the transition to digital textbooks, access to reliable computers enables students to complete homework assignments and study outside of the classroom. Internet platforms and online searches also facilitate career exploration and application for summer jobs. Work Force students rely on the computer labs, as many do not have access to computers or Internet at home. Each PCC serves roughly 45 Work Force students, ranging in age from 13 to 18, for a total of 130 to 135 students annually.[10]
- **The Parents ROCK program** leveraged grant-funded computers to improve participants' digital literacy skills. Access to the computers allows students to complete homework assignments that require a computer. Participating parents become more engaged in reading with their children and assisting with homework.[11] Throughout the grant period, 362 participants completed 8,871 hours of Parents ROCK training.[12]

In addition to the benefits reported for individuals, there are some impacts reported for organizations in the community:

- **Improved coordination with Cambridge Public Schools through the establishment of a PCC within a local high school exclusively for Work Force students.** This PCC allows Work Force students, many of whom do not have computers at home, the opportunity to complete digital homework assignments. The PCC has reinforced the Work Force program's presence in the school system, enhanced communication with guidance counselors and teachers, and helped facilitate the high school's access to public housing students' parents. These coordinated efforts amplify the educational support available for public housing students participating in the Work Force program.
- **Additional computer-based training programs in public libraries because of demand from ESOL participants.** The Gateways program director worked with local libraries to offer courses in Excel, Publisher, and other topics beyond the scope of the Gateways curriculum.

Without the BTOP grant, CHA would not have had the resources necessary to include digital content in its curricula. With the changing technical climate of education, this would severely hinder CHA resident services' ability to assist children and their families in achieving academic success, including admission to college. It would place foreign-born residents at a disadvantage in connecting with their communities, communicating with families in their native countries, and accessing the most effective English language-learning resources. Finally, residents of Cambridge public housing would be without free, local access to computers and high-speed Internet, or the training to use such tools.

If PCC equipment had not been updated by grant funds, the Director of Resident Services does not believe the PCCs would be in operation today. Before the BTOP grant, the Jefferson Park and 119 Windsor Street PCCs had closed because of a loss in state funding. Roosevelt Towers did not have a PCC. Before closing, the resources available at the existing PCCs were limited. The outdated computers frequently malfunctioned. PCC workstations were unable to run modern applications or access content-heavy websites. Users and staff were frustrated when using the computer labs. As discussed in this report, CHA's focus on improving the condition of computer labs was a key part of enhancing resident services and achieving the benefits described.

Section 1. Introduction

The Cambridge Housing Authority (CHA) has provided affordable apartments and rental assistance to low-income families and individuals in the city of Cambridge, Massachusetts for seventy-five years. Its mission is to develop and manage safe, quality, affordable housing in a manner that promotes citizenship, community, and self-reliance. CHA offers a unique range of services for residents of all ages, including a full array of wellness, education, workforce, and life skills training.

On February 1, 2010, the National Telecommunications and Information Administration (NTIA) awarded CHA a Broadband Technology Opportunities Program (BTOP) Public Computer Center (PCC) grant for $698,924 to rehabilitate and improve CHA's broadband training. CHA reopened and expanded three public computer centers that serve approximately 10,000 public housing residents, including low-income households, immigrants, seniors, and minorities. CHA collaborates with the Cambridge Public Schools and the Cambridge Community Learning Center (CLC).

1.1 What the Interviewees Told Us

Figure 1 displays words used frequently by interviewees during discussions that took place with ASR. These interviewees included program management and representatives from three CHA locations: Roosevelt Towers, 119 Windsor Street, and Jefferson Park. The word cloud displays the 100 words used most frequently by the interviewees. The purpose of the word cloud is to provide a succinct visual summary of the conversations that occurred. Statements made by ASR personnel during the interviews and focus groups were excluded from the analysis, as were common words, such as prepositions, articles, and conjunctions, which were identified using a standard "stop list."

As shown in the word cloud, the respondents perceived the grant as being highly focused on "computers" and the "people" who use them, particularly "students" and "kids." These terms reflect the project's goal of integrating computers into programs that improve children's educational achievements. The frequency of terms such as "school," "learn," and "lab" reflects the PCC's role in enhancing pre-existing service programs.

Figure 1. Words Interviewees Used Frequently
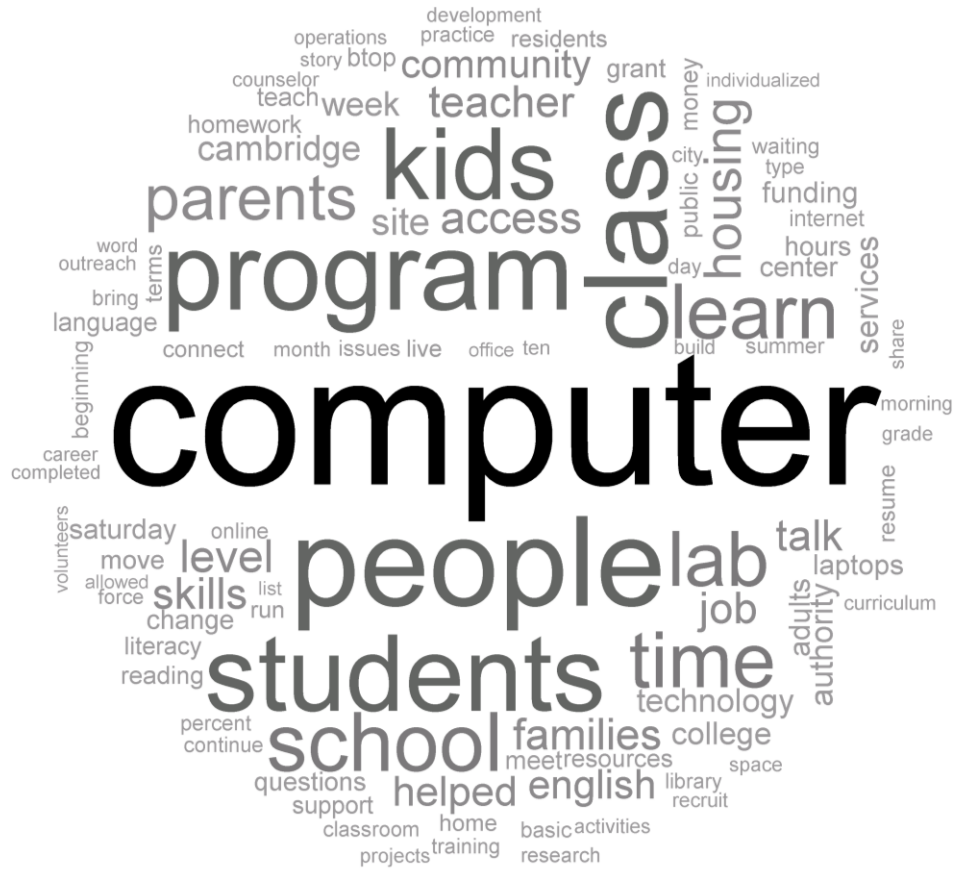
Section 2. Impacts

The most prominent impacts of the CHA grant are in the focus areas of Digital Literacy and Education and Training. In addition to providing open lab access and digital literacy training to approximately 10,000 public housing residents, the grant enhanced CHA resident services by providing the resources necessary to incorporate digital content into existing curricula. These programs include an adult English for speakers of other languages (ESOL) program, a children's literacy program, and a life skills and vocational training program for low-income youth.

According to interviewees, the primary impacts to users include the acquisition of digital literacy skills, improved social connections, and an enhanced awareness of the Internet's capabilities. It improved foreign-born residents' ability to access the most effective English language-learning resources, to connect with the local community, and to communicate with relatives in their native countries. With the changing technical climate of education, the grant improved CHA resident services' ability to assist children and their families in achieving academic objectives, including improvements to childhood literacy and completion of secondary school. The grant also provides CHA residents free, local access to computers, broadband, and training. Such impacts are significant when considering the grant's target population. Compared to other Cambridge residents, those living in public housing are more isolated by language and educational barriers. Many must simultaneously balance raising a family and working multiple jobs and are less likely to have home access to a computer and the Internet.[13] The accounts provided by interviewees include the following:

- "I feel that having computers in the Work Force program is critical because it allows us to teach students to use the computers in ways that will advance them. We can do a lesson in which we're talking about careers and we get everybody on a computer. We're going to web pages that they wouldn't have gone to otherwise. We use the computers in prepping students for the SATs, preparing college applications, and researching colleges. It allows us to guide their research. If they were doing it all at home, we wouldn't be there to guide them. Most of our students have parents who never went to college and don't know how to guide them."

