

Adoption Persistence:

A LONGITUDINAL STUDY OF THE DIGITAL INCLUSION IMPACT OF THE CONNECT
YOUR COMMUNITY PROJECT ~ AUGUST 28, 2017

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ADOPTION PERSISTENCE:

A longitudinal study of the digital inclusion impact of the Connect Your Community Project.

Background

The Connect Your Community (CYC) program was a large-scale digital inclusion effort funded through a three-year grant of \$18.7 million from the U.S. Department of Commerce's Broadband Technology Opportunities Program (BTOP) and provided basic computer skills training, equipment and support for tens of thousands of low-income individuals and their households in seven communities – Cleveland; Akron; Appalachian Ohio; Detroit, MI; Lexington, KY; Manatee County, FL; and Winston-Salem/Forsyth County, NC. Between 2010 and 2013 the CYC project trained more than 33,000 low-income individuals nationally with more than 5,500 in the Cleveland area. This high impact program administered locally by OneCommunity was carried out through a coalitional effort by 5 community agencies; The Cleveland Housing Network, Ashbury Senior Computer Community Center, Famicos, Fairfax Renaissance Development Corporation, and Cuyahoga Community College.

In November of 2012 the Connect Your Community project team designed and led a large-scale survey of 10,400 program participants nationally. What resulted is one of the largest and most comprehensive datasets representing program participants from a national broadband inclusion program to date. The survey sample was randomly selected from the programs' 33,000 trainees and balanced to proportionately represent each of the project's 7 lead partner agencies. A collection

of 2,267 completed phone surveys provided insight into program satisfaction, demographic representation, areas of computer use, and the impact of the introduction of this new technology on their lives.

Introduction

The Adoption Persistence Survey is a project funded by the Cleveland Foundation and is the first ever phone survey designed to measure the longitudinal impact of a digital inclusion¹ training program. The term “adoption” as it is used in this paper refers to the longer term “broadband adoption” which was used by National Telecommunication and Information Administration (NTIA) during its Recovery-Act-funded Broadband Technology Opportunities Program (which supported programs throughout the continental United States) to describe individuals who were first time users (adopters) of internet, specifically broadband, technology. The Connect Your Community project was the third largest of these projects nationally. This research effort served to re-contact those (Cleveland-based) program participants that were represented in the original 2012 CYC Participant Survey sample.

The Adoption Persistence Survey illustrates the long-term impact of a high-touch community-based training program by measuring previously unconnected participants use of and engagement in online activities of broadband adopters² 5-6 years after completing 30+ hours of basic computer training, obtaining a computer and home internet connection.

Key Findings

1. 76% of all respondents maintained their home internet subscription.
2. 65% of those without a home internet connection say cost is the primary reason for them not maintaining their service. 18% say it is their lack of a computer.
3. Only 10% of respondents report a lack of interest or need for home internet, preferring to rely on community resources.
4. 74% of unconnected respondents report that they rely on libraries for internet access.
5. 54% of all respondents report that they own a smartphone, 41% say they own a desktop or laptop computer.

¹ Digital inclusion is the ability of individuals and groups to equitably access and use sufficient and reasonable quality internet technologies.

² Broadband adopters are individuals or groups who, previous to any program intervention, did not have home access to broadband internet but later (often after acquiring technology skills as well) added this service to their home for the first time.

6. 22% of connected respondents report to get information on voting online; a finding that puts them 9% ahead of the national average of 13% as of the 2016 elections.
7. 44% of respondents report to use their county's website and 39% reporting use of their city's website.
8. 47% of connected respondents report to utilize online banking to manage personal finances.
9. 43% of connected respondents use patient health record (PHRs) portals to manage their health online.
10. 69% of connected and 60% of unconnected respondents report that they use a computer for their job.
11. 82% report that their participation in the Connect Your Community project resulted in a positive workforce-related impact.
12. Over 75% of the recruiting into the CYC project was done through some means involving the social network that the participant was embedded in.
13. Half of the population (50.47%) said that they shared what they learned in the CYC project with others outside of the community centers; in their own personal networks.
14. Participants with many connections tended to help about 4(3.96) others, while those with a few connections tended to help just 1(1.32) person on average.

Methodology

For this survey, we contacted by telephone the universe of 5,463 Connect Your Community Project participants in Cleveland Ohio who previously did not have home broadband connections and who had completed 30 or more hours of basic computer training after which they reported to have added an internet connection to their home³. Of the 429 collected multiple choice surveys, 230 were provided by past program participants that also responded to the original 2012 CYC participant survey. The remaining 199 responses were included in the original survey sample, but were not reached during the first 2012 survey effort. Follow-up included three callbacks to non-responding numbers, unless a hard refusal was given. In total, 429 individuals completed the telephone survey. Designed by the authors, the survey was administered in English and conducted by past digital inclusion training program participants who received specialized workforce training through the Ashbury Senior

³ This number is lower than the 5,500 total participants due to a handful of client records not having phone numbers.

Community Computer Center (ASC3) in Cleveland, Ohio. The survey was administered using VOIP phone lines in a CATI lab setting and responses were digitally recorded by our trained representatives using a computer-programmed interface. Both scientifically designed surveys meet all criteria for statistical significance. The Multiple-choice portion of our survey is valid within less than a $\pm 5\%$ margin for the population (95% confidence interval) while the network portion is representative within a $\pm 8\%$ margin of error and so, both can be generalized to represent the whole of The Connect Your Community local participant base.

This longitudinal study of Adoption Persistence was divided into two main phases. The first phase authored by Samantha Schartman-Cyck, looked at individual choices and at demographics and how they may have influenced those choices. The second phase, authored by Valdis Krebs, looked at the social links between the individuals surveyed and derived how those social structures may have influenced choices, adoption behavior and learning.

All participants were invited to complete a separate survey about diffusion of their computing skills among their social networks; 141 agreed to continue with the additional questions during the same call. This optional part of the survey asked people to name those they knew prior to the program, those they met through the program, and those they helped outside of the program. These responses were analyzed using the software "InFlow⁴" to produce both maps and metrics from which we were able to discover what social patterns help or hinder the persistence of adoption. (Wasserman S, 1994). Through this analysis, we are able to see which network roles move adoption forward and which ones stop it in its tracks. In addition to individual and small group network patterns, we were able to evaluate which community centers that participated in the CYC project helped their communities move forward and distribute the adoption as widely as possible. The lower level of participation we saw in this portion of the survey, we believe, could be attributable to individual concerns for privacy and also potentially from the delay in time being problematic for people remembering their personal details of years past. If someone was connected to strong ties (i.e. friends or family) during the program it would be easier to remember their details than for someone who had many weak ties (i.e. acquaintances, neighbors) to others in the CYC project.

⁴ InFlow is a software package developed by Valdis Krebs over 20 years ago as network analysis tool "for business people by business people." InFlow has been licensed to thousands of individuals, most of who have also been trained by Krebs.

I. Demographics

The Connect Your Community Project was designed to serve those in the digital divide; be that for reasons of cost, of access or for a lack of skill. The purpose of the program was to eradicate the economic and social inequities created by depriving a segment of the population of access to technology and the online economy through providing training, support and access to low-cost or free equipment and home broadband connectivity. The national digital divide predominantly consists of low income individuals over the age of 35, and those with lower educational attainment than the average American (PEW Research Center, 2016).

The program participants of the Connect Your Community project and thus our survey respondents are representative of this cross-section of the population. All survey respondents are over the age of 18 with 89% being over the age of 45. Aligning with this, 31% of respondents report to be enrolled in Medicare, and 19% report to receive social security income.

While a large portion (45%) of respondents report to live alone, this is a slightly lower percentage than respondents of the 2012 survey for which 53% reported single-person households. 29% of respondents report to live with just one other person (child, spouse or roommate) down from 40% in 2012. The remaining 25% of respondents report to currently live in larger (3 or more person) households with >1% preferring not to provide this information. These numbers seem to indicate a slight increase in shared housing since 2012 and represents an increase in opportunity for programs to impact a larger number of residents through reciprocal training. Survey respondents also largely (73%) report to be single (unmarried) reinforcing the trend towards shared housing among unmarried residents. Perhaps more surprisingly, only 12% of respondents report to be a parent of a school-aged child – a significant decrease since 2012 where 25% of respondents reported this status. However, only 5% of these parents report to receive or provide child support. Additionally, 17% of respondents report to be U.S. veteran's; with only 7% of these claiming to receive veteran's assistance benefits. Lastly, 34% report to be currently disabled but only 14% report to currently be on disability. Overall, 49% of all respondents reported that they were enrolled in one or more social service program at the time of this survey.

II. Adoption Persistence

The field of Digital Inclusion has seen a handful of programs that continue to be seen by the field as exemplary. The Connect Your Community project, which was

responsible for training, equipping and connecting over 33,000 new broadband adopters nationally, is one such program. The components of the CYC project can be described as high-touch, personal, and tailored while maintaining standardization: 30 hours of basic computer training and 8 hours of (optional) elective training. Full participation resulted in a free or reduced cost computer and consultation of where and how to obtain the most affordable home internet connection available to that individual. All survey respondents completed this program and reported to have added an internet connection in their home by the time they left the program⁵.

Now, up to 6 years since their participation in the CYC project,

76% of all respondents report to have maintained their home connectivity.

In 2012, 22% of program participants reported not having home internet access at the time of the survey with 54% of these citing cost as the reason (Schartman, 2012 Connect Your Community Participant Survey, 2012)⁶. Today, 5 years since the original survey, 24% of respondents report to be without home internet connectivity only this time 65% cite cost as the primary barrier to home connectivity; an 11% increase over the 2012 report. This finding corresponds with continuously rising prices from internet service providers (ISPs) and the increasingly constricted availability of low-cost solutions (Sherman, 2015) (Brodkin, 2017).

The cost of internet plans isn't the only burden on low-income residents, 18% of all respondents, cite their lack of a working home computer or other internet-capable device to be the reason for not adding home broadband to their home. Only 10% of respondents report a lack of interest or need for home internet, preferring to rely on community resources. The remaining 8% of unconnected respondents report varied reasons for not having home internet connectivity. These reasons range from a lack of

⁵ 54% of the overall sample was confirmed to have had home broadband at the completion of the program by submitting to us a copy of their first internet bill. The remaining 46% of the sample reported to have added this service but failed to provide their bills for verification.

⁶ The 2012 participant survey included participants who may have gone through the program as early as 2009. So, while all participants reported being connected at the end of their program, the 2012 survey was able to capture a short-term (up to 3-year) drop-off in home connectivity.

time (1%), to a preference for community resources (3%), to experiencing a level of difficulty (1%) and lastly, a lack of availability (3%) (Callahan, 2017).

