January 2015

Deepening Ties

Comcast Internet Essentials Customers Show Broader and Deeper Ties to the Internet Over Time — Especially Among Those Who Had Digital Literacy Skills Training

John B. Horrigan, PhD

Research Funded by the Comcast Technology Research & Development Fund

The Comcast Technology Research & Development Fund, launched in March 2013, offers funding for researchers at leading academic institutions. The Fund is designed to be a significant investment in the future of technology by supercharging research and development into innovations that will shape the Internet industries for years to come. A wide range of research is funded, including research that focuses on public policy issues that go to enabling communities to take advantage of that innovation and growth. Funding is also provided to support open source development efforts.

Researchers who are selected to participate in the program have access to resources ranging from financial support to hands-on support from Comcast's extensive and experienced network of engineers and other experts. To date, the Fund has funded Georgia Institute of Technology, University of California San Diego, Villanova University, University of Connecticut and other research institutions.

More information about the Fund can be found at http://techfund.comcast.com/.

Table of Contents

Executive Summary

Introduction

This report, *Deepening Ties,* offers valuable new guidance for policymakers who are working on one of the most important social challenges of our time: how to connect all Americans to the broadband Internet and ensure that those who come online get the most out of it.

Deepening Ties continues survey research begun in *Essentials of Connectivity*, which benchmarked the Internet usage patterns of low-income families who obtained home broadband service through Comcast's Internet Essentials (IE) program. That study found that IE participants were frequent users of the Internet at home and felt home access to broadband helped their children with school work and helped adults look for jobs, find health or medical information, and stay better in touch with family and friends.

Deepening Ties follows up with more than 700 of the users who participated in the original survey and examines the following questions:

- What has changed for respondents with the passage of time?
- Have respondents' relationships with the Internet deepened?
- Have reported impacts of having the Internet at home changed?
- To what, if anything, can we attribute identified changes?

The way in which *Deepening Ties* addresses these questions is unique. The study's longitudinal design—comparing responses of the same set of users at the beginning and end of an 8-month period—has not been used before to examine the Internet's impact on individuals who have only recently begun receiving service at home. This design allows a much richer and deeper understanding of how these new adopters use broadband and what matters the most to them in connecting to the opportunities and resources that exist online.

Several key findings stand out and demand the most immediate action from policymakers and the entire broadband community—including not just Internet providers, but schools, banks, government offices, and everyone who interacts with the public online or works on connecting more Americans to the Internet. These are:

- ***The Primacy of Training***—The most significant finding in *Deepening Ties* is the very large impact formal training has on digital literacy or the attainment of concrete Internet skills. Those who receive formal training from an IE program, library, or other institution (as opposed to informal assistance from family or friends) were significantly more likely to use the Internet to pursue economic opportunities and cultivate social ties. Those who received formal training were 15 percentage points more likely to use the Internet to look for a job, 14 percentage points more likely to use it to access government services, and 12 percentage points more likely to use it to connect with family and friends. Some 31% of IE families report taking advantage of training, highlighting the need to do more. There is an opportunity for all—community organizations, banks, schools, the government, tech companies and Internet service providers—to develop digital literacy programs or promote existing training programs, such as that provided by Comcast, to the broader population of non-broadband adopters.
- ***Leveling the Playing Field for Working Parents***—63% of the IE users surveyed said home broadband helped them to manage their work schedules and balance family responsibilities, 48% reported being better able to communicate with their employers, and 41% said home broadband allowed them to work

at home on occasion. In other words, home broadband is a critical tool to achieve work/life balance. It can bring key elements of workplace flexibility that many high-income and white-collar families take for granted to everyone.

- ***Education Drives Engagement***—As a program directed at families with school-age children, it is no surprise that the IE families surveyed are highly motivated to use home broadband to further their children's educational aspirations and accomplishments. But the degree to which survey respondents felt that home broadband was genuinely working for their families in this regard is striking: 84% of those surveyed said IE's home broadband helps their children with schoolwork "a lot"; 81% said it helps their children learn about specific topics that interest them, such as science or history, "a lot"; 63% said it helps their children's "creative pursuits"; and 65% said it helps their children's reading ability. At the same time, however, these families want even more educational value from IE, with 65% seeking training on how to better communicate with their children's teachers and 63% wanting more information on college and financial aid. Program designers can take pride in these numbers, which show IE users reporting a very high degree of engagement with the core education-focused mission of the program.

One other finding bears mention: The second survey in September found that the number of IE users who reported their overall quality of life to be "very good" or "excellent" had jumped 7% since the first January survey. While the survey data is not sufficient to categorically establish that sustained home access to the Internet is responsible for this jump, this figure deserves further study. A 7% increase in quality of life satisfaction across the hundreds of thousands of families who use IE is a positive social change. While the data here do not establish causation, access to home broadband is known to save time, improve household convenience, and bring a myriad of education, economic, social, and entertainment benefits. For this reason, such a heartening jump in quality of life reported by IE new adopters is certainly no surprise.