- "I think it's such a great thing because the kids are allowed only a certain amount of time at school. This gives them a chance to expand their use to something comparable to their peers with computers at home. For some of our students, at school and on Saturdays are the only times that the kids get to use computers. Teachers are expecting homework to be done on the computer."

- "I think the biggest benefit is around job search, college search, being able to access all of those critical tools online. While we could do that with the old labs, by the time our funding ran out, the computers were very out of date. They were very slow and it was very frustrating. It wasn't the kind of useful resource that it became when we were able to replace the computers and have high-speed Internet access. You could move through things. You could actually accomplish objectives."

- "The students know they can rely on us and use the lab for access. Oftentimes students at home don't have access to Internet or to computers. So it was great for them to know that until 6:30 on Monday through Thursday and 6:00 on Fridays they can come here. Sometimes they would work really hard on projects, but they didn't have the opportunity to print it out and things like that."

- "I know that when we're able to replace the computers, the interest level increased a lot. I'd say by about a third over the course of those six months because people, rather than being frustrated in the lab with computers not functioning, were having a positive experience."

This qualitative evidence supports the conclusion that the grant facilitated the improvement of CHA resident service programs. These programs provide public housing residents with digital literacy training, ESOL instruction, college and workforce preparation for high school students, and children's literacy building. These results are in line with the intent of the American Recovery and Reinvestment Act of 2009 (Recovery Act) and the specific goals of the CHA grant.

2.1 Focus Areas

This section describes the impacts of the CHA project in terms of five focus areas. In order to analyze where impacts should expect to be found for this project, ASR tabulated the training hours for CHA reported in the 2012 APR using the focus area categories described in *Interim Report 1*.[14]

Figure 2. Grantee Training Hours Categorized by Focus Area
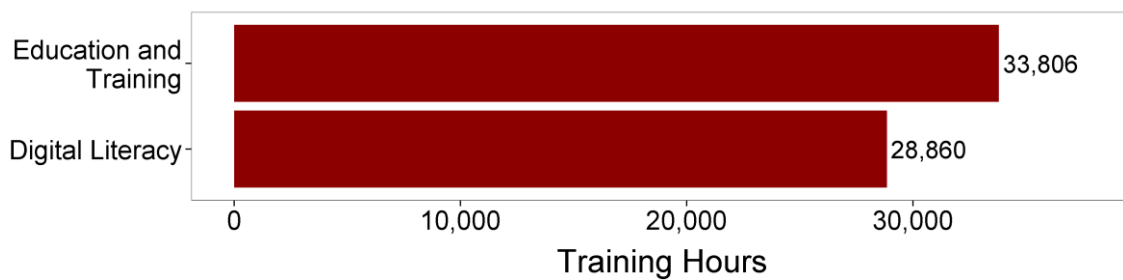
As shown in Figure 2, CHA reported more than 60,000 hours in their 2012 APR, all focused on Education and Training and Digital Literacy topics. ASR also analyzed the statements the grantee made during the interviews and categorized them based on focus area. Figure 3 shows the relative frequency with which each focus area was mentioned.

Figure 3. Focus Area Statements Made by Interviewees
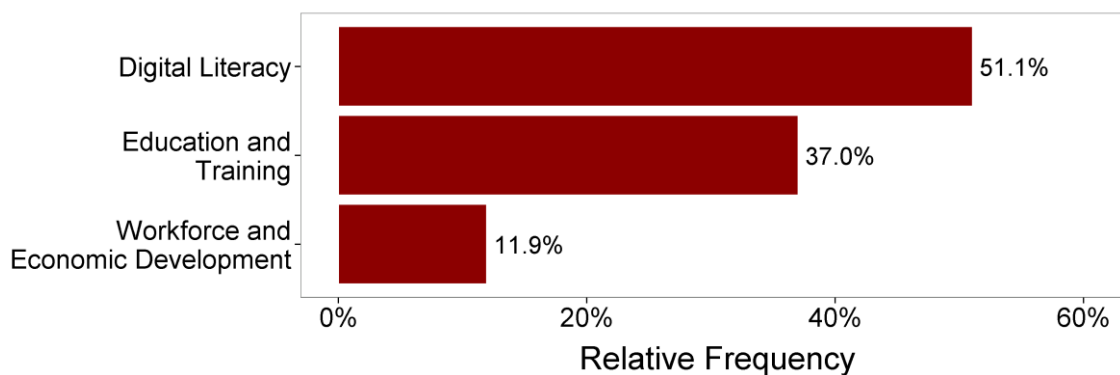
Figure 3 provides another measure of the grantee's focus. As illustrated above, most responses and discussion in the interviews centered on Digital Literacy and Education and Training. Although the majority of training the grantee provides is classified as Education and Training, Digital Literacy was the primary focus area referenced in discussions. This suggests that Digital Literacy was a significant part of most training activities performed by the grantee. In addition, while CHA does not report training classified as Workforce and Economic Development, the grantee did address this area in the interview responses, suggesting that this was an area of impact.

"The computer classes and open labs attract adults of all ages and of diverse backgrounds. They come for reasons that reflect their life goals, to develop skills to better position themselves for a job or a better job, to comparison shop or pay their bills, to help their school-age children with homework, or simply to keep up with current news. All of this activity further engages learners with the wider community, whether that be their family or extended family, Cambridge, Port-au-Prince, or elsewhere in the world."
– Strictly Computers Instructor

This focus area is fundamental to all the others. Digital Literacy defines a set of skills and abilities that enable an individual to interact with the digital aspects of culture, and to maintain a digital identity. In the National Broadband Plan, the Federal Communications Commission (FCC) defines digital literacy as "the skills needed to use information and communications technology to find, evaluate, create, and communicate information."[15]

Figure 4 presents the number of training hours provided by CHA resident service programs over the course of the grant period. The amount of training delivered has increased steadily, with the exception of the third quarters.[16] The third quarter includes summer months during which CHA scales back provision of services.[17]

Figure 4. Quarterly Training by Resident Service Programs Using CHA PCCs
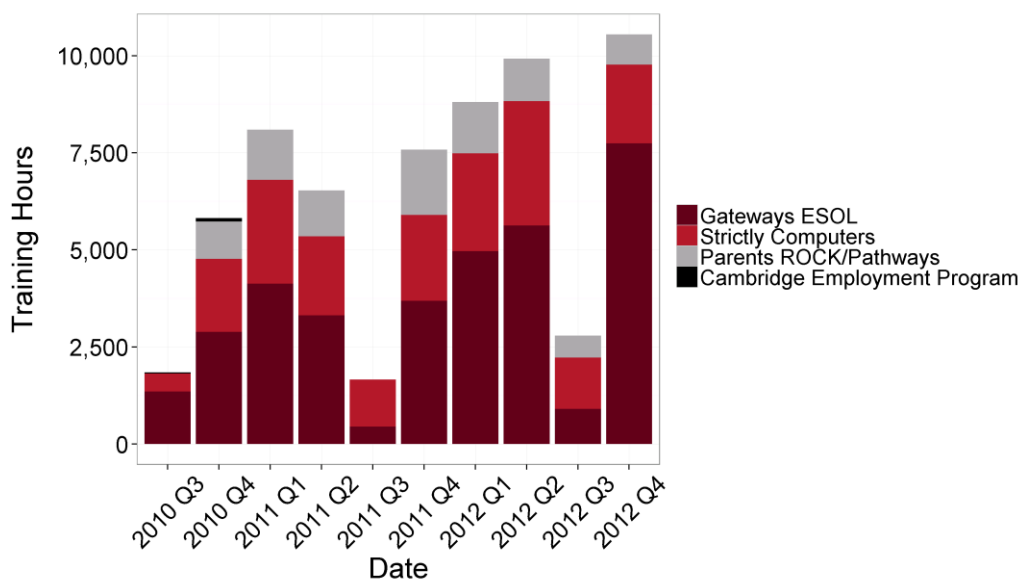
The CHA project focuses on integrating digital components into the following existing resident service programs, resulting in improved digital literacy for participants:

- The Gateways Adult Basic Education Program provides English language instruction and computer instruction in the CHA's computer centers and introduces users to an array of educational and vocational opportunities. The Massachusetts Department of Education also supports the Gateways program. Gateways ESOL classes are offered at the Jefferson Park computer center. By the end of 2012, 692 students had participated in 35,066 hours of Gateways training.[18]
- The Strictly Computers course, led by instructors from the CLC, includes training in Microsoft Office applications and basic Internet skills. The course offers advanced topics for more

experienced students. The Windsor Street and Jefferson Park computer centers offer the Strictly Computers course in a five-week summer term and two fifteen-week terms during the academic year. CHA delivered 19,541 hours of Strictly Computers training to 585 participants.[19]

- The Work Force program is a nationally recognized youth development program that provides educational support, comprehensive life skills, and vocational training for low-income youth who live in Cambridge public housing. All three PCC locations offer the Work Force program. Work Force participants are diverse, comprising a broad range of ethnicities and cultural backgrounds: 31 percent Haitian, 29 percent African American, 17 percent Hispanic, 12 percent African, 4 percent multiracial, 4 percent Asian, 3 percent Cape Verdean, and 1 percent White.[20] Each PCC serves roughly 45 Work Force students, ranging in age from 13 to 18, for a total of 130 to 135 students annually (52 percent female and 48 percent male).[21]

- The Parents Reading on Computers with Kids (Parents ROCK) program provides literacy training to young children and their parents or guardians with the goal of promoting family stability, increasing success at school, and improving literacy. The Cambridge Agenda for Children, in conjunction with the Pathways to Family Success family literacy and case management program, funds and operates Parents ROCK. The Windsor Street computer center offers the Pathways/Parents ROCK program. Throughout the grant period, 362 participants completed 8,871 hours of Parents ROCK training.[22]

In addition to these programmatic enhancements, interviewees reported Digital Literacy impacts across programs. While there is not a quantitative gauge to measure the extent of the outcome, program staff interviewed by ASR report that an increase in digital competency among their students translates into improved self-confidence. As noted above, formal education among many CHA residents is limited to a high school diploma or general equivalency diploma (GED). Achieving success in a quasi-academic setting is motivating for program participants. While previous experience may be limited among participants, participation in digital literacy activities enhances students' awareness of the Internet's capabilities and their desire to learn more advanced skills. The grant enabled CHA to incorporate digital content into curricula, resulting in the following program-specific impacts reported by interviewees:

- The Gateways program incorporates computer instruction into the ESOL curriculum, providing students with a more robust skill set. Gateways students gain the knowledge and skills necessary to operate computers independently. Students become aware of the Internet's capabilities and express interest in pursuing advanced digital opportunities.

- The Department of Elementary and Secondary Education funds the Gateways program as an English learning class. As a result, Gateways cannot expand the curriculum beyond basic computer instruction. The program director worked with local libraries to meet user demand for higher-level computer courses, including Microsoft Excel and Publisher.

- The Strictly Computers course affects users' perceptions of computers and the extent to which they integrate computers and the Internet into their daily lives, regardless of whether the point of access is at home, at a local library, or on a mobile device.

- Strictly Computers students learn to leverage the Internet to connect to their families, to their community, to their native countries, and to their interests and goals, including reading online news or job searching. Communicating with relatives is of particular importance to students, as many are immigrants and speaking with those in their native countries via telephone is expensive. Students learn to use the Internet to save money communicating with family members.

- Grant-funded technology enabled Work Force students to learn the online research skills necessary for their college and career search. Students are able to operate individual laptops during lessons, learning to conduct web research effectively. Students learn to locate, evaluate, and apply online information to school assignments and to their college and career search.

- The availability of grant-funded computers has affected Parents ROCK participants' awareness of computers and the Internet. The Pathways coordinator has observed increased interest among parents seeking assistance in locating information or accomplishing tasks online.

CHA resident services programs, including Gateways, Work Force, and Pathways, have historically operated at capacity. Because of the grant, these programs have integrated the modernized workstations and digital content into their curricula:

- Access to the PCC allowed the Gateways program to incorporate computer instruction as an adjunct to the core, state-funded ESOL classroom activities. The Gateways program also leveraged grant funds to establish an introductory computer module to ensure that ESOL course participants with limited computer skills are able to maximize the benefits of the program. In addition to the six hours of ESOL training per week, participants in the computer basics module attend a supplementary two-hour session each week.
- The Strictly Computers program includes basic computer operations, Microsoft Word, and a second level presenting PowerPoint, Excel, and more advanced topics. Teachers determine lesson content based on student demand.
- Work Force instructors provide individualized assistance, guiding students' computer-based activities. Before the grant, students often had to share computers, prohibiting individualized support in digital activities.
- The Parents ROCK program emphasizes the computer as a literacy device. Children attending the session with their parents use grant-funded computers for literacy-based activities connected to a weekly theme.
- The Pathways coordinator provides relevant selections of websites and online resources for interested parents.
- The Parents ROCK aide engages students in assigned activities. For the younger attendees, activities often include letter games and activities on Public Broadcasting Service (PBS) websites. For the older students attending the program, the activities generally prompt users to engage in web-based research related to the topic of the week. An example of a Parents ROCK web research prompt is provided in Figure 5 below:

Figure 5. Parents ROCK Student Computer-Based Assignment

Option 1: Businessperson

You are a marketer. Convince me to travel to some fabulous place and spend a lot of money going there.

Find interesting facts and enticing pictures. List some things I could do there. Find it on Google Earth or a map web site.

Option 2: Humanitarian

You want to save the world. Tell me what the biggest problem is and convince me to do something about it.

Give me some hard facts about the problem, and tell me what should be done.

For both options, show me where your facts come from – you're more persuasive that way!

2.3 Education and Training

> *"It's a big deal to have the ability to monitor their children's work, homework, grades, and communicate with the teaching staff. No one takes phone calls anymore." – Gateways Program Manager*

This focus area includes activities that lead to a certificate or diploma that would typically be awarded by an educational institution, or that indicates the recipient has received training that is recognized as valuable for career advancement. Examples of certificates or diplomas include community college degrees, four-year college degrees, advanced degrees, GEDs, certifications in advanced software technologies such as network engineering, and other licenses or certifications that reflect knowledge of a particular subject at a level that would typically be taught at an educational institution.

Resident services offering educational support were able to enhance their provision of service through the integration of grant-funded computers. Interviewees reported the following impacts to Gateways students resulting from the integration of grant-funded equipment into Education and Training activities:

- The Gateways program provides ESOL instruction for working-age adult, low-income residents of Cambridge Public Housing.

- Grant-funded computers facilitate access to more effective language-learning programs. Gateways instructors direct students to USALearns.org, a free, interactive English-learning website for adults. The website features include pronunciation via microphone, writing, reading, and listening comprehension. Before the BTOP grant, the resources available in the computer lab did not have the capacity to access the website.

- The grant-funded computers allow Gateways students to connect better with their children's schooling and monitor their academic progress. With an increasing amount of school-related content, such as homework, announcements, and correspondence with teachers and administrators occurring online, resources for students to access this content are a significant educational tool.

- The Gateways program manager organized a Free Application for Federal Student Aid (FAFSA) tutorial for students with children approaching college age and parents of Work Force students. Grant-funded PCCs provide access to modernized computers, allowing users to access and submit electronic financial aid forms. The tutorial, offered in conjunction with the Cambridge Economic Opportunity Commission, enabled parents of high school-age students to complete their taxes in order to prepare for the FAFSA. The program also walked participants through the first steps of the FAFSA and directed attendees to support services, available online, through the local high school.