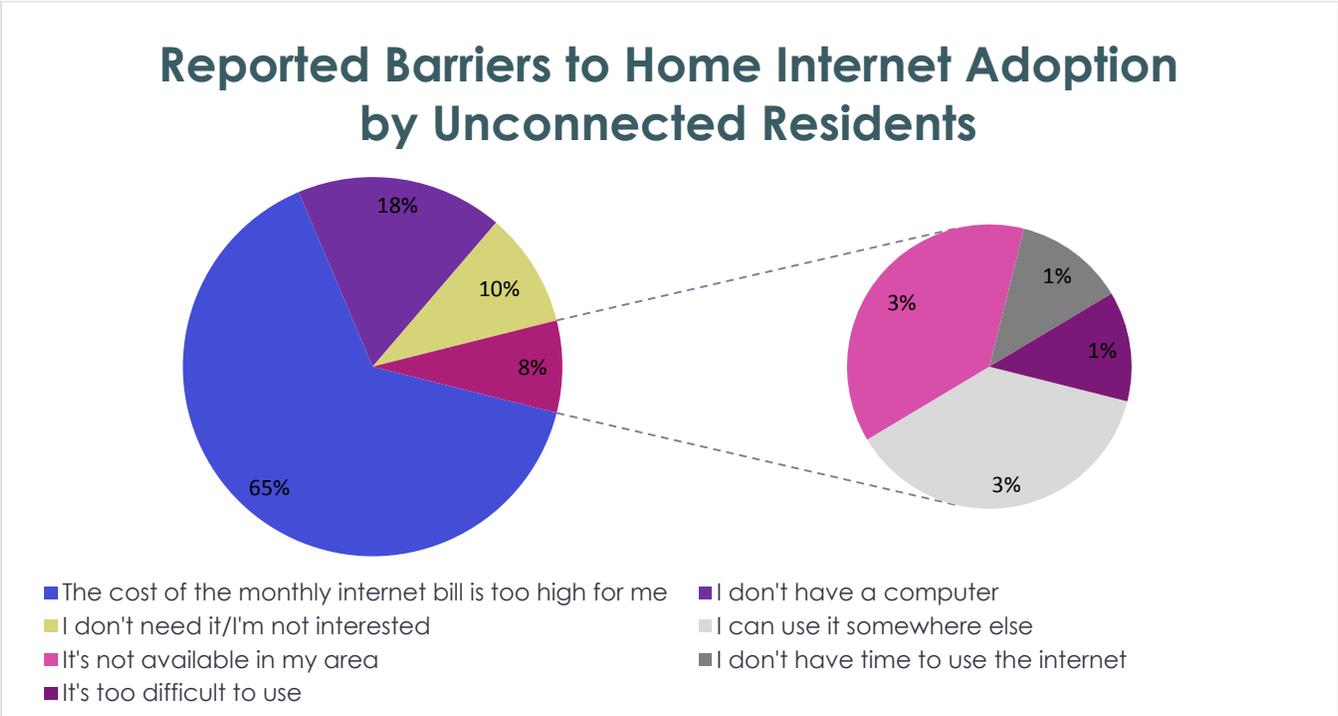


Figure 1

Do those without a home internet connection automatically rely on community resources? A large majority (71%) say yes, but 29% of the unconnected (that's 7% of all respondents) go without access all together; reporting that they do not use community resources for connectivity at all. This provides an opportunity for concentrated outreach to learn more about why this small cohort prefers to remain unconnected and offer additional personalized support if desired.

The most reported community resource used by unconnected survey respondents by and large are libraries with 74% of respondents reporting that they rely on the system. This reinforces the value of libraries as important and dependable community resources to those struggling with barriers to personal device ownership and home access. Interestingly, the second most reported community access resource was not an option provided by the survey but was instead captured through respondents selecting "other" as their category and reporting "smartphones" to interviewers as their "explanation". This response was cited by 12% of unconnected

respondents in answering the question “which of the following locations do you typically go to for internet access” and represents the only described reason for “other” to be selected. While this does not indicate a specific location, it seems to implicate a reliance on mobile devices, cellular data plans and/or community Wi-Fi by those otherwise unable to obtain a traditional home connection. Work and family members/friends tie for the third most reported source of connectivity, each claimed by 11% of respondents. The rest of the categories shown in *Figure 2* (community centers, schools, cafés and churches) are reported by 5% or less of respondents. In the case of community center use however, low reporting of community center use could point not to a lack of preference, but to a lack of availability - dependable/convenient hours and/or geographic accessibility across this sector.

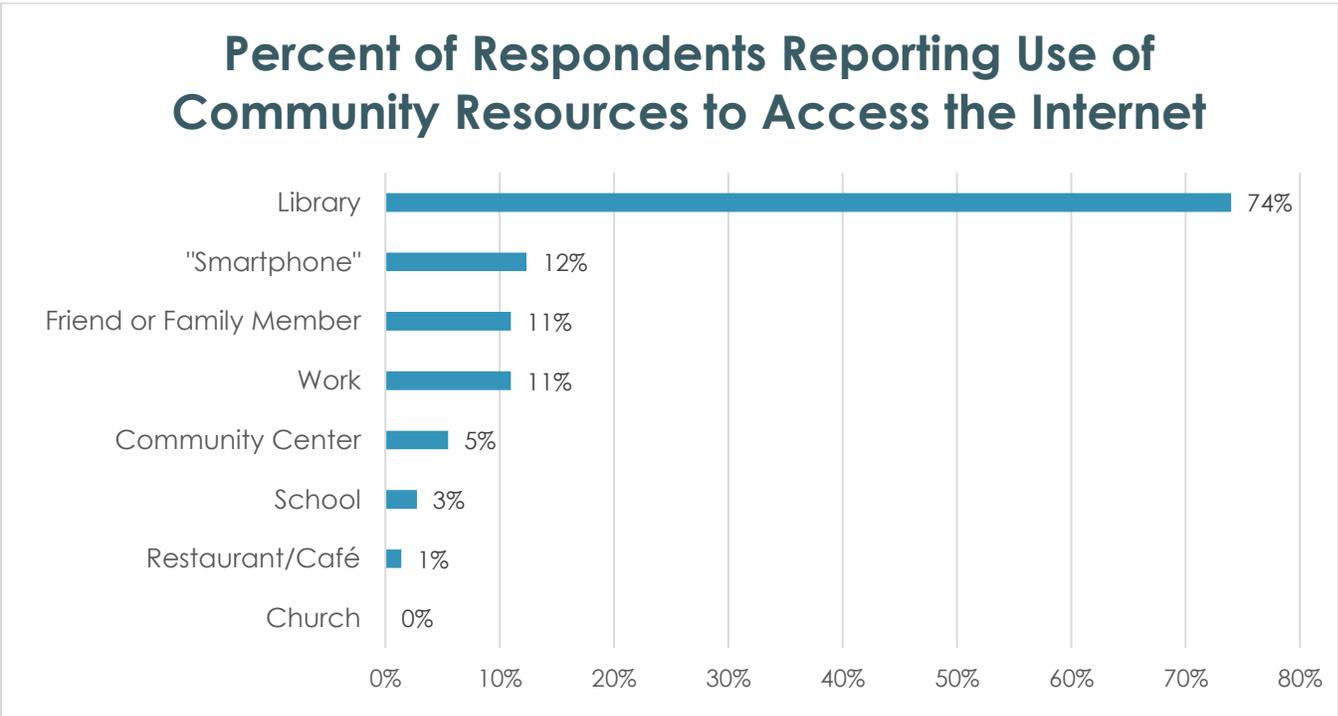


Figure 2

III. Device Ownership

The Unconnected

Not all community resources that offer public access to the internet also offer access to computers. Some locations, (like cafés) require users to have their own

devices. To better understand respondents level of internet readiness, we asked them to tell us what types of devices they currently owned. As can be seen in *Figure 3*, smartphones are by far the most commonly owned device with just under half (47%) of all respondents having reported to own them. This figure however, is low compared to the national smartphone ownership numbers reported by the Pew Research Center in January of 2017 that shows that 64% of adults making less than \$30,000/year own smartphones.

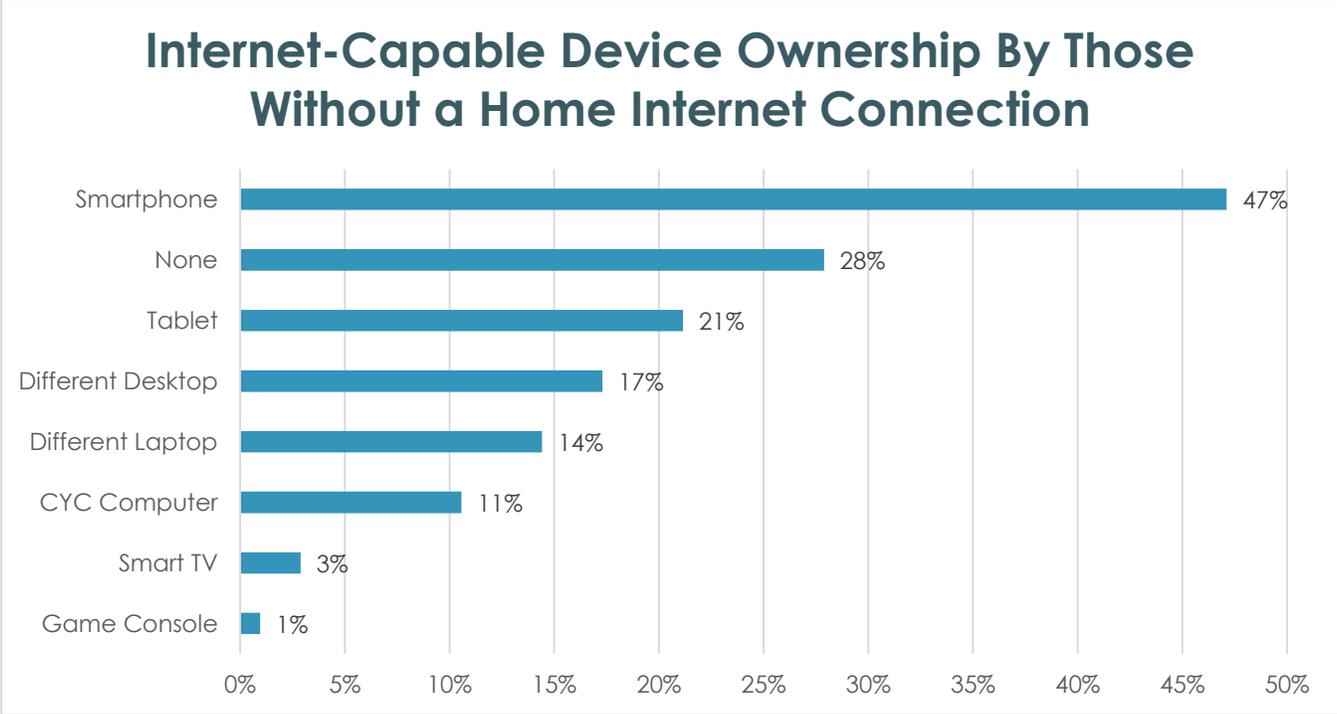


Figure 3

Pew goes on to report smartphone ownership at: 74% of people aged 50-64, 72% among African Americans, and 77% for those living in Urban centers (Pew Research Center, January). This puts unconnected Cleveland respondents more than 20% less likely to own a smartphone than the national average. Also, important to note, is that while mobile accessible websites and applications have significantly increased in availability, there are still many important tasks smartphone-only users are unable to (or at least find difficult to) accomplish such as creating a resume, submitting job applications (which often requires attachments in word doc or PDF form) or taking an online course. Furthermore, not all smartphones have the same capabilities/features, or available apps, adding a level of complexity to how connected a smartphone-only user really is (Karen Mossberger, 2008).