Summary of Findings

Finding One: Respondents used the Internet more frequently and confidently after an additional eight months' experience with home broadband access through IE. They also reported that this home Internet access helped them to maintain social ties, access entertainment, and enabled their kids' completion of school work:

- In September 2014, 95% of IE customers said they used their IE service at home "at least occasionally"; up 11 points from 84% who said this in January 2014.
- 59% of IE users said they were "very comfortable" with computers in September, a sharp increase of 12 points from 47% who said this in January.
- 53% of respondents in September said IE helped them access entertainment "a lot"; up 7 points from 46% in January.
- 57% said in September that IE helps them stay in touch with family and friends "a lot"; up 4 points from 53% in January.
- The vast majority (82%) of IE users said in January 2014 that IE service helped their kids with school work "a lot." That already high level nudged up slightly, by 2 points, to 84% when the September 2014 survey was undertaken.
- 50% of respondents in September said their overall quality of life was "excellent" or "very good"; up 7 points from January.

Finding Two: While home Internet's role in promoting economic opportunity helps people to job hunt, its impact extends far beyond that to managing personal finances and work schedules, developing workforce skills, communicating with the boss, and, for a few, entrepreneurship. The September 2014 survey found:

- 61% said they want training on how to improve their workforce skills.
- 57% used the Internet to look for a job.
- 55% used the Internet to apply for a job.

- 55% considered using the Internet to acquire new workforce skills.
- 49% wanted training on how to start their own businesses.
- 46% considered taking classes online to earn credit or a degree.

Improving job-related communication and planning is important to IE users:
- 63% said having home broadband through IE helped them manage their work schedules in ways that help them to meet their family's needs.
- 48% said IE helped them communicate more effectively with their employers.
- 41% said having home broadband allows them to work from home on occasion.

Finding Three: Online educational opportunity is a key priority for IE customers. A large majority of survey respondents said that IE contributed to substantial improvement in their children's academic performance:
- 84% said IE helps their children with their school work "a lot."
- 81% said IE specifically helps their children with school assignments "a lot."
- 81% said IE helps their children find out about topics of interest to them, such as math, science, or history "a lot."
- 65% said IE helps their children's reading ability "a lot."
- 63% said IE helps their children's creative pursuits "a lot."

But parents also yearn for more training on how to have a more positive impact on their children's educational environment. Among IE respondents:
- 65% would welcome training on how to communicate with their child's teacher.
- 63% would welcome training on looking for information about college or financial aid for their kids.

Finding Four: About 31% of IE users have had formal Internet-related training, (i.e., from a library, community center, IE, or a program other than IE). When asked in September 2014 whether they had ever had training on the Internet or computers:
- 18% received it through the library.
- 11% received it from a community center.
- 10% received it from a program *other* than IE.
- 9% received it through the IE program itself.

IE users, while easily able to identify whether they have received training, may be less certain about which entities support Internet and computer training programs they have used. IE, through the Comcast Foundation, sponsors in-person digital literacy at a variety of organizations, such as libraries or community centers. Since the launch of IE in 2011, Comcast has invested more than $200 million in cash and in-kind support for such training, reaching 1.75 million people.[1] It is likely, therefore, that a sizable share of the training IE users received through libraries, community centers, or other programs, was supported by cash or in-kind support from the Comcast Foundation.

1 http://corporate.comcast.com/comcast-voices/comcast-to-offer-six-months-of-free-internet-essentials-service-and-announces-debt-forgiveness-plan

Finding Five: Formal training on how to use the Internet significantly boosts trainees' engagement with the Internet. They are more likely to use the Internet to pursue economic opportunities and to cultivate social ties. The following table compares a variety of results for those who had training to those who did not:

Training helped respondents to:	Got training (IE, library, community center, other)	Received no training
Manage work schedule	71%	59%
Look for a job	67	52
Stay in touch with family, friends, and neighbors	65	53
Apply for a job	63	51
Access entertainment, such as videos, movies, and online games	56	52
Assist with home-based work on occasion	50	36
Get access to government services	44	30

Some IE users also had informal training; 47% learned about Internet usage from their children and 15% from nearby friends. Notably, those who had informal training from children or nearby friends showed *no statistically significant differences* in levels or changes in key metrics.

IE users themselves seem to recognize this value. Overall, 79% of IE users reported being interested in receiving training in at least one of seven common Internet topics (children's education, college and financial aid, discounts and shopping, workforce skills, accessing government services, managing money, starting a business). And the typical IE customer is interested in training on more than one topic; in fact, the average number of topics cited was four.

The upshot is clear: providing training that makes the Internet easily and reliably accessible to those who need it can increase their quality of life, professional opportunities and financial security.