The Work Force program provides students in grades eight through twelve with open access to homework centers and weekly classes geared toward life skills, college prep, and job readiness. The program has a record of success since its inception in 1984, with a nearly 80 percent participant retention rate and a 100 percent high school graduation rate. Approximately 95 percent of participants enroll in college or technical school upon completing the program and over 90 percent are currently pursuing higher education or employed.[23] Two-thirds of program alumni out of the program for more than four years no longer reside in public housing.[24] Work Force and CHA staff described several program impacts related to the Education and Training activities facilitated by the grant:

- Grant-funded computer labs have improved the Work Force program's ability to support students with the college search and application process. For example, Internet access is central to completing and submitting the Common Application, a free online undergraduate application used by more than 400 colleges and universities. Before the BTOP grant, equipment available at the PCCs did not have the ability to complete digital applications effectively. The grant-funded equipment facilitates students' college application process, reducing the amount of time and effort required to complete an application. The increase in modernized computers allows students to work simultaneously on applications, rather than take turns on a limited number of computers. The grant also enabled access to Naviance, an online college and career-planning platform. Naviance helps Work Force staff keep students on track working toward collegiate and career-related goals. Access to Naviance allows staff to monitor students'

progress and provide more targeted guidance, reducing the likelihood that students miss deadlines or opportunities.

- With the transition to digital textbooks, access to reliable computers influences students' ability to complete homework assignments and study outside of the classroom. The grant allowed the Work Force program to provide students with access to technological resources comparable to what is available and used in their schools. Work Force students rely on the grant-funded computers labs, as many do not have access to computers or Internet at home. The Work Force instructor explained that the majority of the eighth grade curriculum is posted on Google Docs. In order to complete homework assignments, students need access to a computer and Internet. Teachers report to Work Force instructors that struggling students do not have access to computers to complete assignments. With resources available through the grant, students are able to complete homework assignments posted on Google Docs.

- The grant helped to cultivate the relationship and improve communication between CHA and Cambridge Public Schools. The Work Force program established a PCC in Cambridge Rindge and Latin High School available exclusively to Work Force students. This PCC, staffed with a Work Force teacher counselor, has helped to reinforce the Work Force program's presence in the school system and enhance communication with guidance counselors and other school staff. The new PCC has helped to garner support for the Work Force program among school personnel who are now able to observe the program in action. Work Force staff members have established improved relationships with high school faculty. This partnership has also helped facilitate the high school's access to public housing students' parents.

- Work Force students are permitted to use the homework center and laptops outside of their designated class hours. Instructors observed an increase in students using the homework center since receiving the grant-funded laptops.

- Work Force students use the computers for homework, research, and papers. They explore career options and create and maintain résumés. Laptops encourage students to seek guidance and collaborate with peers. Students are able to print projects and assignments at the facility, and share their sense of achievement upon completion with staff and fellow students.

The Parents ROCK program introduces parents and their four- to seven-year-old children to literacy-building computer programs. A 2012 report prepared for the Massachusetts Department of Elementary and Secondary Education and Adult and Community Learning Services Division determined that vocabulary scores of Parents ROCK students increased or remained the same, although it is difficult to isolate the effect of the Saturday program relative to that attributable to school activities.[25] Interviewees report the following impacts resulting from Education and Training activities:

- Access to the computers allows students to complete homework assignments that require a computer and save parents the time and effort required to seek out a public computer. Most children attending the Parents ROCK sessions do not have computers at home. Saturday meetings may be the only opportunity for students to use computers outside of school.

- Parents observe young children engaging in educational games on the computers and recognize the educational value of computers and the Internet. Many parents may initially perceive their children's Internet activity to be purely recreational. Parents' perceptions of their children's Internet use change as students exhibit educational gains as a result of engaging in Parents ROCK activities. These activities illustrate how the Internet can be a valuable tool for enhancing students' academic performance and helping students plan for the future.

- Parents participating in the Parents ROCK program became more engaged in reading with their children and assisting with homework. Many parents have attended parent-teacher conferences. Attending the conference allows parents to reinforce teachers' suggestions for student improvement at home. Parents ROCK staff members report that parents are actively volunteering in their children's classrooms and in other community events. The Parents ROCK program helps parents overcome barriers to support their children's educational needs.

2.4 Workforce and Economic Development

> *"The ability to use the computer centers to launch a new career that might involve computer technology just isn't feasible when you're a single mother raising two or three kids, working two jobs, you've just come out of your English class, and you've somehow found the time for that, to enter a training program that will in most cases be full time. How do you support your kids?"* – Cambridge Housing Authority Director of Resident Services

This focus area includes activities intended to increase overall employment of the target population, or to assist employed members of that population in finding jobs that offer increased salaries, better benefits, or a more attractive career path, including self-employment. Workforce and Economic Development activities can be performed for one's own benefit, or they may be done on behalf of another person to assist with his or her employment situation. In order for project activities to be included in this category, it must be the intention of the grantee to assist members of the workforce in improving their employment outcomes, and project resources must be devoted to this purpose.

Participants in interviews report the following impacts from Workforce and Economic Development activities:

- CHA determined from experience with its programs that the most significant employment-related benefits for adult residents are increasing hourly wages, obtaining a position with benefits, and improved work hours. Acquiring the skills necessary to obtain a position involving advanced computer skills is not feasible for many in the target population, who are working multiple jobs and raising families.
- Gaining computer skills has given residents the confidence to pursue job opportunities they may have otherwise disregarded. After receiving training, participants are more willing to learn new technology skills on the job, broadening their employment possibilities.

CHA resident services programs offer the follow Workforce and Economic Development activities using grant-funded equipment:

- The Gateways instructors direct students to CareerCruising.com during class lab sessions. The career exploration website provides education, skill-level, and salary information. Gateways instructors work with students to understand the information on the site and discuss personal barriers to career objectives.
- Some Gateways students worked on online applications during class lab sessions or during the computer module. Online job applications are becoming the standard for many employers. For a student to obtain a job as a housekeeper, cashier, or other position at a hotel or other large corporation, the online application is a necessary hurdle. Though the positions may not require computer skills, access to computers is necessary to produce a résumé and complete an application.
- Strictly Computers class activities may include viewing job boards, completing online applications, or drafting a résumé.
- The Strictly Computers instructors created a certificate to award students who complete the course. The back of the certificate includes a list of the skills acquired through participation in the program. Students can take this certificate to potential employers to verify their digital skill set. The Strictly Computers course instructor estimated that ten of fifteen students per session obtain a certificate for completing beginner Microsoft PowerPoint or Excel classes. The Strictly Computers class has provided 585 residents with training, suggesting that an estimated 390 students have obtained certificates.

- Computer skills and online activities are an integral part of the Work Force program, used by students to develop résumés, fill out job applications, and research colleges, career paths, and job opportunities.

- Exploratory jobs provide Work Force students with the opportunity to try out various career fields. The average Work Force student holds three exploratory positions between ninth and twelfth grade, earning approximately $3,000. Work Force students use computers to prepare and print résumés, and research exploratory job positions. Eighty percent of the students placed in the Work Force program's exploratory jobs receive "competent" or "advanced" evaluation ratings from employer-mentors.[26]

- The evaluation study team observed a ninth grade Work Force class where students were preparing for an informational visit to Draper Laboratories, a not-for-profit research and development organization. Students use the PCCs to research positions at the firm and draft questions for employees. This research assignment helps students to maximize their learning experience at the facility and to converse with employees.

Section 3. Recovery Act Goals

This section describes the activities and outcomes associated with Recovery Act goals. Of the five Recovery Act goals for the BTOP program as a whole, two relate most directly to PCC and SBA programs:

1. Provide broadband education, awareness, training, access, equipment, and support to
   a. schools, libraries, medical and healthcare providers, community colleges and other institutions of higher learning, and other community support organizations
   b. organizations and agencies that provide outreach, access, equipment, and support services to facilitate greater use of broadband services by vulnerable populations (e.g., low-income, unemployed, seniors)
   c. job-creating strategic facilities located in state- or federally designated economic development zones
2. Stimulate the demand for broadband, economic growth, and job creation.