Additionally concerning is the 28% of unconnected respondents who reported to not own an internet-capable device at all; 55% of which also report to not use community resources to access the internet. Of this group, 93% are over the age of 45 and 69% are retired or on disability. This cohort represents the least connected of the entire sample and is most at risk for experiencing economic and social inequities due to a lack of access.

The Connected

While Device ownership is not entirely dependent on one having a home internet subscription, there is a strong correlation as is easily seen in *Figure 4*. Respondents that have current home internet access are, on average 18% more likely to own an internet-capable device; making this group not only better connected, but also more internet ready in general, as they are better equipped to take advantage of public and community access options in addition to their home connectivity (Horrigan, 2016).

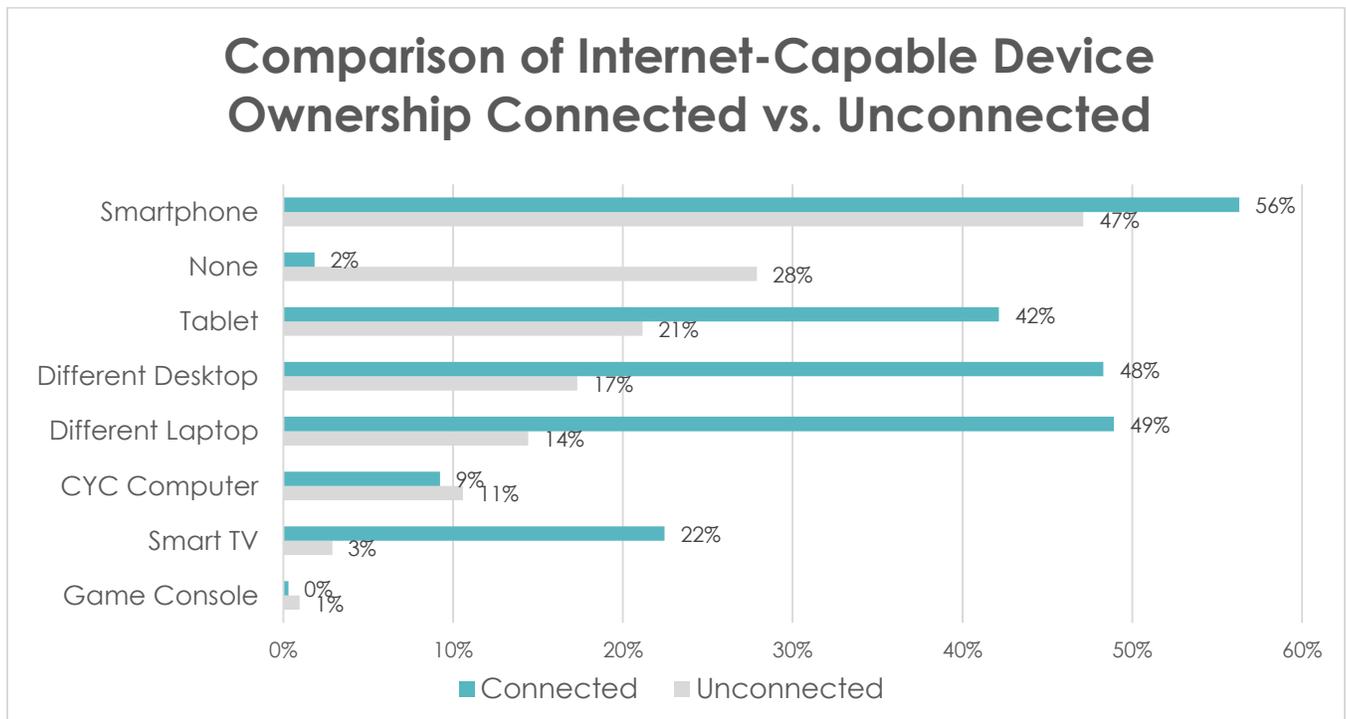


Figure 4

Most notably is the finding that those who reported to not have an internet-capable device drops from 28% among those without a home internet connection to 2% among those who do.

IV. Internet Subscription Persistence and Use

We know that 76% of all respondents continue to have home internet subscriptions since their participation in the CYC project, but do they still have the same account? According to our survey, 49% of connected respondents have maintained the same account they established while exiting the CYC project, whilst 43% say they changed to a different service. The remaining 8% report to not remember.

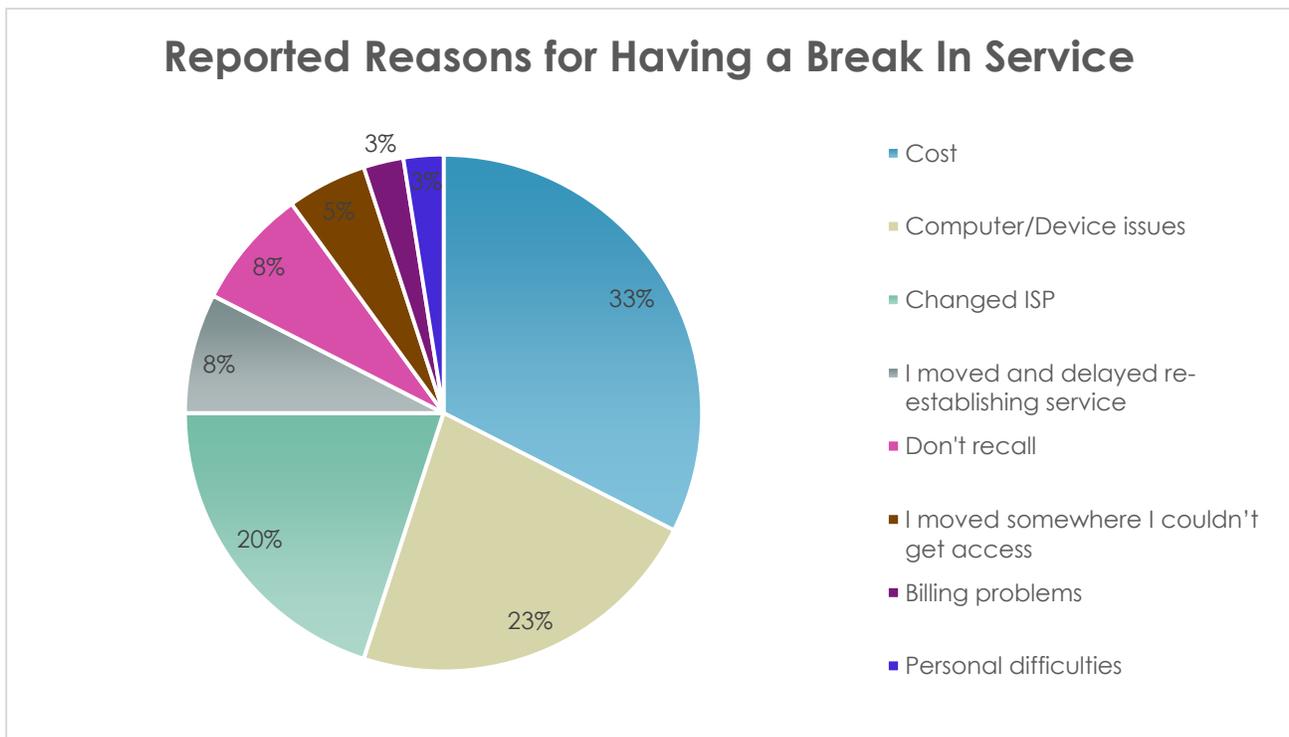


Figure 5

When asked if respondents had had a break in their service since they established it, 15% said they did. As illustrated in *Figure 5*, the most commonly reported reason for a currently connected respondent to have had a past break in their service is cost followed by issues with their internet-capable devices (which could also be seen as a cost barrier if one cannot afford available service options).

While the high rate of adoption persistence found by our survey supports the effectiveness of Digital Inclusion programs to help those in the digital divide overcome barriers to home internet adoption, it does not suggest a removal of those barriers.

The prevalence of income-related reported reasons (cost, device problems, billing issues) for having a break in service underscores the importance of acknowledging economic inequities among the unconnected and serves to highlight the need for more affordable, dependable and robust access for residents.

Shown in *Figure 6*, by far the most reported type of internet connection is cable with 61% of connected respondents, followed by a standard DSL connection with 31%.

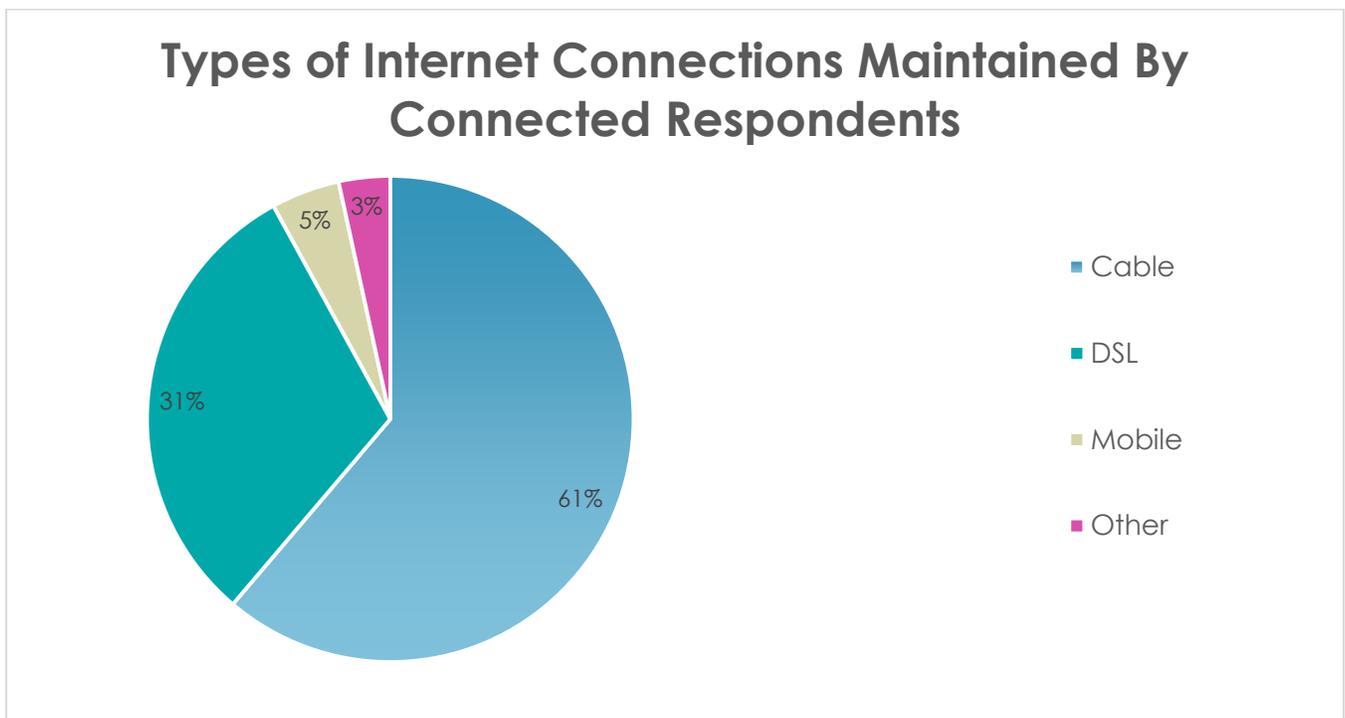


Figure 6

This is consistent with Respondents reported ISP accounts as seen in *Figure 7*. Here we see that 56% of respondents report to have internet service through AT&T. It is