Methodology

This report, *Deepening Ties,* is based on a telephone survey conducted by Princeton Survey Research Associates, International, from September 15, 2014, to October 7, 2014. The survey interviewed 722 Internet Essentials customers who had been contacted initially in a January 2014 survey of 1,969 IE customers. For results, based on the September sample of 722 respondents, the margin of error is plus or minus 3.7 percentage points.

Introduction

The *Essentials of Connectivity* report, published in March 2014, benchmarked the Internet usage patterns of Comcast Internet Essentials customers who had begun using IE within the three months prior to the survey. The survey, which interviewed 1,969 IE customers, showed strong levels of engagement with the Internet among consumers who were either brand new to home-based high-speed service (half of the sample) or "re-adopters" (half of the sample who had home Internet service at some point in the past). Respondents were frequent users of the Internet at home and they felt home access helped their children with school work and helped adults in the household look for jobs, find health or medical information, or just stay in better touch with family and friends.

This report, *Deepening Ties*, reflects responses from the IE customers eight months later, collected through a September 2014 callback survey of 722 of the 1,969 who participated in the first survey (conducted in January 2014). The survey's longitudinal design allows examination of several questions:

- What has changed for respondents with the passage of time?
- Have respondents' relationships with the Internet deepened?
- Have reported impacts of having the Internet at home changed?
- To what, if anything, can we attribute identified changes?

The report will explore these and other questions along with three themes that emerge from the survey results:

- How the Internet becomes more embedded in people's lives over time, which in turn opens the door to stronger social ties and educational pursuits.
- Economic opportunity and home Internet access.
- The role of training on how to use computers and the Internet and how training spurs more engaged online use.

The Challenge of Increasing Participation on the Internet

In the past decade and a half, the Internet has become a key tool in most people's lives. We use it to shop, job search, find news and information, socialize and access entertainment. And most can access it virtually anywhere, using a broad range of electronic devices. For many of us, Internet access is so easy and immediate that we take it for granted. And we may feel isolated when what we've come to view as both an intellectual and emotional lifeline suddenly becomes unavailable.

But not everyone uses the Internet widely or often. Low-income Americans, those with limited education, older people, Latinos, and African Americans access the Internet less frequently than others in the general population, even though the latter two groups exceed the average for Smartphone use.

People who are considering venturing into the Internet slip-stream for the first time may feel a combination of anticipation over its potential benefits and apprehension over new obstacles they may suddenly confront. Access fosters inclusiveness, bringing more of the world into the lives of those who have relied on more static and inflexible ways of obtaining information and interacting with others. But they may feel anxiety over the unfamiliar set of responsibilities that come with home access. How do I troubleshoot devices if there is a glitch? How do I protect against malware or spyware that might infect my computer? How do I make sure the kids don't see inappropriate content? And how do I get up to speed on all this — *fast*?

In short, as recent evidence suggests, new Internet users may face a steep and confusing learning curve. A 2010 study of low-income technology users revealed the existence of many "un-adopters" of broadband—those who once had access, but lost it due to income constraints and technology problems (some caused by computer viruses).[2] Then there's the "second-level digital divide": potential Internet users whose lack of digital skills and pervasive deficits in "digital readiness" could prevent them from quickly embracing Internet usage.[3] This report, and the survey of Comcast IE customers on which it is based, analyzes the challenges those who have recently adopted broadband face in becoming fully engaged online.

But why should we worry about how many people are connecting to the Internet and to what extent? The answer: ***societal expectations***. As documented in *The Essentials of Connectivity*, new users are typically assumed by teachers, service providers and current or potential employers to have broadband Internet access at home. Lack of access and usage could actually pose social and professional barriers.

One way to meet this expectation is to ***accelerate*** and ***improve*** new and potential users' familiarity with the Internet. This is a key objective of the Comcast IE program. IE's design—a discounted monthly service plan, the chance to buy a $150 computer and access to training—is intended to encourage sustained and meaningful Internet use. For a discussion of the IE program, see Appendix I.

2 Dharma Dailey, Amelia Bryne, Allison Powell & Joe Karaganis, "Broadband Adoption in Low-Income Communities." *Social Science Research Council*, March 2010. Available online at: http://www.ssrc.org/features/view/broadband-adoption-in-low-income-communities/

3 Eszter Hargittai, "Second-Level Digital Divide: Differences in People's Online Skills." *First Monday*, Volume 7, Number 4, April 2002. Available online at: http://firstmonday.org/article/view/942/864

People's Deepening Relationship With the Internet

A number of metrics from the callback survey demonstrate that, in the eight months since the first survey, the Internet gained a strong foothold in people's lives and had become embedded in most users' daily rhythms.

The first piece of evidence of this trend is frequency of online use. When asked in January 2014 whether they used IE "at least occasionally," about 84% of those surveyed responded that they did. By September 2014, the number had risen to 95%. Those who said they used IE at least occasionally were then asked how often they used the Internet. In January, 59% said they did so several times a day, a number that rose to 62% in September. This means that more people with IE are using it at least occasionally and are using it a bit more often than they had been.