3.1 Provision of Services

> *"Had we not been able to reopen the labs, the equipment we had in there would by now be so completely outmoded we couldn't use it. We couldn't get programs for it. Nothing would be supported." – Cambridge Housing Authority Director of Resident Services*

The grant provides residents of Cambridge public housing with free, local access to computers and high-speed Internet. The CHA resident population is a proxy for patrons of the grant-funded PCCs. A survey conducted in spring 2011 in CHA's family and elderly developments revealed that 56 percent of respondents indicated someone in their home owned some type of computer (50 percent laptops, 46 percent desktops, 2 percent notebooks, and 2 percent smart phones), and 54 percent of respondents had Internet access in their home (89 percent of those had high-speed and 11 had percent dial-up).[27]

The grant funded computer and equipment upgrades at Jefferson Park and Windsor Street computer centers, and the establishment of a new, laptop-equipped computer center in the Roosevelt Towers family housing complex. With grant funds, CHA purchased a total of forty new desktop and laptop computers distributed between Jefferson Park and Roosevelt Towers PCCs, a new network server at the Windsor Street center, and three years of broadband and wireless service (provided by Comcast) for each of the labs. These enhancements would not have been possible without BTOP.

The grant quickly resulted in improvements to broadband access. CHA installed forty workstations in the third quarter of 2010. This number rose to forty-six in the fourth quarter of 2011, with the addition of a fourth PCC in Cambridge Rindge and Latin High School.[28] By the fourth quarter of 2010, two PCCs received upgraded broadband connections, and one new broadband connection had been installed.[29] Because of these improvements, CHA doubled the number of computer labs and improved the quality of workstations available for residents. If PCC equipment had not been updated through the grant, the Director of Resident Services does not believe the PCCs would be in operation today.

From grant inception through the end of 2012, the CHA PCCs served an average of 151.5 users per week.[30] Before the grant, Roosevelt Towers did not have a computer lab. Roosevelt Towers

residents and those residing in nearby Section 8 housing would have to walk twenty minutes to 119 Windsor Street to access computers. Now, grant-funded equipment is available for residents to check e-mail, engage in job searches, and participate in other activities previously unfeasible. Open lab hours, staffed by trained adult educators, are available at all three computer centers.

With the inception of the grant, CHA implemented a monthly services report, collecting data for the open labs and the Strictly Computers course reported together under the service category of Computer Centers. CHA has since discontinued the collection of data for this survey.

CHA met or exceeded nearly all annual goals for fiscal year 2011. These include the number of Strictly Computer classes and open labs offered and the number of adults enrolled in the Strictly Computers summer and academic sessions. Outcomes include:[31]

- Thirty-one adult students enrolled in the Strictly Computers five-week summer course, surpassing CHA's goal of enrolling thirty students in 2011.
- CHA's annual enrollment goal for adults in the Strictly Computers academic session was 90 with 66 completing the course. One hundred thirteen students enrolled, and sixty-one completed the course.
- CHA's annual goal for number of students served by open labs includes 40 students not enrolled in classes and 24 students enrolled in classes. Ninety-one students not enrolled in classes and nineteen enrolled students attended open labs.
- CHA met all of its goals for course provision, including offering two summer sessions and six academic sessions of Strictly Computers, and six open lab sessions offered in conjunction with the academic session of Strictly Computers.

The availability of modernized equipment has allowed CHA resident services programs to integrate a digital component into their curricula. Before the BTOP grant, the ability of these programs to incorporate technology was limited by outmoded resources. The availability of grant-funded PCCs has enhanced CHA resident service programs by facilitating access to new software and websites, allowing students simultaneous use of computers and alleviating frustration among both students and teachers:

- Before the grant, the Gateways program offered at the Jefferson Park PCC, acquired its computers through the U.S. Department of Housing and Urban Development (HUD) grants in the mid- to late 1990s. The computers, which ran Windows 95 or 98, often malfunctioned. Gateways students seldom used the computer lab, as capabilities were limited. Instructors were hesitant to bring lower-level English students into the computer lab. Since receiving the grant-funded equipment, all Gateways classes use the lab as part of course instruction. Students are able to engage in speaking, listening, and other activities in the lab, whereas they previously would have been limited to typing exercises.
- In addition to the grant-funded PCCs, Gateways students can access computers at local libraries. Libraries generally have time limits, a limited number of computers, and waiting lists. Cambridge Community Television offers a limited number of public access hours. Students residing in a nearby Section 8 housing facility have access to a small computer lab in the building, though classes are not offered.
- Before the BTOP grant, the Work Force program at Roosevelt Towers used four outdated, malfunctioning machines. This limited the range of activities Work Force students could engage in, as anything requiring a computer often resulted in frustration.
- Without the grant-funded equipment, the CHA Resident Services Director does not think it would have been feasible to continue to offer the computer component of the Parents ROCK program. The older computers limited the activities students could engage in, as they did not have the functionality to support certain software programs, games, or websites. The computers available to the class would have been too slow to maintain the children's interest and would have frustrated parents.

- Most Parents ROCK participants do not have computers at home. The computers provide children with the opportunity to learn and explore beyond what is possible within school-designated time limits and assignments.

3.2 Broadband and Economic Growth

CHA resident service programs use the digital components of their curricula to support Workforce and Economic Development activities. Instructors help patrons develop the basic computer skills necessary to create résumés, draft cover letters, and complete online applications. Students have started to use online job seeking resources, such as CareerCruising.com and online job boards.

As required by the Recovery Act, CHA reported the number of jobs created as a direct result of the project every quarter. As shown in Figure 6, the number of full-time-equivalent positions created has increased in the last quarter of each year of grant performance.[32] Since the end of 2011, CHA has reported that the number of full-time-equivalent positions increased to 4.48.[33] The grant provides funding for the staff members that provide guidance and informal training during open lab hours, the Strictly Computers staff, and a portion of the CHA's Director of Residential Services salary for project administration.

Figure 6. Direct Jobs Created by CHA
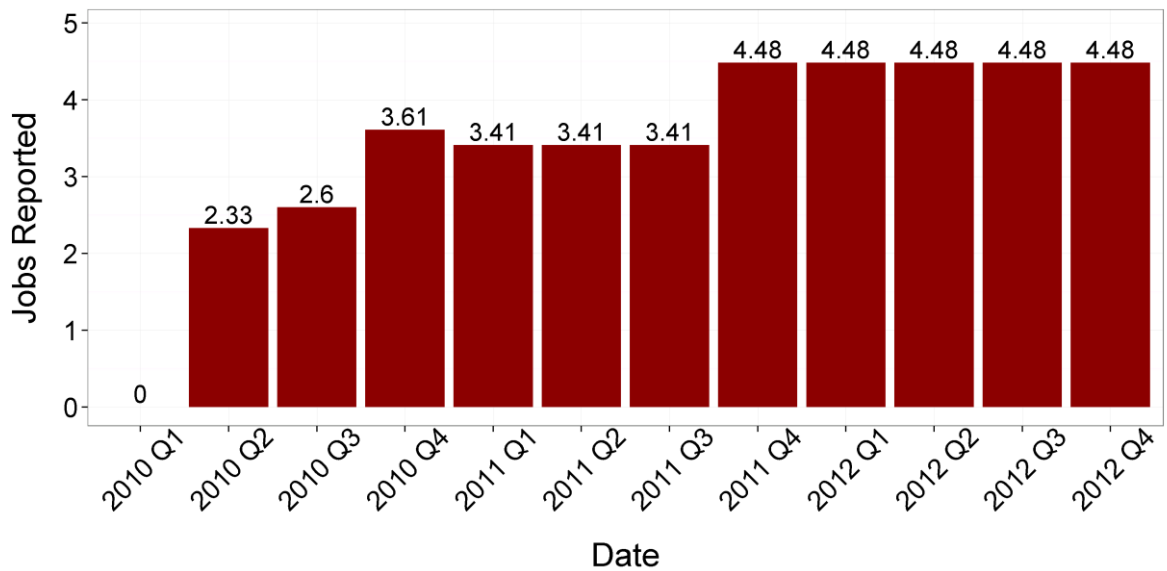
Section 4. Grant Implementation

This section describes particular aspects of implementation of the CHA grant in order to understand the composition of activities and outcomes observed. The purpose of this section is twofold. First, defining a consistent set of categories for each of the grants in the study sample facilitates cross-case comparison and analysis. Second, presentation of the activities and outcomes for this grant by category simplifies understanding of the focus of the grantees' work. This analysis is based on qualitative observations made during the site visit.