important to note here that AT&T offers, in some locations, the option of their U-Verse service which is marketed to be their version of “cable” in addition to their standard DSL service. This could explain why while the majority of respondents claim to have cable service, Time Warner (the traditional local cable provider) comes in second with 33% of respondents who reported to have internet subscriptions through them.

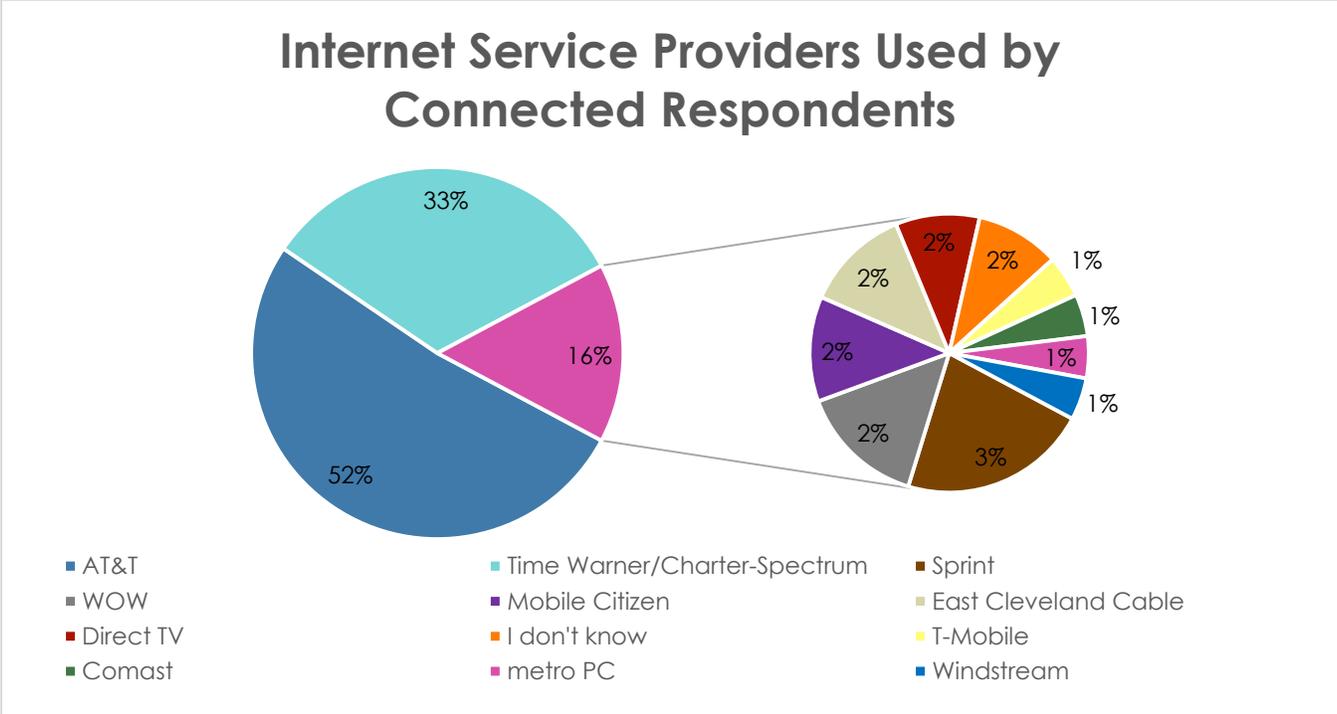


Figure 7

While many home internet subscriptions are unlimited, some are not, or are dependent on enrollment in other services from the provider. For one example, AT&T caps DSL service at 150GB with no option to upgrade to an unlimited plan (Brodkin, 2016). This arrangement can lead to overages of up to \$200 per month for subscribers. This type of service can hurt low-income Cleveland residents who may not have the option of an uncapped service in their area and who may want to use their connection for pursuing an online education, or who see their internet service as a replacement for pricey cable packages.

But are respondents aware of data limits?

According to survey respondents, only 17% were aware of data caps on their service.

Of these, 51% report having an unlimited internet plan, while the rest report data caps as low as 20gb or less per month (Figure 8).

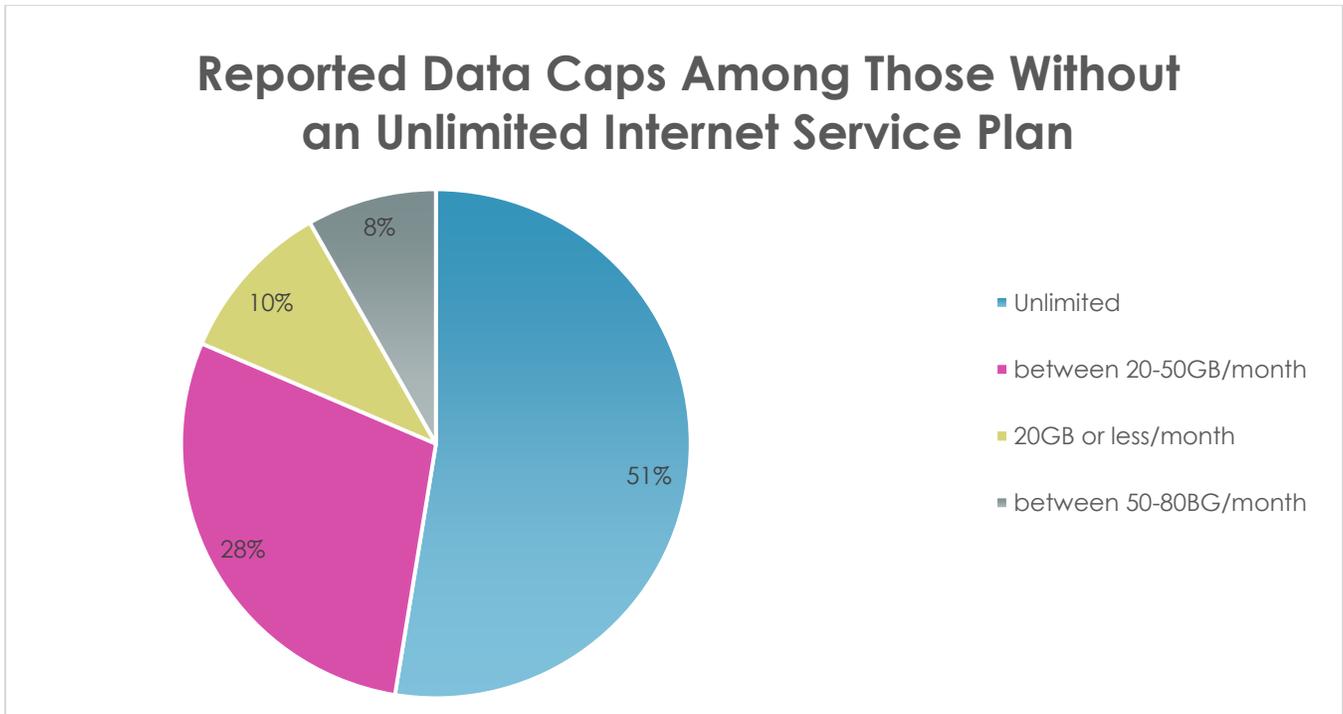


Figure 8

This means that 49% of those aware of data caps on their service (8% of all respondents) are severely limited in their ability to meaningfully use the internet. With a standard definition movie requiring an average of 2-5GB of data to stream alone, a cap of less than 150GB per month would likely be prohibitive to taking online classes, or using YouTube for useful tutorials let alone offset other entertainment costs like streaming video services such as Netflix and Hulu (Bouma, 2014).

V. Meaningful Internet Use

One major challenge that Digital Inclusion advocates are met with is an environment of reluctance to financially support efforts to close the digital divide through social programs like the Connect Your Community Project. Politically rooted in the anti-entitlement camp, financial support has been insufficient, inconsistent or nonexistent (Brodkin, 2017). In 2012, in an effort to prove the social value of connecting the unconnected, the Connect Your Community Project team, asked, as part of their participant survey, what online activities participants engaged in once they obtained home internet connectivity. The results found that over 63% used their home internet access to look for health information online, 33% used it to look for a job, 30% reported use of city and county websites, 28% to look up public transportation information, and 25% to bank online. Even more compelling was the finding that 78% of parents reported that their children used their new home internet connection to do schoolwork online and that 83% of these parents said that their children spent in excess of 3 hours per week doing so (Schartman, 2012). These findings have led community organizations and thought-leaders to seek out and strive to form partnerships with private industry, educational institutions, and local government who stand to gain value from connecting the unconnected.

During our recent survey of past program participants, we asked again what online activities they engaged in. The responses show a wide array of meaningful uses of the online economy and paint a picture of far-reaching societal impact and cross-sector value generation.