Respondents also exhibited higher levels of comfort using a computer over time. Just under half (47%) of IE customers in January said they felt *very comfortable* using a computer; a number that rose in September to 59%— a jump of about 25%.

Expressions of greater confidence with computer use and more frequent use translate into respondents' seeing the Internet's impacts in different places in their lives. This was borne out by their responses to questions about the Internet's impact in their lives and how they view others' expectations that they have home access. Reported impacts grew consistently, if modestly, across several questions asked:

Table 1: Self-reported impacts of having home broadband through IE

% who say Internet helps "a lot" for:	September 2014	January 2014	Change
Kids' school work	84%	82%	+2
Staying in touch with family & friends	57%	53%	+4
Accessing entertainment	53%	46%	+7
Looking for or applying for a job	43%	44%	-1
Getting access to government services	35%	42%	-7

The 7-point decline in people's perceptions of how the Internet helps them to access government services is of note, especially because respondents have become more likely over time to feel that government expects them to have home access (see below). At a minimum, the finding serves as a warning for government officials who are enthusiastic about the Internet as a service delivery tool. Quality government websites' interfaces with the public seem to lag behind expectations that government officials convey to the public about the need to use them — at least among this sample of low-income IE customers. This finding suggests that, as noted elsewhere in the report, government agencies may need to become involved in providing training to users on how to use online applications.

With respect to whether respondents have encountered institutions that expect them to have home Internet access, the data show an increase across the board. A comparison of responses from the January survey to the September survey follows:

Table 2: Changes in expectations from January to September 2014

% who say institution expects them to have home Internet access	September 2014	January 2014	Change
Schools	87%	83%	+4
Banks/financial institutions	71%	65%	+6
Health insurance companies	62%	53%	+9
Government	56%	50%	+6
Job or employer	54%	49%	+5

It is worth noting that respondents' sense of IE's impact extended to their children. The survey asked new questions about academic development and how IE factors into it. In connection with their children, the survey found:

- 81% said it helped their kids "a lot" with school assignments.
- 81% said it helped "a lot" to find out about topics that interest them, such as math, science, or history.
- 65% said it helped "a lot" with reading ability.
- 63% said it helped "a lot" in pursuing creative activities such as music, writing, or art.

Growth in adoption of tech gear has gone hand-in-hand with growth in frequency of use and perceived impacts.

Table 3: Changes in device ownership from January to September 2014

% who have device	September 2014	January 2014	Change
Desktop or laptop computer	88%	85%	+3
Smartphone	62%	57%	+5
Tablet computer	41%	36%	+5

With many respondents having portable computing devices, most IE users (72%) have set up wireless networks in their homes.

A final indicator of how the Internet has anchored itself in respondents' lives is how they view the quality of their lives. Specifically:

- In January 2014, 43% of IE respondents said their quality of life was at least very good—with 24% saying it was excellent and 19% very good.
- By September 2014, 50% said their quality of life was at least very good—with 25% saying it was excellent and 25% saying it was very good.

This is not to say that increased Internet use is the causal driver of respondents' improvement in their quality of life. However, one of the known benefits of having home broadband access is saving time on everyday activities and the appearance of a service that offers a boon to household productivity and convenience is bound to help quality of life.

Key Takeaways

In just eight months' time, Internet Essentials customers have become more frequent and confident Internet users.

- 95% in September said they used IE at least occasionally, up 11 points from 84% in January.
- 59% in September said that they were very comfortable with computers, up 12 points from 47% in January.
- This translates into a stronger sense that the Internet helps with kids' school work and users' social ties, access to entertainment and job searches.

Economic Opportunity: Job Search, Home Businesses, Work, and Personal Finance

The September survey offered a new set of questions to IE respondents to determine how home Internet service affected money, work and economic advancement in their lives. The results show that these issues loom large for IE customers, because they use the Internet to look for work, manage work-employment issues in their current jobs, bank online and improve job skills. Some even use their IE service for home-based businesses.

For context, the survey asked about employment and technology use at work. In the sample of IE customers, 38% said they were employed full-time and 23% part-time. About 45% of those employed full- or part-time use a computer at work to carry out job-related tasks and the same number (46%) use the Internet to do so.

Using the Internet to participate more fully in the job market is a clear priority for IE customers. A few data points make the case:

- 57% have used IE to look for a job.
- 55% have used it to apply for a job.
- 55% have given thought to acquiring new workforce skills.
  - 34% have given it "a lot" of thought.
  - 21% have given it "some" thought.
- 46% have given thought to taking online classes for credit or a degree.
  - 27% have given it "a lot" of thought.
  - 19% have given it "some" thought.

A clear majority of IE customers—61%—said they would be interested in getting specific training on how to improve their workforce skills.