ASR is using a theory-based evaluation approach to examine the social and economic impacts of the BTOP program. This permits deeper understanding of grant features in terms of theory, which helps to explain how the grant activities produce impacts. For the PCC and SBA grants, ASR uses theories of technology adoption to examine factors that shape the demand-side of broadband services. The key theory ASR employs is the unified theory of the acceptance and use of technology (UTAUT), a technology adoption model proposed by Venkatesh et al. (2003).[34] The model is among the top three articles published in the information systems field and the preeminent article explaining the adoption of information systems. The UTAUT model traces its history from theoretical constructs found in literature that have a bearing on a user's intention of technology adoption and use. The UTAUT model is derived from the leading theories of technology adoption, including the theory of reasoned action, technology acceptance model, motivational model, theory of planned behavior, a combined theory of planned behavior/technology acceptance model, model of personal computer use, diffusion of innovations theory, and social cognitive theory.

UTAUT explains technology acceptance by looking at a user's intention to use an information system and the user's long-term use of that technology. The UTAUT model combines concepts found in earlier models of technology use to posit a unified theory of information technology adoption and use. UTAUT includes four dimensions determining user intention and technology use: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. Each of these dimensions is further classified into constructs constituting the dimension. The subsections below define and discuss each of these dimensions. Venkatesh empirically tested the model and reported that it was successful in explaining more variation in user adoption of technology than other adoption models tested.

Figure 7 presents the frequency of topics related to grant implementation as discussed during interviews and focus groups from highest to lowest. These topics fall into four categories, corresponding to the four UTAUT categories listed above. The most frequent implementation topics discussed relate to Facilitating Conditions.

Figure 7. Distribution of Grant Implementation Topics by UTAUT Dimension
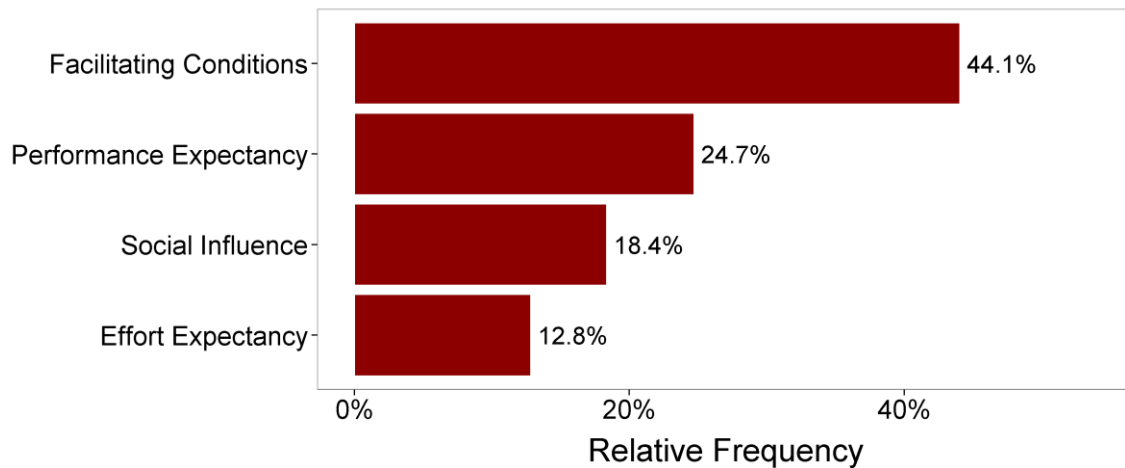
4.1 Facilitating Conditions

This category captures how the technical infrastructure available to the user supports potential broadband adoption, and the degree to which there are organizational supports for adoption. This includes access to broadband technology, the extent to which users can choose to use broadband, the compatibility of broadband with their lifestyle and activities, and the cost of using broadband. This also includes the resources needed to support the PCC's services to provide access to the Internet and computers.

4.1.1 Access

- Many Work Force students do not have Internet access at home. The availability of digital resources and guidance from trainers supports students as they prepare for entrance exams, research schools, and complete applications.
- Training environments are structured with students in mind. Youth tend to be more skilled in computer use, so their training focuses more on independent work in an open lab setting. Adults benefit more from peer learning, and thus a classroom setting is preferable for course delivery.
- The Strictly Computers course offers a morning and evening session to accommodate participants. Saturday morning Strictly Computers classes are available at Jefferson Park for those whose schedules do not allow for weekday training. While Saturday morning students who are residents of other locations would like to have classes available in their own housing facilities, they are willing to travel to take advantage of this time slot.

4.1.2 Equipment

- Before receiving grant funding, computer labs were reliant on outdated equipment. The grant allowed for the purchase of new, upgraded equipment. The new computers have stimulated demand for computer access among residents, which led to the implementation of staffed open labs.

4.1.3 Training

- The grant helped to secure training for Work Force instructors from the local high school to use the Naviance program. Before BTOP, the high school would not invest resources in training

Work Force staff, as there was not an adequate facility for Work Force staff to use the skills gained in training.

- The grant funded the hiring of computer aides to assist Gateways trainers, particularly in lower-level classes. Additional computer aides work on a volunteer basis. The presence of computer aides during classroom-based training allows students to receive more individualized instruction and trainers to deliver curricula more effectively.

- Work Force teacher counselors may remain in PCCs after regular instructional time to work one on one with students who have specific learning needs or requests.

- The Parents ROCK program, which targets students in kindergarten through third grade, accommodates parents who need childcare for older children. Staff has incorporated program material to suit the educational needs of students outside of the target age range.

4.1.4 Other Activities

- Strictly Computers staff consults with prospective students about their interests and expectations in order to recommend the best course of training for each student. Most classes are considered "open-entry, open-exit"; however, trainers admit new students while the course is in progress only if they believe those students possess the skills necessary to join the class at that time. Residents who express interest in topics not covered in training are encouraged to explore open labs.

- Strictly Computers enrollees undergo an assessment at the beginning of the course to determine baseline skills. Trainers use the assessment results to fill roster seats according to skill level. Participants with lower skills enter the course as early as possible to receive training that begins at the most basic level. Participants who have a more advanced skill set can begin the course midway since they have already mastered the techniques taught in the early lessons.

- A technical assistant and two Work Force student volunteers assist students using the computers during Saturday Parents ROCK sessions. Staff members provide students with individualized attention, helping them to navigate the Internet and various computer programs. The two Work Force students are familiar with the computer lab, which is helpful to program staff and students.

4.2 Performance Expectancy

Performance Expectancy measures the degree to which a potential adopter believes that using the public computing center to gain access to broadband is beneficial. Aspects of Performance Expectancy include the perceived usefulness of the new technology, outcomes expectations, and the perceived relative advantage of the technology versus previously used technologies. Examples include:

- Performance expectations vary among patrons. Enrollees range from job seekers who want to develop digital skills to secure employment to parents who want to leverage digital tools to help their children with schoolwork to residents who want to use the Internet to shop, bank, or pay bills.

- Some residents approached trainers about learning to complete online tasks not covered in their classes, such as paying bills or using social media. In these cases, residents stay in the lab following instructional time to work in a one-on-one setting with their trainer during open lab hours.