Civic Participation

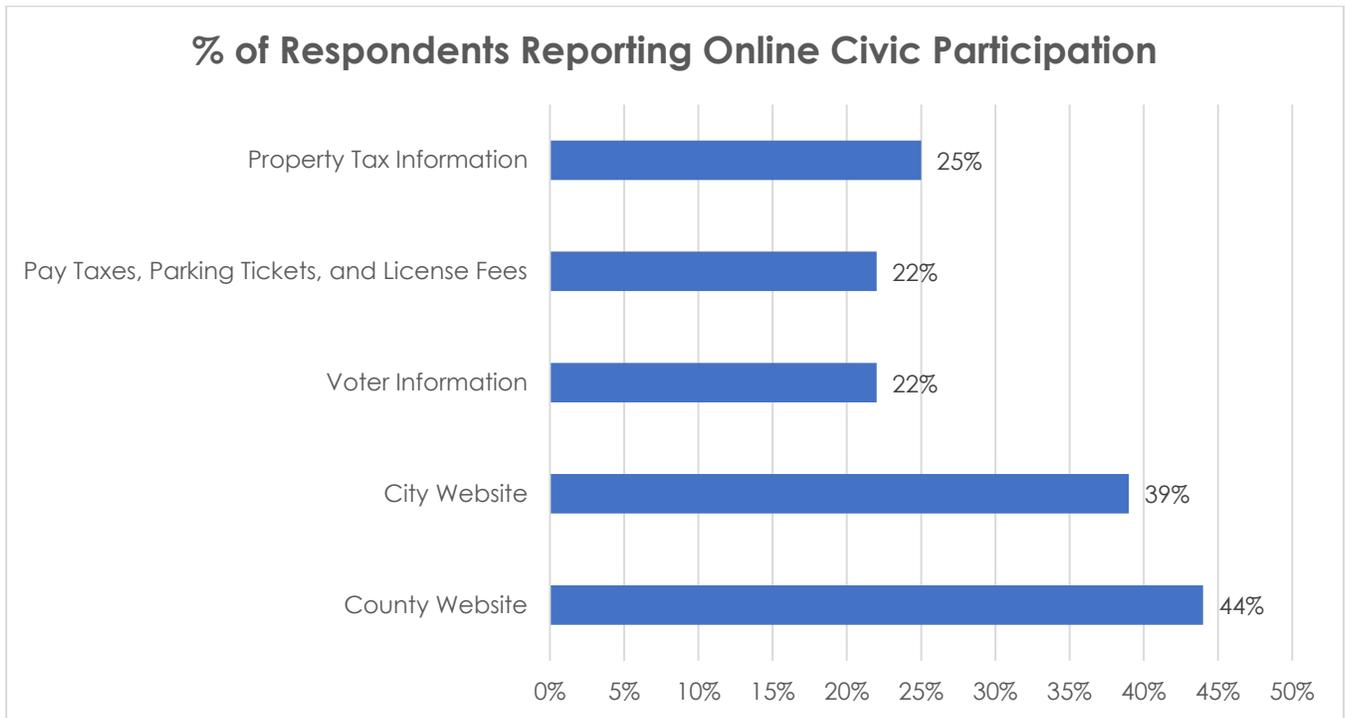


Figure 9

Strong civic participation (shown in *Figure 9*) was demonstrated by 44% of respondents who reported to use their county website and 39% to have used their city's website; this is an increase of 14% and 9% respectively over the 2012 findings.

As of the 2016 elections, the Pew Research Center found that the national average for people using online resources to research voting information was 13% (Jeffrey Gottfried, 2016). Survey respondents were found to be 9% more likely to use online resources to look up voting information with 22% claiming to engage in this activity. Additionally, 25% of respondents have gone online to find property tax information; an increase of 14% since the 2012 findings. Online payment of taxes, parking tickets and/or license fees also saw a 13% increase in reporting over the 2012 findings with 22% of respondents claiming to have done this since their program participation (Schartman, 2012).

Beyond direct civic participation, 17% of respondents reported to use their connectivity to assist in and support their living situation by searching for new places to live online. Additionally, 40% report to regularly use their internet access to look up public transportation information compared with 28% in 2012. So, not only do connected residents engage civically but they also use the internet to make better use of public resources.

Online Resources for Personal Lifestyle Management

With transportation and work schedules being a point of stress for many low-income residents, close access to resources such as banks, educational institutions and healthcare become more important for successful life-management. However, increasingly banks are closing branches to cut overhead and liability, particularly in lower-income districts forcing residents of these areas to either travel longer distances to visit a branch, or to rely on online banking to manage their finances (Schwartz, 2011). Educational Institutions continue to grow their online course offerings, shifting many continuing education classes to the online platform (Babson Survey Research Group, 2016), and healthcare providers increasingly lean on online patient portals to deliver important health information, automate scheduling, and manage doctor-patient communication (Landi, 2016).

Online Banking

According to our recent survey, 47% of connected respondents report to utilize online banking to manage personal finances since their participation in the Connect Your Community training program. This is in line with the 2013 Pew findings that 48% of all low-income internet users bank online (Fox, 2013). Moreover, 50% of connected respondents report to pay bills online; an activity that requires not only technical ability to set up and navigate, but also a level of comfort and trust in the technology and their own ability to protect themselves online. For previously unconnected residents to reach this level of comfort and trust, training and support from a trusted source is a necessary tool.

Education

With more classes being offered online, connected residents are met with increased opportunities to affordably pursue professional skill development and new careers. Additionally, the internet offers those with connectivity access to a wide array of self-help and DIY resources in the form of free online tutorials and videos. These kinds of resources can reduce costs by assisting people in repairing their homes and home items instead of replacing them or hiring expensive professional help. In 2012 15% of respondents reported to have taken an online class. Today, this number has grown to 23%; showing that as command over the technology and comfort increases, people will use the internet for self-improvement.

Health

During the 2012 Connect Your Community participant survey, 81% of respondents reported that the program improved their ability to find reputable health information online; making this the highest reported area of online activity attributed to participant

training. This finding led the CYC project team to develop two small-scale pilot programs⁷ focused on assisting participants in signing up for and using their healthcare provider's patient health records portal (PHR).

Today, health information management continues to be an area of importance to respondents with 70% of connected respondents reinforcing their 2012 responses that the CYC project improved their ability to find health information online. Moreover, 38% of current respondents report that they communicate with their hospital or doctor online. This is an increase of 9% over the 2012 results.

But, communication with hospitals and doctors is just one way patients are able to participate in the management of their health; patient health record portals are increasing in availability and popularity among users. These patient portals often allow users to schedule appointments, request medication refills, and even view test results online. According to a survey conducted in 2014 by the Xerox Corporation, only 36% of Americans currently use online patient health portals (Pennic, 2014). However, when we asked the connected respondents of our survey, 43% reported to actively use MyChart⁸, Follow My Health⁹, or another online patient health record portal (*Figure 10*). This puts past participants of the Connect Your Community project 7% more likely to use online PHR portals than the national average. Additionally, 26% report to both schedule appointments with their doctors online and also to request medication refills. 34% report to use their PHR to view medical test results online. A recent article in the Journal of the American Medical Informatics Association, it was stated that research has shown "lower enrollment [to PHRs] among racial and ethnic minorities" and that a "lack of home internet access affects the uptake of patient portal outreach efforts" (Adam T Perzynski, 2017).

⁷ One pilot program was formed as a collaboration with MetroHealth hospitals in Cleveland OH and the other was formed through a partnership with Wake Forest Baptist Health in Winston-Salem NC.

⁸ MyChart is a product made by Epic, and used primarily by the Cleveland Clinic locally.

⁹ Follow My Health is an online patient portal used by University Hospitals locally.

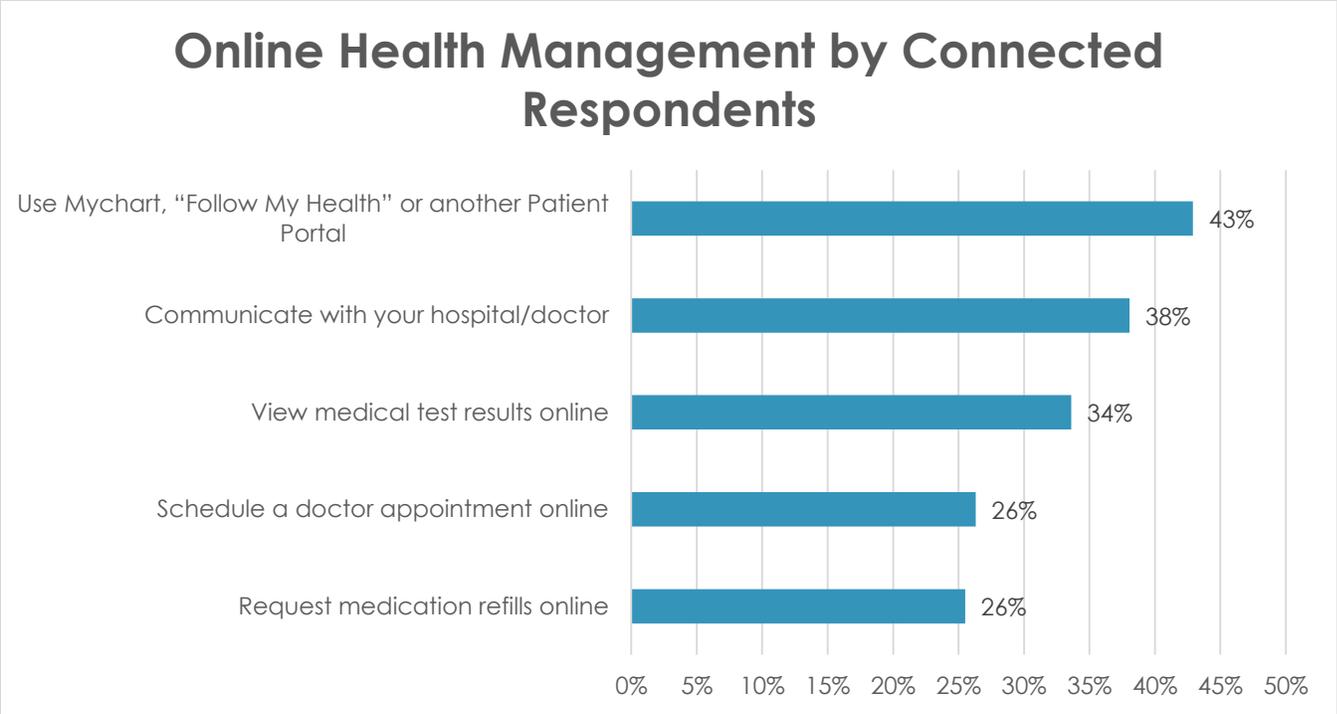


Figure 10

With prior research showing that patient health record (PHR) portal enrollment among African American patients is only 23% and 24% among Hispanic patients¹⁰, the computer training and connectivity assistance model used in the CYC project seem to serve as an effective onboarding model of adoption for diverse patient populations.

VI. Employment

Many online activities can be said to improve an individuals' overall lifestyle or potential. From online retailers offering cost savings, to online bill pay reducing the needs for stamps; from making refilling medications easier and faster, to making educational content more accessible. These things make a connected household more efficient, economical, and smart. But, most of these lifestyle enhancements are difficult to attribute to an overall impact on a local economy. More directly impactful however, is the relationship between a person's access to the internet and their ability to obtain and/or improve their employment situation. According to a report by the National Telecommunications and Information Administration, academic studies have proved that internet use increases employment and income (National Telecommunication and Information Administration, 2013). It is important to note that

¹⁰ According to the 2012 survey, 61% of program participants were African American, 6% were Hispanic, and 24% were Caucasian.

this research does not make the particular implication that home connectivity is critical to this impact, but rather is attributable to an individual's ability to use and navigate the internet, and access it when needed to create resumes and submit applications. However, while many consider public-access computers to be a surrogate for home access, it is important to note that these computers, or the rules by which they are accessed, can be problematic when applying for jobs. For example, public computers typically do not allow users to save their work; so, if an application takes 35 minutes to complete and the library kicks users off after 30 minutes, the user has made zero progress. Some potential employers also require use of the internet beyond the application, including signing up for drug testing. Sometimes this must be done immediately, which may not be possible for one relying on public access computers.