Another element in the economic opportunity equation is entrepreneurship. Six percent of those surveyed said they had a business that they own or operate out of their home. Most (two-thirds) had the business before they got IE service, meaning that only a few IE customers started their home business *after* they began receiving IE service. Their main activities are marketing their businesses or communicating with their suppliers. Even though few IE customers have home-based businesses, 49% expressed interest in getting training on how to start their own businesses (whether home-based or not).

A separate but no less important theme for IE users on the economic front is convenience. For IE users, the Internet also helps ease the flow of communication about matters pertaining to work or finance. Two-thirds (67%) of IE respondents have an account at a bank or some other financial institution, suggesting that 33% are "unbanked." This contrasts with the national rate of "unbanked" Americans which stands at 7.7% and 19% for households with incomes of or under $30,000 per year, although differences in the wording of the question resulted in the figures not being strictly comparable.

Respondents without bank accounts were likely to use alternative financial service options to carry out banking transactions. Among all IE respondents, 46% had used the Internet to do banking or learn how to better manage finances, such as looking for less expensive ways to cash checks or obtain credit. And more than half (54%) say they would be interested in training that would help them to better manage their finances.

Home Internet access doesn't help IE customers with financial matters alone. It helps them manage day-to-day communications with their employers. Nearly two-thirds (63%) of employed IE customers said that having home broadband through Internet Essentials helped them to manage their work schedules, and thus, meet their families' needs. Half (48%) said IE helped them to communicate more effectively with their employers. And 41% said that having broadband at home allowed them to work from home on occasion.

Key Takeaways

- Internet Essentials users view home access as a pathway to economic opportunity—both in terms of job searching and workforce skills development.
- Having broadband at home helps respondents to manage work schedules, communicate with employers and sometimes to work from home.
- IE service provides everyday convenience for users by helping them to manage schedules and search for bargains.

The Role of Training

The September 2014 callback survey took a different approach to asking about whether respondents had received any training on the Internet or computers. The January 2014 survey asked people whether they had received in-person training provided through IE (13% had) or had used the Internet Essentials Online Learning Center (23% had). This means that 29% of IE customers, in January, had some sort of training from at least one of the two types of training about which they were asked (either IE-provided training or the Internet Essentials Online Learning Center).

Rather than replicate the January survey, the September callback survey asked a longer list of possible ways IE customers might have obtained training on how to use a computer or the Internet. The results were:

- 47% received training through their children.
- 18% received it through the library.
- 15% received it from a friend in their neighborhood.
- 11% received it from a community center.
- 10% received it from a program *other* than IE.
- 9% received it through the IE program itself.

Note that the survey asked respondents to say whether they received training and where (such as a library or community center). The source of the support for the training is not something respondents are likely to know. Comcast's reach into digital literacy support is extensive, with $200 million in cash or in-kind support, via the Comcast Foundation, for digital literacy training at various organizations since 2011.[4] This means that it is quite likely that, for many IE users, the training they received at community centers, libraries, or other programs had significant support from the Comcast Foundation.

IE customers are also interested in training in specific areas. When asked if they would be interested in learning to use the Internet in specific topic areas, here is what IE users said:

Table 4: Topics on which IE customers would like training (% who said "yes")

On how to communicate with your children's teachers and school	65%
To look for information about college or financial aid for your child	63%
To find out about ways to save money on things you buy	62%
To improve your skills for the workforce	61%
To learn about how to access government services through the Internet	56%
To learn to better manage your money and finances	54%
To start your own business	49%

The findings show that the vast majority—79%—of IE customers would be interested in training on how to use the Internet on at least one of these seven topics. And the typical IE customer is interested in training on more than one topic; in fact, the average number of topics cited was four.

4 http://corporate.comcast.com/comcast-voices/comcast-to-offer-six-months-of-free-internet-essentials-service-and-announces-debt-forgiveness-plan

When focusing on formal training—that is, whether the respondent had training at a library, community center, through IE, or through some other program—about 31% of respondents took advantage of these programs (rather than learning from children or friends).

Moreover, those who took advantage of formal training were significantly more likely to use the Internet to look for jobs and report high levels of comfort with computers (controlling for other factors, such as the respondents' baseline level of comfort with computers in January, age, income and education; see Appendix II: Methodology for further discussion).

This is a significant finding for two reasons. First, although it seems natural to assume that training will affect people's ability to master Internet usage, empirical support for it is hard to come by—yet is clear here.[5] Any effects from training may also be spurious; an apparently significant training effect may actually reflect the passage of time and accumulated experience with computers and the Internet, not the training itself. Such effects may also be artifacts of the people who seek out training; perhaps those people are more motivated to learn or already skilled with computers, showing that the training itself does not mean much. Analysis presented in the footnote below addresses these possible issues and finds that the training effect is real and independent of the passage of time and the nature of those who seek training.

Second, it is worth noting that having had training from a friend or child has no impact on people's behavioral patterns. Often it is thought that the existence of "digital natives" in the household will lift the levels of digital skills for everyone. The findings here do not show that.