- Students have limited knowledge of the Internet's capabilities before attending the Strictly Computers class. The course instructor discovered that students are excited and motivated to learn about conducting everyday activities online, including paying bills, sharing photos, and communicating with relatives. Staff members have observed a sharp increase in demand for

computer access among residents after they become familiar with the Internet and understand its capabilities.

4.3 Social Influence

This category measures the degree to which potential adopters perceive that others will view them favorably or interact with them in a positive way if they adopt broadband technology. This includes friends and family members who might already be using broadband technology. It also includes measures of whether the use of broadband is considered to be a social norm for the social group to which the potential adopter belongs. Components of Social Influence include subjective norms, social factors, and the image associated with broadband use.

4.3.1   Peer Influence

The communication of positive experiences by program participants to friends and neighbors can have a powerful impact on residents' decision to adopt broadband technology. The grantee has observed the following:

- Word of mouth among residents has been an effective, informal means of outreach for all programming at CHA. Most notably, residents who have recently relocated from foreign countries are often referred by their sponsors or temporary host families who help them access community resources.
- Immigrant families are often socially isolated relative to their U.S.-born counterparts. The desire for social connectivity is a driver for program participation among these populations. The community-learning environment helps to suppress feelings of isolation and establish a sense of community.
- One of the Strictly Computers instructors is a former student who completed the program more than five years ago. This staff member is on the tenants' council of the housing authority and a familiar face to many residents.
- Students become more adept and comfortable with computer use after receiving training. Students who participate in the computer basics modules, and those who begin the ESOL program with sufficient computer skills, often demonstrate leadership skills in assisting students new to the program or on the waiting list for the computer basics module. Student leaders can apply for computer aid volunteer positions at the Jefferson Park computer lab.

4.3.2   Family Influence

CHA children often influence their parents to adopt broadband use by their children. This type of social influence includes the following:

- Parents want to acquire digital literacy skills comparable to those of their children. Youth are typically exposed to computers at school and exhibit skills that are more advanced than those of their parents. Some parents who enroll in digital literacy training want to be able to navigate technology without the assistance of their children.
- Parents want to become more knowledgeable about the activities their children are engaging in with computers. Many youth go online for recreation, and parents are often more comfortable with their children's Internet use once they themselves have a greater understanding of the Internet and online safety protocol.
- Parents want to take on a more active role in their children's schooling. They may adopt broadband use to interact with the school's web-based communications and progress tracking systems. They may also want to be able to help their children use online education tools, such as digital format textbooks, to complete assignments.

4.3.3 Program Outreach

Program staff members have engaged in the following formal outreach activities:

- Three times each year, CHA distributes packets of fliers that advertise its various programs, including grant-funded and grant-augmented programs, to all CHA residents. Residents frequently pass this information along to neighbors and friends, some of whom may not reside in Cambridge public housing.
- Gateways staff members distribute fliers promoting open lab hours to housing complexes and work with the Digital Divide Committee in Cambridge to promote its services to residents.
- The Work Force markets the program to students through local schools. Principals initially introduce the Work Force to seventh grade students, before they are eligible to enter the program as eighth-graders. The Work Force staff members promote their services by presenting to students who live in CHA or Section 8 housing in their schools at the beginning of each school year.
- The Parents ROCK program has collaborated with an early education provider to establish a network of outreach workers who act as liaisons in their respective communities. These language-based outreach efforts target neighborhoods with high concentrations of foreign-born residents.

4.4 Effort Expectancy

This category measures the expectations of the potential adopter regarding the difficulty of using broadband to achieve benefits in one or more of the focus areas described above. It includes preconceived ideas about the difficulty of using broadband technology and computers in general, and anxiety or concerns about the risks of broadband use. For PCCs, it indicates how the service model made using broadband to access information and services on the Internet easier. Effort expectancies vary among CHA residents, as noted below:

- New equipment provided through grant funds improved residents' Effort Expectancy. Technical problems with outdated machines intensified anxiety and lack of confidence among novice users.
- Trainers have observed higher levels of motivation among some members of immigrant populations. Trainers noted that these individuals are more inclined to take advantage of learning opportunities.
- Speakers of English as a second language face an additional barrier to digital literacy. Because the computers are programmed in English and training materials are presented in English, staff members refer some students to ESOL classes to support their digital literacy training.
- American-born residents with lower levels of education often have more reservations about computer use. Trainers note that these students are more likely to approach training activities with the notion that they might fail.
- Observing a peer succeed in training often alleviates the anxiety residents may feel about using computers and influence them to enroll in training of their own. The group-based learning structure of CLC trainings creates an environment in which participants build confidence by learning from their peers and instructors.

Section 5. Techniques, Tools, and Strategies

This section describes successful techniques, tools, and strategies identified by the grantee. CHA noted many successful techniques, tools, and strategies that it developed over the course of the grant.

5.1 Techniques, Tools, and Strategies

CHA described several techniques, tools, and strategies that increased the impact of the grant. Many of these related to the structure and content of training programs, the relationship between instructors and students, and the relationship between CHA and existing or potential partners.

- The Gateways program stresses the importance of incorporating project-based lessons into digital literacy training. Rather than practicing various word-processing commands, students create digital projects using personal artifacts such as pictures and music from their native countries and practice their English skills by creating short narratives to share with the class. This strategy helps to engage students by incorporating topics that are interesting and relevant and simultaneously reinforces digital literacy skills.

- Gateways program staff recommend integrating technology throughout the entire program curriculum. This helps to establish a supportive learning environment and address potential hesitation among students to approach technology independently.

- The Gateways program recommends integrating technology into each level of English learning. Gateways instructors found it effective to provide a supplemental computer basics module for students with limited English or technology skills in order to ensure that they are successful in the ESOL curriculum with integrated technology. They also recommend that the program offer open access or a link to a community resource with public access so that students without a computer or Internet connection at home can continue to practice and refine their skillset.

- The Strictly Computers instructor stresses the effectiveness of teachers and assistants who are familiar with the public housing community (i.e., a resident or member of the tenant council) or those who are involved in social service groups. Continuity among staff is also important.

- The Strictly Computers instructor calls students who have missed multiple classes and encourages them to return to class if feasible. She prompts absent students with the option to resume the course in the upcoming semester. The Strictly Computers instructor creates a waiting list with ten slots to fill the places of those who drop out.

- Strictly Computers trainers conduct project-based learning to help participants gain an understanding of how they can apply their digital literacy skills. Participants create useful digital artifacts rather than complete practice drills. For example, a job seeker may create a résumé, or a tenant who has a housing issue may compose a letter to his or her property owner.

- Work Force instructors enforce a minimum thirty minutes of homework before they allow students to use the laptops. Students are eager to complete their thirty-minute homework session so that they are able to use the computers.

- Work Force staff members visually observe computer use at the PCC to ensure that students are making productive use of the computers during designated study or instructional time.

- The Roosevelt Towers PCC has a server that maintains students' work. Students are confident that they will not lose their work.

- The mobility of laptops encourages students to collaborate with peers.

- CHA was able to leverage a substantial amount of in-kind services to implement the program. CHA provides financial management, staff, and physical space at no cost. Leveraging established CHA infrastructure was helpful in grant implementation.
- Before receiving the BTOP grant, CHA recognized that it is more effective to have an instructor with experience teaching low-level courses than an instructor with in-depth technical knowledge. The CHA resident population includes a significant number of immigrants for whom English is not the primary language. Some may not be literate in their first language. Much of computer use is dependent on general literacy, and it is therefore important to hire educators familiar with teaching introductory-level courses to students with limited English skills.
- Connecting with local schools is the most effective method CHA found to reach student populations.
- The CHA Resident Services Director indicated that, if given the opportunity to implement the project again, he would collaborate with other BTOP recipients, specifically the housing authority recipients, to identify best practices.
- On-site activities are convenient for families that live in the facilities in which programming is taking place. Conversely, inclement weather or travel can affect attendance for participants who do not live near the facility where they are attending activities.