This barrier aside, 60% of unconnected working respondents report to use a computer for their job. This number increases to 69% among connected working respondents. So, while having a home internet connection appears to increase a person's likelihood to hold a position that requires computer skills, the majority of unconnected respondents, all of which received training, also report computer use at their jobs.

We found evidence of positive employment impact during our 2012 participant survey where 22% of those in the workforce (not retired or enrolled full-time in school) reported to have experienced some positive employment outcome since completing the program (Schartman, 2012). We define "positive employment impact" as respondent reporting a new full or part-time job, had a pay increase, or started a business.

Today, up to 6 years later, this impact has grown exponentially. Of all survey respondents, 40% said that they are currently in the workforce; meaning that they are not retired and are not enrolled full-time in school.

Of those currently in the workforce, 82% report that they have had a positive workforce-related impact since their participation in the Connect Your Community project.

As seen in *Figure 11*, 54% said that they were hired into a new full-time or part-time position since their program participation, 35% had a pay increase, 20% started

temporary employment, 18% received a promotion at their current place of employment and 23% started a business. But even more impressive, is that of all currently employed survey respondents, 45% said they began their current position after their participation in the Connect Your Community project; and 45% attributed their obtaining this position to the training they received through CYC!

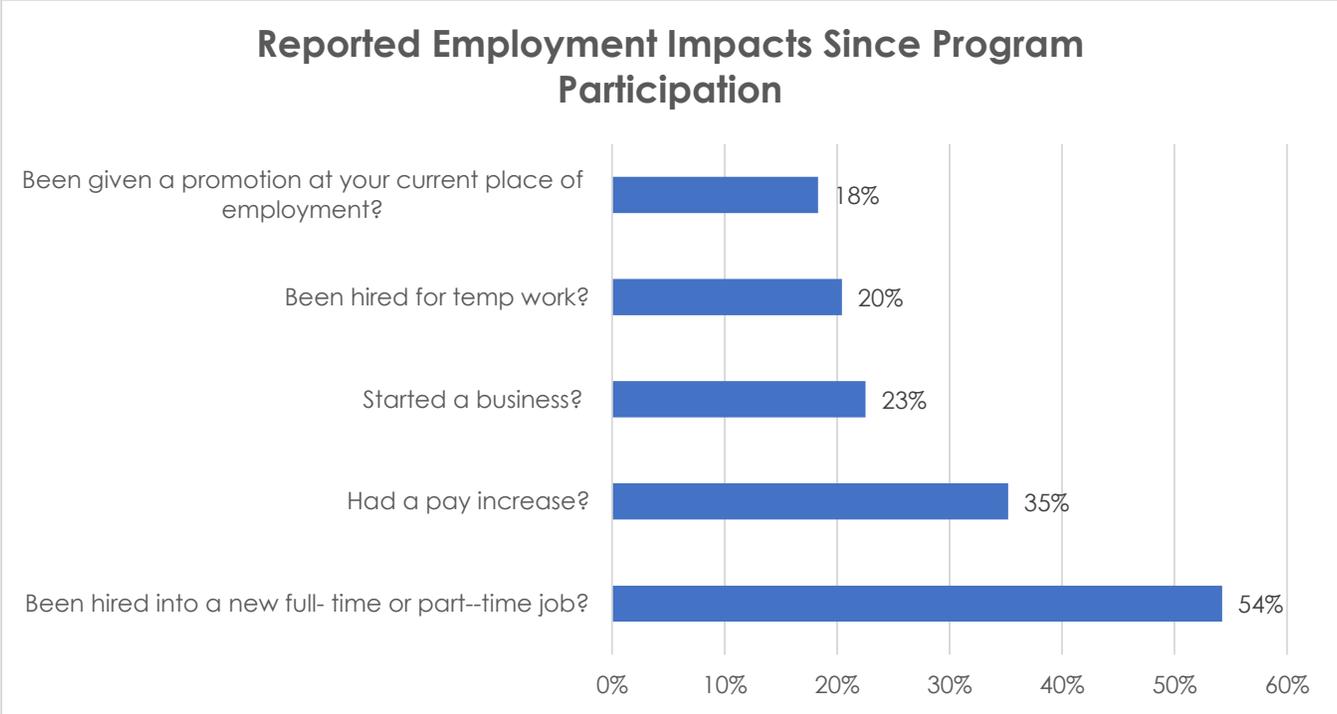


Figure 11

But, computer literacy and connectivity may improve household income for more than those in the workforce. Of those who reported to be retired or disabled (59% of respondents), 8% reported that they have started a business or plan to in the next year. This number is 13% of all respondents. Furthermore, 6% report to have used their home computer to sell things online (8% of all respondents). While these may seem to be small numbers, of all respondents who said they had started a business online, 28% were retired or disabled. Of all who reported to have sold something online, half were either retired or disabled. This finding shows that for many who are unable to take traditional workforce positions, computer skills and connectivity offers a possible avenue to supplementing household income.

VII. Networks of Adoption

Introduction

It has long been observed by those conducting training from within a community center framework, that adoption is catalyzed through community relationships. Community center leaders have long seen program participants bring other family members and friends through the same program, which creates and fosters a safe (and comfortable) environment for learning while helping to create a network of support around participants. In order to illustrate the role that community centers and program participants play in adoption, we included a series of questions that queried respondents' relationships with others in the program, and how they used their training to help others in their own social networks.

When people change their behavior, or adopt new ideas or products, they do not do it in isolation. Change is a social dynamic. We often look to what others are doing before we decide what to do ourselves. We don't just look at the general population, we mostly look at people close to us – those who are like us – and adopt similar beliefs, practices and products as them. Birds of a feather flock together and they also think together (McPherson M, 2001).

In this way, our research suggests that when digital inclusion advocates help a handful of their constituents adopt technology, These community members will in turn, impact others in the community through their personal networks.

So, if you can get a few birds to adapt new behaviors, and these early adopters are satisfied with the results, others will soon copy them and soon the whole flock will be in lock step.

We evaluated this flocking behavior in the adoption of technology and services to help bridge the digital divide in Cleveland, Ohio. The following section, will explain how people find out about new programs designed to help them, and how they share interesting possibilities with their friends and families. We explore if technology adoption, and its subsequent knowledge-sharing, follow typical patterns of change in human groups, and if the social dynamics in groups help or hinder the persistence of adoption and learning in the efforts made by the Connect Your Community project. We also examine how these social dynamics compare to other formal methods of

persuasion such as advertising and government communication of available programs.

Additionally, we look at specific CYC groups in Cleveland and see which social structures helped to move adoption and learning forward. Are there better ways to structure our networks to help communities adopt useful behaviors and tools for their own benefit? What lessons have we learned from this project –5 years after the initial CYC training sessions – which we can apply to future projects of a similar type or goals? What would be easier, and more beneficial, to do earlier in the project? How can we enhance adoption through network building?

Network Knowledge Transfer and Information Flow

People adopt behaviors and practices that they see succeeding with their friends, family, neighbors and colleagues. Therefore, they are open to suggestions and invitations from folks around them that seem to have made good choices. One of the key aspects of the success of the CYC project was that it successfully recruited many of those best poised to disperse information about the program to participate. Sure, everyone wants a free computer and low-cost Internet access, but no one will sign up if they do not know about it. The typical approach for many programs is the formal one – advertisements, bulletins and news from various government or non-profit organizations. Unfortunately, these types of media are ineffective in either notifying the population of what is available, or getting them to adopt something new and different – even if on the surface it is a great deal. Much of this is due to the fact that advertisements are often not treated as trustworthy and assumed to come with “fine print” however, learning about programs and offers through a trusted source like a friend or family member yields a much higher level of consideration. This can be seen in Figure 12 where only 12% of all participants found their way to the program through such a formal means.

How Respondents Reported To Have Learned About the CYC Project

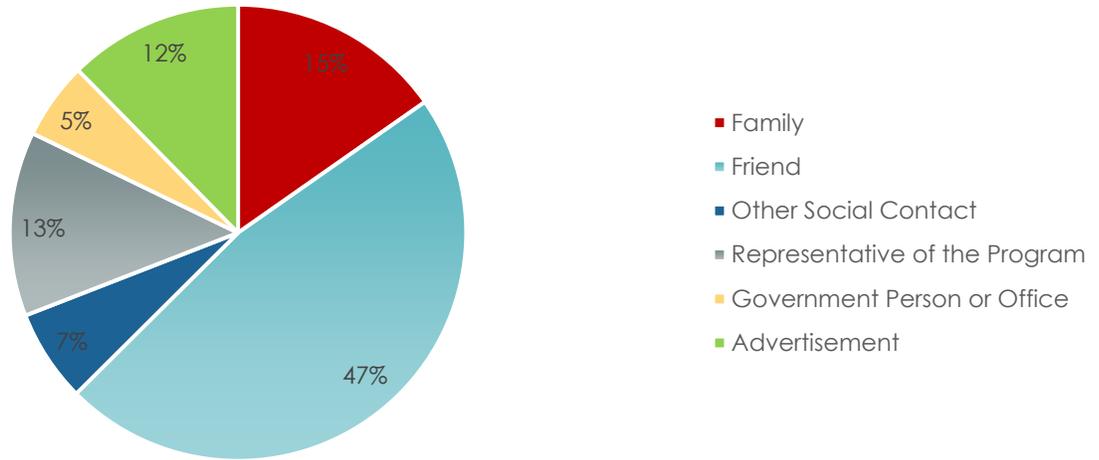


Figure 12

The Connect Your Community project was successful in Cleveland, at least in part, because most participants found out about the program, and its benefits, from other people. Social information flow – word-of-mouth (WoM) – was the key recruiting strategy. WoM has been shown, over the decades, to be a key strategy in the adoption of many new behaviors around the world (Rogers, 1995). *Figure 12* shows the various media that program participants used to find out about the program. All colors other than the green (Advertising) – designate a human/social interaction between a participant and another person who told them about the CYC project. Over 75% of the recruiting was through some means involving the social network that the participant was embedded in.

In addition to the standard participant survey questions (covered earlier in this paper), we asked respondents about their specific connections, what existing social ties they had to others in the network and which new social ties they developed as a result of this program. We also asked them to tell us if, and how, they used their network to pay forward the knowledge they gained from the program. In other words; Did they help others get online and improve their computer skills and how often did they do that?