Comparing the frequency of online activities for those with formal training to those without it puts the impact of formal training on full display. As the following table shows, two-thirds of IE customers who had training went on to look for a job online compared with half (52%) of those who did not take advantage of any training. Similar differences are evident when it comes to applying for work and working at home on occasion. The differences are smaller with respect to communicating with employers and online banking, but they are noteworthy nonetheless.

Table 5: Comparing impacts for those with training and those without it (% who said it helps "a lot")

	Got training (IE, library, community center, other)	Received no training
Help managing work schedule	71%	59%
Looking for a job	67%	52%
Applying for a job	63%	51%
Communicating better with employer	53%	46%
Help in working at home on occasion	50%	36%
Doing online banking	50%	44%

Respondents who have had computer or Internet training were also much more likely to say that their IE service helps them manage their work schedules than those who did not have training. This type of benefit from having home access—having more certainty about work hours so that child care and other issues can be better managed—can really open users up to the possibilities of home-based computer/Internet access in other parts of their lives.

5 In Chicago, analysis suggests that, over a five-year period, neighborhoods subject to the Smart Communities intervention have home broadband adoption rates that are 9 percentage points higher than other neighborhoods. Smart Communities also show rates of use of the Internet for searchers for jobs, health information, and transportation matters that are 10–11% higher than those in other neighborhoods. See Karen Mossberger, Caroline Tolbert & Christopher Anderson, "Measuring Change in Internet Use and Broadband Adoption," April 2014. Available online at: https://cpi.asu.edu/sites/default/files/smartcommunities_measuringinternetchangeinchicago_0.pdf

The impact of training is also evident when IE customers think about how having home-based Internet service has affected their lives and their children's lives. Those who have received training are much more likely, compared to those who received no training, to say home access has helped "a lot" in looking for a job, accessing government services and staying in touch with family or friends. The differences in favor of those with training are consistent, if smaller, in other areas with the exception of gaining access to banking or financial services.

Table 6: Comparing activities for those with training and those without it (% who said it helps "a lot")

	Got training (IE, library, community center, other)	Received no training
Doing school work	86%	81%
Staying in touch with family, friends and neighbors	65%	53%
Accessing entertainment like videos, movies and online games	56%	52%
Looking or applying for a job	55%	38%
Getting access to government services	44%	30%
Getting access to banking and financial services	44%	44%
Looking for or starting a business	18%	14%

With respect to their children, parents who have had Internet or computer training are more likely, by a 6 to 9 percentage point margin, to think the Internet has helped their children "a lot."

Table 7: Comparing impacts for children who received training to those who did not (% who said it helps "a lot")

	Got training (IE, library, community center, other)	Received no training
Finding out more about a topic that interests them, such as math, science or history	85%	79%
Doing their assignments for school	84%	79%
Improving their reading ability	71%	62%
Pursuing creative activities, such as music, writing or art	67%	61%

People who have had training are, perhaps not surprisingly, more likely to be interested in receiving training in specific areas. The following table shows IE customers' responses when asked whether they would be interested in training programs that focused on specific topic areas.

Table 8: Comparing interest in training on specific topics in those with training and those without it (% who have given this "a lot" or "some" thought)

	Formal training (IE, library, community center, other)	Received no training
Acquiring new workforce skills so you can increase your income	60%	52%
Starting your own business	38%	29%
Pursuing creative activities, such as music, writing or art	58%	48%
Taking classes online for credit toward earning a degree or certification	55%	42%

IE users are clearly interested in using the Internet for economic advancement, particularly those who have training. About 60% of those who received training would be interested in receiving guidance on acquiring new workforce skills, 55% said this about online classes, and more than one-third (38%) indicated they would welcome training on how to start their own businesses. Also noteworthy is the interest in pursuing creative activities. Nearly three in five (58%) said they would be interested in learning how to pursue creative activities online, a 10 percentage point increase over those who had not received training.

Finally, it is worth noting that those who had formal training on computers or the Internet were more likely to report *increases* in levels of comfort with computer use from January to September. Recall that the share of respondents saying they were very comfortable with computers rose from 47% in January 2014 to 59% in September 2014. Of this increase, 60% are those who had formal training, a disproportionately large share given that just 31% of all respondents had any training.

Key Takeaways

- Nearly one-third (31%) of Internet Essentials users have had formal training on the Internet or computers, meaning they took classes at libraries, community centers, an IE program or a program other than IE. Those who have had such training are more likely than those who did not to use the Internet for job searching and cultivating social ties.
- A strong majority—79%—would be interested in training in additional areas such as their child's education, financial literacy, and workforce skills.

Conclusion

The research shows that Internet Essentials customers who previously had little or no home broadband Internet access integrated its use into various aspects of their lives fairly quickly. The survey showed significant improvement in Internet usage after eight months of adoption in most cases. The only exception was access to government services online. These outcomes show that increased access to the Internet fostered social connectedness, access to education, creative pursuits and entertainment for most respondents. Home Internet access also opens doors to economic opportunity for many respondents and helps them to manage many aspects of their work, such as scheduling work hours and working at home.