5.2 What Did Not Work

- CHA anticipated that the PCCs would have a more profound effect on employment. CHA initially planned to collaborate with the Cambridge Employment Program (CEP) to offer job search assistance. The arrangement never came to fruition because while the BTOP grant was being considered, CEP obtained the resources for a few computers within its offices.
- Many Parents ROCK families were unable to participate in the Comcast Internet Essentials program. Language barriers were a significant obstacle to completing an application by telephone for some Parents ROCK families.
- Aside from Comcast, there are no options for low-cost service in Cambridge. The CHA resident services director has attempted to coordinate with other cities' efforts to provide low-cost service, but has yet to identify any viable options.
- The Strictly Computers program attempted to implement a job readiness course for users who had expressed interest in obtaining employment or improving their employment situation. The course was discontinued after users appeared more interested in taking additional courses than searching for and obtaining employment. The goal of the course was for users to generate an updated résumé, to dress appropriately for interviews, and to be familiar with job interviewing etiquette. The content of the course seemed to be a mismatch for the attendees.

5.3 Challenges

- The provision of new equipment spurred more demand for computer access than was anticipated. While open lab time is available, the Gateways program is working to schedule additional open lab hours to accommodate residents' requests. Challenges with the equipment have been the kinds of technical issues that typically arise when maintaining a site outfitted with multiple computers, predominantly networking problems. Keeping up with constantly evolving technology in the future will be a challenge for the grantee from a financial and programmatic standpoint.
- Retention is a challenge for Strictly Computers. Residents enroll when they find extra time in their schedule or when they feel particularly motivated. The grantee has observed that upswings in enrollment coincide with the beginning of both the calendar and school year. After the first two to three sessions, attendance tends to fall.

- The Parents ROCK program initially anticipated that the computers would be a focal point and primary learning activity for parents. However, parents and staff observed that the children's skill level far surpassed that of parents. The computers are now generally a resource for children.
- The grantee believes that the "digital divide" remains a problem in Cambridge, particularly among adults. CHA leadership and Cambridge's Digital Divide Committee are seeking creative solutions to boost broadband adoption in their community.
- The Jefferson Park PCC is not readily visible to residents because of its basement location and poor signage.

Section 6. Conclusions

The grant enhanced the programmatic capabilities of CHA resident service programs by incorporating digital components into the curricula of four major programs:

- **The Gateways program** provides ESOL students with access to online tools to learn English. Grant-funded computers facilitate access to more effective language-learning programs. The grant-funded computers and the digital literacy skills gained through the Gateways program improve parents' ability to connect with their children's schooling, monitor academic progress, and participate in many more activities in their communities through improved computer and English skills.
- **The Strictly Computers** course teaches students to leverage the Internet to connect to their families, their community, and their native countries. Students gain the digital literacy skills to operate a computer independently. Upon completion of the course, students receive a certificate listing the skills obtained in class, which they can use to verify their digital skill set to a potential employer.
- **The Work Force program** provides students with the ability to work on college applications and essays and receive guidance from staff outside of school. Grant-funded computer labs have facilitated the Work Force program's ability to support students with the college search and application process, much of which requires Internet access. With the transition to digital textbooks, access to reliable computers determines students' ability to complete homework assignments and study outside of the classroom. Internet platforms and online search also facilitate career exploration and application for summer jobs. Work Force students rely on the computer labs, as many do not have access to computers or Internet at home.
- **The Parents ROCK program** leveraged grant-funded computers to affect participants' awareness of computers and the Internet. The coordinator has observed increased interest among parents in seeking assistance in locating information or accomplishing tasks online. Access to the computers allows students to complete homework assignments that require a computer and saves parents the time and effort required to seek out a public computer. The Parents ROCK program affects parental involvement in children's education. Participating parents become more engaged in reading with their children and assisting with homework.

Without the BTOP grant, CHA resident services would not have the resources necessary to include digital content in their curricula. With the changing technical climate of education, this would severely hinder CHA resident services' ability to assist children and their families in achieving academic success. It would place foreign-born residents at a disadvantage in connecting with their communities, communicating with families in their native counties, and accessing the most effective English language-learning resources. Finally, residents of Cambridge public housing would be without free, local access to computers and high-speed Internet, or the training to use such tools.

Over the course of the grant period, the Cambridge Housing Authority has come to recognize the PCCs as an important element of their resident services program. In the near future, CHA will renovate the Jefferson Park housing complex. Previously situated in a difficult-to-locate basement space, the Jefferson Park PCC will move to a highly visible, new street-level space in the forefront of the housing complex.

Section 7. Next Steps for the BTOP Evaluation Study

In early 2014, ASR will deliver *Interim Report 2* to NTIA. This report will include a summary of the second round of case study visits to the fifteen PCC and SBA grants, allowing for an analysis of the impacts of the grants over time. *Interim Report 2* will also summarize the findings from case study visits to twelve Comprehensive Community Infrastructure (CCI) grants. These visits will take place in the fall of 2013 and result in a set of twelve case study reports delivered to NTIA over several months.

For the PCC and SBA projects, *Interim Report 2* will provide an update to and refinement of the analysis presented in *Interim Report 1*. For the CCI projects, *Interim Report 2* will summarize the activities underway by twelve CCI grantees and the impacts these projects intend to have on broadband availability and adoption for community anchor institutions, communities, and individuals.

ASR will check in with CHA in the second quarter of 2014 to learn more about the sustainability of the project. CHA has taken steps to address sustainability, including the following:

- Funds have been shifted to support Strictly Computers classes through June 2013. Computer aide positions may be eliminated after June. In the post-grant period, programming at CHA will become more reliant on the services of volunteers.
- Staff members are working to integrate the equipment and programming funded by the grant into existing federally and state-funded programming.
- Additional equipment has been ordered to supplement existing technology. Program staff members are actively seeking out partners to fund future equipment purchases, as current technology will become obsolete over the next few years.
- Future revitalization possibilities for CHA facilities include a street-level computer lab. This type of facility would be more visible and accessible than the current basement locations.

Finally, in September 2014, ASR will deliver a *Final Report* that quantitatively and qualitatively estimates the economic and social impact of BTOP grants (including CCI, PCC, and SBA). The centerpiece of the *Final Report* will be an assessment of how and to what extent BTOP grant awards have achieved economic and social benefits in areas served by the grantees. To the extent that such information is available, results from studies performed by the grantees will round out the conclusions presented.

Notes

[1] National Telecommunications and Information Administration, "Post-Award Monitoring (PAM) Database 2013-03-11" (Washington, D.C.: Distributed by National Telecommunications and Information Administration, 2013).

[2] National Telecommunications and Information Administration, "Post-Award Monitoring (PAM) Database 2013-03-11" (Washington, D.C.: Distributed by National Telecommunications and Information Administration, 2013).

[3] United States Census Bureau, "2005-2009 ACS 5-year Summary File," *American Community Survey*, 2011, http://www.census.gov/acs/www/data_documentation/summary_file/.

[4] Cambridge Housing Authority, "Cambridge Housing Authority Community Computer Centers Application," *BroadbandUSA: Connecting America's Communities*, 2009, http://www2.ntia.doc.gov/files/grantees/Cambridge_Housing_Authority_Application_Redacted_06142010.pdf.

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[7] Edgemere Consulting Corporation, *Cambridge Housing Authority Public Housing Resident Satisfaction Survey*, 2011.

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Glossary

Acronym	Definition
APR	Annual Performance Progress Report
ASR	ASR Analytics, LLC
BTOP	Broadband Technology Opportunities Program
CCI	Comprehensive Community Infrastructure
CEP	Cambridge Employment Program
CHA	Cambridge Housing Authority
CLC	Community Learning Center
ESOL	English for Speakers of Other Languages
FAFSA	Free Application for Federal Student Aid
FCC	Federal Communications Commission
GED	General equivalency degree
HUD	U.S. Department of Housing and Urban Development
NTIA	National Telecommunications and Information Administration
PBS	Public Broadcasting Service
PCC	Public Computer Center
PPR	Performance Progress Report
ROCK	Parents Reading on Computers with Kids
SBA	Sustainable Broadband Adoption
UTAUT	Universal Theory of Acceptance and Use of Technology

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