Of the 429 people who completed the survey, 141 agreed to participate in our network analysis research and provide full and reliable information. These participants are shown in *Figure 13*. Survey participants are the red nodes in the diagram, while the aqua colored nodes are people they chose as “someone they already knew” or a “new connection” in the CYC project.

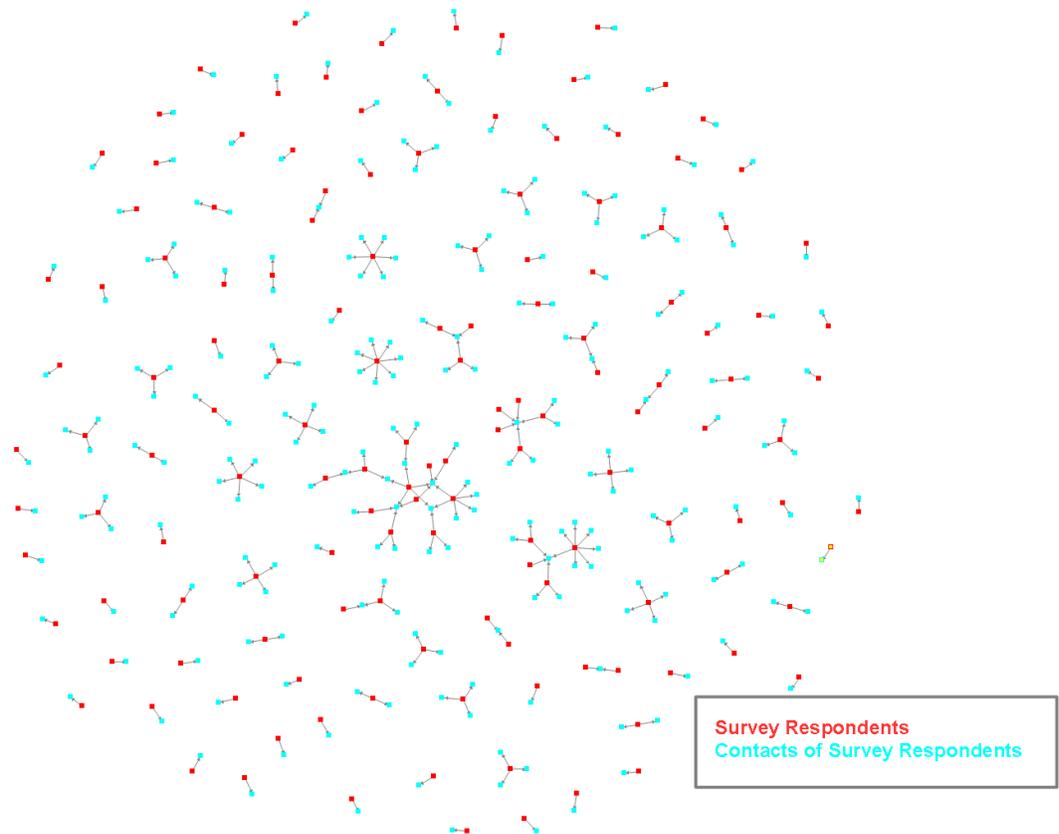


Figure 13: Survey Participants and People they nominated as New/Existing Friends from the CYC project

This final group, shown again in *Figure 14* is now defined in more depth by their community center affiliation (where they took classes as part of the CYC project) and those they nominated are now black. While each survey participant is colored by the Cleveland community center that administered the CYC project to them. Only the larger centers have a unique color. All of the small centers (< 20 participants) are aggregated into the Other category and colored purple.

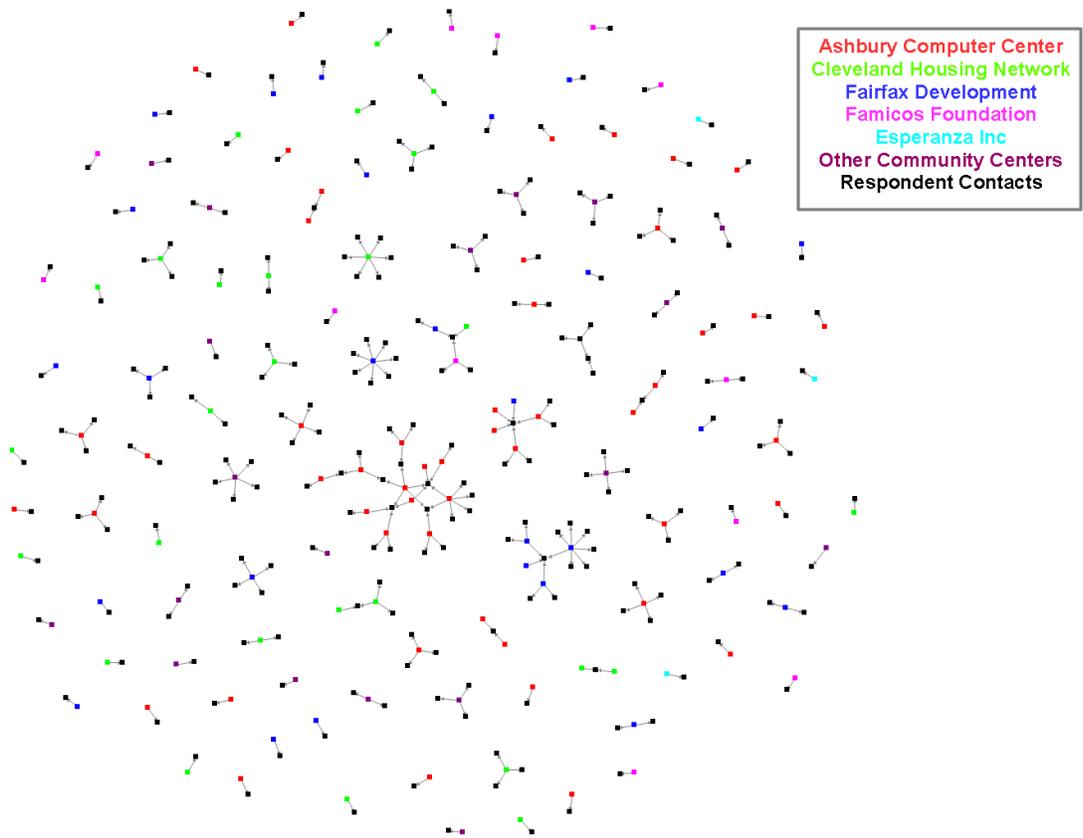


Figure 14: 141 Survey Respondents with Usable Network Data

We see many small sub-networks in *Figure 14*. Most of the participants are connected only to those they nominated and not to each other. However, the middle of the graph does show some larger groups. These are participants that knew each other and knew some of the same people. These are *emergent clusters* in the social space of these communities. The red nodes and the blue nodes represent the two large community centers – Ashbury (26% of the total respondents) and Fairfax (16% of the total respondents). There are many small clusters of like-colored nodes. With a deeper interview of these participants we might find that they do know one or more people in common or someone in one of the larger clusters. We believe, based on anecdotal knowledge, these community centers are better connected than the maps show.

We can see from the numbers and the network patterns that Ashbury forms the largest community followed by Cleveland Housing Network, Fairfax, Famicos, and Esperanza. There are opportunities for connections within each community center and between each community center. *Figure 15* shows us 4 of the most interesting

emergent network communities in our responding population. Again, the nodes are colored as above in *Figure 14*. The key nodes in each sub network are highlighted.

Network weaving is a process of building networks mostly from within. People or groups that are not connected, but should be, are connected/woven, by the third party that either knows them both, or is responsible for community development within the group (Krebs, 2005). Our first weaving opportunity is on the left side of *Figure 15*. We may connect the two highlighted nodes to each other. Connecting two well-connected nodes is the best overall option for weaving two groups together. Not only would this connect the two fragments of the Ashbury network (red nodes) it would bring in a member of the Fairfax Renaissance Development Corporation into the group. Connecting diverse groups builds more resilient networks than connecting similar groups (Krebs, 2005).

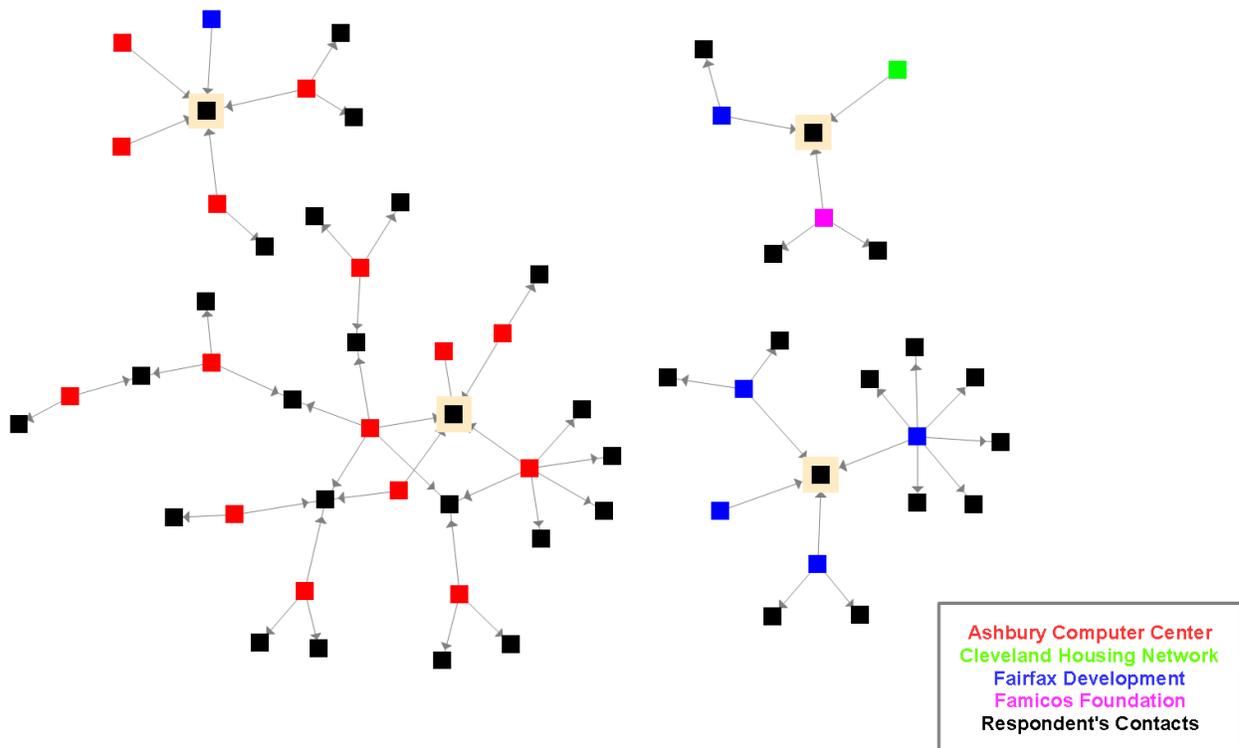


Figure 15: Key Sub-networks in Survey Respondent Data

Having good connections within a community is important. People naturally look to others for help making decisions. A denser¹¹ network speeds up the transfer of new information, ideas and innovations (Valente, 1995).