These impacts occur at a higher rate for respondents who have had some formal training on how to use the Internet and computers. Training on computers and the Internet clearly helps to increase and improve Internet use among those who have little experience with this technology. This finding extends to a subset of new Internet users: families with school-age children who qualify for free or reduced-price lunch programs. This group is more likely to be attuned to using the Internet than other demographic segments who lack online access at home because they are younger, have school-age children and are more motivated to think about the benefits of accessing broadband at home. Thus, the finding that training (even when holding factors such as age constant) impacts online behavior among this group is somewhat unexpected.

These findings indicate that investing resources in training programs will have payoffs—and that they will probably be more significant for groups of non-broadband-using Americans who are less likely to use the Internet than IE customers, such as older Americans. The fact that survey respondents used libraries, Comcast IE-provided training resources and other community-based organizations to obtain training also suggests that investing in a range of community institutions to provide this support can be effective, efficient and affordable.

The upshot is clear: providing training that makes the Internet easily and reliably accessible to those who need it can increase their quality of life, professional opportunities and financial security.

With this in mind, other institutions should consider providing Internet training. Banks, health care providers, government agencies, and others have a stake in having an expanding pool of online users who know how to negotiate this resource. Such institutions might directly provide training or fund entities with the necessary experience and expertise. The evidence that training pays off for users shows that planning efforts to make training resources available would benefit both inexperienced and potential users and society as a whole.

Appendix I: Background on Internet Essentials

Context

As the nation's largest residential broadband service provider, Comcast is dedicated to bridging the digital divide by narrowing the broadband opportunity gap. Comcast has wired more than 99% of its service area for broadband, ensuring that families have access to the Internet no matter where they live. Comcast has invested and continues to invest substantially in digital literacy training and increasing public access to broadband in the local communities it serves, including Boys & Girls Clubs of America, the League of United Latin American Citizens (LULAC) Technology Centers, FIRST Robotics Competition, Easter Seals, and most recently, Khan Academy.

In the summer of 2011, Comcast launched its own broadband adoption program for low-income families in the United States. IE has evolved into the largest and most comprehensive broadband adoption program anywhere in America, providing low-cost broadband service for $9.95 a month; the option to purchase a full-service, Internet-ready computer for less than $150; and multiple options for digital literacy training in print, online, and in person.

Research consistently has shown that the barriers to broadband adoption involve a complex mix of low digital literacy, perceived lack of relevance of online content, and the need for low-cost, good quality computers and Internet service. IE was designed to address all of these critical hurdles to broadband adoption.

Program Features

IE is designed to meet the needs of a specific population—low-income families with school-age children who are not currently connected to broadband Internet at home. Since the program launched, Comcast has expanded and strengthened it in multiple ways every year. In the three years since the launch, Comcast has connected more than 350,000 families, or 1.4 million low-income Americans, to the Internet at home. Comcast's partners have been critical in helping make IE what it is today.

More Families Eligible for the Program

- Any family with a school-age child from Head Start to 12th grade, who is eligible to participate in the National School Lunch Program (NSLP), may apply for IE. The program is open to students in public, charter, parochial, and private schools, as well as students who participate in cyberschool or who are homeschooled.
- Comcast will offer amnesty for families with Comcast debt older than one year for the purpose of connecting to IE.
- All families whose children attend schools with 70% or more participation in the NSLP are pre-approved when they apply for IE and do not need to submit any additional paperwork in order to get connected.

Reflecting Our Diverse Communities

- English and Spanish-speaking families can call Comcast's dedicated in-language call center, or apply online at InternetEssentials.com or InternetBasico.com.
- Schools and partner organizations may order materials, free of charge, in 12 languages beyond English and Spanish, including Chinese, Korean, and Russian.

Technology Enhancements

- Comcast increased the connection speed for customers twice in less than two years. Internet Essentials now offers up to 5 Mbps downstream, which is more than triple the speed offered at the beginning of the program.
- Comcast developed an online application that permits families to apply for Internet Essentials at public computing centers, libraries, or anywhere there is an Internet connection. Families can also apply right from their smartphones, and upload pictures of any necessary qualifying documents.

Building Digital Communities

Comcast works directly with an extensive network of thousands of community, non-profit, faith-based, and government organizations across its footprint to offer and promote Internet Essentials to eligible families. Comcast has made a significant commitment to supporting digital literacy training and education, a pillar of Comcast's Internet Essentials program, which addresses this need to increase the level of digital and computer skills for low-income families and build healthy, thriving digital communities that are able to compete in the 21st century's globally connected economy. Since 2011, Comcast has invested more than $200 million in cash and in-kind support into digital literacy training, reaching more than 1.75 million people through the program's non-profit, digital literacy partners.