The denser the internal networks within each community center the more rapid the diffusion of innovations.

Not only is it good to have internal connections within each community center, but also each center should be connected via multiple paths to other community centers. This will enable shared learning between centers. They all face similar issues and problems and have common goals. What one knows can help the others (Valente, 1995). Connecting the two highlighted nodes on the right side of *Figure 15* is an example of weaving a network between diverse groups. This connection would bring together 3 community centers – Fairfax Development, Cleveland Housing Network and the Famicos Foundation.

Personal Networks and the Spreading of Knowledge

Beyond the strength of a network being attributed to the number or strength of connections between members of a community center, a network can also benefit from participants' own personal networks. If we look at some basic network metrics across all survey participants' data, we see some interesting things.

About half of the population (50.47%) said that they shared what they learned with others outside of the community centers; in their own personal networks.

The most interesting dynamic in this finding is that: Those with more overall connections tend to help others more. The more connections you have the more helpful you are.¹² People with many connections tended to help about 4(3.96) others, while those with a few connections tended to help just 1(1.32) person on average.

¹¹ A dense network has many connections amongst the same set of nodes. A sparse network has very few connections amongst that same set of nodes.

¹² We are sure there is a limit to this but we did not see it in our data.

This is a noticeable difference! From this data, we recommend that centers work to identify highly connected participants at the beginning of a given program and involve them in both *inviting* new participants into the program and in *spreading* the new knowledge they acquire. Of course, those with less connections can also do this but, according to our data, may not be as motivated. If you have a group of 1000 who are willing to share their learning and half are highly connected, then they will reach 1980 others, while the low connected group will reach 660, about 1/3 as much. Either way, the 1000 now pay forward to 2640 others; an increase of 38%. A very nice ripple effect!

We see the advantage of social ripple effects in distributing information throughout a community. A better-connected community, both internally and externally, will distribute information more rapidly and more accurately. To accomplish this, community members must be taught the basics of connecting better to communicate better.

VIII. Conclusion

As our world becomes progressively digital, the pressure to maintain connectivity in order to engage increases. Meanwhile, the range of connectivity options and barriers to them grows. But as the complexity of this landscape continues to mature, so too must our vigilance for inclusion develop. The digital divide poses many challenges to the disadvantaged; from the affordability of and access to connectivity and equipment, to a need for technology literacy and support. The Connect Your Community project addressed all of these barriers systematically and has been shown to be a measurably successful approach to mitigating the challenges faced by the unconnected and digitally naïve. Still, while projects like CYC stand to successfully improve internet adoption and engagement with technology, it does not address the source of the barriers contributing to the divide. To best begin to craft a solution, thought leaders must understand that:

- 1.) Not all internet-accessible devices are equally as internet-capable. Smartphones are not a replacement for a computer in all cases.
- 2.) Having home connectivity does not always mean that the household is sufficiently connected. Data caps, and bandwidth limitations can still bar families from making meaningful use of the internet such as taking online classes, or watching DIY video content.

3.) Owning a device and home connection does not necessarily equate to access. If an individual does not have the skills to navigate the internet or create the needed content (like a resume), their “access” is meaningless.

4.) The best resource for dispersing information or encouraging adoption are those participating in current programs. But, network analysis should be done concurrently with these programs. As people are trained and participate, gather information beyond contact information and skill assessments – get to know more about what makes technology important to the participant and who is important to them. Collect network data early. People will know their current network connections and use this information to build a better network while the program proceeds so as to enhance both learning and distribution of the information. Being familiar with participants' networks allows programs to both target the best connected among their communities to assist with recruitment and knowledge transfer, and also focus resources on the least connected who may need more support.

Additionally, there is a social justice responsibility on the part of leaders in this field. Just as we must strive towards providing a structure of support around access to all residents, we must also challenge our service providers to extend an equitable quality of service to all. Provider investment in lower-income areas of cities have traditionally been lacking (Callahan, 2017). If older service technologies are more constrained¹³, and low-income residents do not have the option of a newer or upgraded service, providers could ultimately be charging those who are most financially disadvantaged more for less (less data, less speed, and less bandwidth).

To meet these challenges, local government leadership and the funding community should come together to create a reliable structure of support for disadvantaged residents to obtain and sustain home internet access. The results of this survey show that the model demonstrated by the Connect Your Community project is likely to return a high level of longitudinal persistence. If support for such a model is provided locally and paired with strong advocacy for service equity, Cleveland could indeed see a significant reduction in its local divide thus benefitting residents as well as local government and industries like banking and healthcare who stand to directly benefit through a reduction of costs from an increased use of online services.

¹³ DSL is an older network technology than that of fiber and so comes with more limitations from a technological standpoint as we as a policy perspective as some ISPs (AT&T for example), place fairly low data caps on this service without an option to upgrade.

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Bibliography

- Adam T Perzynski, E. M. (2017, September). Patient portals and broadband internet inequality. *Journal of the American Medical Informatics Association*, Volume 24, Issue 5, 927–932.
- Babson Survey Research Group. (2016, February 9). *BABSON STUDY: DISTANCE EDUCATION ENROLLMENT GROWTH CONTINUES*. Retrieved August 8, 2017, from The Online Learning Consortium:
https://onlinelearningconsortium.org/news_item/babson-study-distance-education-enrollment-growth-continues-2/
- Bouma, L. (2014, April 22). *Comparing Data Usage For Netflix, Hulu, and Amazon*. Retrieved August 7, 2017, from Cord Cutters News:
<http://cordcuttersnews.com/comparing-data-usage-for-netflix-hulu-and-amazon/>
- Brodkin, J. (2016, July 29). *AT&T boosts U-verse data cap to 1TB, keeps DSL users at 150GB*. Retrieved August 1, 2017, from Ars Technica:
<https://arstechnica.com/information-technology/2016/07/att-boosts-u-verse-data-cap-to-1tb-keeps-dsl-users-at-150gb/>
- Brodkin, J. (2017, January 25). *FCC Chairman Pai vows to close broadband “digital divide”*. Retrieved August 8, 2017, from Ars Technica:
<https://arstechnica.com/tech-policy/2017/01/fcc-chairman-pai-vows-to-close-broadband-digital-divide/>
- Brodkin, J. (2017, February 3). *FCC makes it harder for poor people to get subsidized broadband*. Retrieved July 26th, 2017, from Ars Technica:
<https://arstechnica.com/tech-policy/2017/02/fcc-makes-it-harder-for-poor-people-to-get-subsidized-broadband/>
- Callahan, B. (2017, March 10). *AT&T's Digital Redlining Of Cleveland*. Retrieved August 1, 2017, from National Digital Inclusion Alliance:
<https://digitalinclusion.org/blog/2017/03/10/atts-digital-redlining-of-cleveland/>
- Fox, S. (2013, August 7). *51% of U.S. Adults Bank Online*. Retrieved August 8, 2017, from Pew Research Center Internet & Technology:
<http://www.pewinternet.org/2013/08/07/51-of-u-s-adults-bank-online/>

- Horrigan, J. B. (2016, September 20). *Digital Readiness Gaps*. Retrieved August 1, 2017, from Pew Research Center: <http://www.pewinternet.org/2016/09/20/digital-readiness-gaps/>
- Jeffrey Gottfried, M. B. (2016, February 4). *The 2016 Presidential Campaign – a News Event That’s Hard to Miss*. Retrieved August 8, 2017, from Pew Research Center Journalism & Media: <http://www.journalism.org/2016/02/04/the-2016-presidential-campaign-a-news-event-thats-hard-to-miss/>
- Karen Mossberger, C. J. (2008). *Digital citizenship : the internet, society, and participation*. Cambridge, Mass: MIT Press.
- Krebs, V. (2005). Building Adaptive Communities through Network Weaving. *Nonprofit Quarterly* vol. 12 (Winter 2005), 66-72.
- Landi, H. (2016, January 7). *The Business Case for Increasing Patient Portal Adoption*. Retrieved August 8, 2017, from Healthcare Informatics: <https://www.healthcare-informatics.com/article/business-case-increasing-patient-portal-adoption>
- McPherson M, S.-L. L. (2001). Birds of a Feather: Homophily in Social Networks. *Annual Review of Sociology*.
- NTIA. (2013). *Exploring the Digital Nation: America's Emerging Online Experience*. National Telecommunications and Information Administration. Washington D.C.: National Telecommunications and Information Administration.
- Pennic, F. (2014, December 16). *64% of Americans Do Not Use Online Patient Portals*. Retrieved August 8, 2017, from HIT Consultant: <http://hitconsultant.net/2014/12/16/64-of-americans-do-not-use-online-patient-portals/>
- PEW Research Center. (2016, 2 18). *Global Attitudes & Trends*. Retrieved 7 20, 2017, from PEW Research Center: <http://www.pewglobal.org/2016/02/22/internet-access-growing-worldwide-but-remains-higher-in-advanced-economies/technology-report-02-04/>
- Pew Research Center. (January, 12 2017). *Mobile Fact Sheet*. Retrieved 27 2017, July, from Pew Research Center: Internet & Technology: <http://www.pewinternet.org/fact-sheet/mobile/>
- Rogers, E. M. (1995). *Diffusion of Innovations, 4th Edition*. New York, NY: The Free Press.

- Schartman, S. (2012, July 7). *2012 Connect Your Community Participant Survey*. Retrieved March 7, 2017, from [Connectyourcommunity.org](http://connectyourcommunity.org/wp-content/uploads/2015/01/2012-CYC-Participant-Survey.pdf): <http://connectyourcommunity.org/wp-content/uploads/2015/01/2012-CYC-Participant-Survey.pdf>
- Schartman, S. (2012). *Seniors of Connect Your Community: Bridging the Digital Divide*. Connect Your Community. Cleveland: CYC Institute.
- Schartman-Cycyk, S. (2016). *Mobile Beacon Client Data Analysis Whitepaper*. Mobile Beacon. Mobile Beacon.
- Schwartz, N. D. (2011, February 22). *Bank Closings Tilt Toward Poor Areas*. Retrieved August 8, 2017, from The New York Times: <http://www.nytimes.com/2011/02/23/business/23banks.html>
- Sherman, E. (2015, May 26). *Moneywatch*. Retrieved July 26, 2017, from CBS News: <http://www.cbsnews.com/news/5-reasons-your-internet-bill-keeps-climbing/>
- Valente, T. (1995). *Network Models of the Diffusion of Innovations*. Cresskill, New Jersey: Hampton Press.
- Wasserman S, F. K. (1994). *Social Network Analysis: Methods and Applications*. New York, NY: Cambridge University Press.