Comcast maintains a strong commitment to its local and national community organizations; one that is grounded in the belief that its primary purpose is to accelerate what they do best—provide much-needed services to their constituents directly. From providing online and workforce development skills, to helping teens prepare for college entrance exams, Comcast's partnerships with Boys & Girls Clubs of America, Easter Seals, the League of United Latin American Citizens Technology Centers, the National Urban League, Khan Academy, and thousands of others connect people to more opportunities in school, work, and life.

Program Milestones

Internet Essentials has grown into a nationwide collaborative that centers on connecting families to the Internet at home and supporting non-profit partners that build the digital literacy infrastructure of the communities Comcast serves. Comcast's more than 8,000 partners are the cornerstone of its success and include: non-profit organizations, community-based organizations, other technology companies, libraries, school districts, teachers and superintendents, members of faith-based organizations, mayors, legislators, governors, and state and locally elected officials. Other program milestones have been accomplished as well. By the end of 2014, Comcast and its community partners:

- Provided support for free digital literacy training and education for more than 1.75 million people;
- Broadcast more than 4 million public service announcement spots, valued at nearly $51 million;
- Sold more than 30,000 subsidized computers for less than $150 each;
- Distributed more than 37 million Internet Essentials brochures for free;
- Welcomed more than 2.2 million visitors to the Internet Essentials websites in English and Spanish and to the Online Learning Center;
- Fielded more than 2.3 million phone calls to the Internet Essentials call center; and
- Offered the program in more than 30,000 schools and 4,000 school districts in 39 states and the District of Columbia.

Appendix II: Methodology

Isolating the Impact of Training

The consistent finding that survey respondents who had training are more active Internet users than those without it seems to point unavoidably to the proposition that training is the driving force behind the differences. It is possible, however, that the differences are due, not to the training, but rather to the characteristics of people who decide to seek training on how to use the Internet or computers. This potential selection bias—whereby people who have some aptitude with computers or interest in job search seek training—means that the training itself may make little difference. Motivated or competent people would have applied for jobs or reported high interest in pursuing creative activities online anyway. In other words, higher use would occur because of attributes these people already possess, not training.

Put differently, even if those who have had training on computers are more likely to use the Internet for certain applications, *it is possible* that the training has nothing to do with that increase in use. Other factors such as the fact that those who seek training are highly motivated—or the mere passage of time—may trigger this behavior, not training.

Multivariate statistical techniques can help reveal the extent of the training effect on Internet use. These techniques allow us to hold a range of other factors constant and focus *only* on a particular variable to see what difference that variable makes. For example, those who have had training are much more likely to have used the Internet to look for a job than those who received no training—by a 55% to 38% margin. Some or even most of that 17 point difference may be due to online job seekers having higher levels of comfort with computers and the Internet to begin with, higher levels of education, age, income or other factors.

Some of the other factors are worthy of discussion. They include whether the respondent has a Smartphone. This is likely to significantly increase the incidence of people using the Internet for specific purposes and in fact does. Past Internet experience may also influence levels of online activity. The January survey asked whether IE users had home broadband service in the past and half did. Previous home broadband use did contribute to higher levels of Internet use among respondents in this survey, but only modestly. But neither having a Smartphone nor past home broadband service eliminates the effect online training has on Internet behavior. The impact of training on this behavior is higher for those who did *not* have broadband at home in the past but also increases significantly for those who have had service.

To assess the impacts of formal training on computers or the Internet on online behavioral and attitudinal patterns, a logistical regression model was developed to explore which factors influence the probability of a respondent doing specific online activity. The discussion to follow uses the results of the logistical regression analysis and examines the likelihood that a respondent searched for a job online and applied for a job online. The analysis also examined whether training had any impact on respondents' levels of comfort with computers. Recall that, from January to September, the share of IE respondents who said they were *very comfortable* with computers rose from 47% to 59%.

Looking for a job: Receiving formal training on computers or the Internet is a significant contributor to the likelihood of using the Internet to job search. This holds true even controlling for respondents' baseline level of computer skills in January (that is, people's levels of comfort with computers in the early days of having IE service), changes in levels of Internet use from January to September, age, income and education. It is true that those with high levels of comfort with computers in January are more likely to use the Internet for job

search—but having had training is an equally significant (and independent) factor that contributes to the incidence of job searching. Older and Latino respondents were significantly less likely to use the Internet for job searching, as were the least-educated respondents (those with a high school education or less). Those who attended college or graduated from it were significantly more likely to use the Internet for job searching.

Applying for a job: The results for applying for a job are much the same as those for searching for one. Those who have had Internet or computer training were significantly more likely to use the Internet to apply for a job than were those with no training. The effect is significant when controlling for a number of other variables, such as age, education, income and race. In this specification, *change* in levels of computer comfort from January to September turned out to be a significant predictor of applying for a job online. That is, respondents whose reported levels of comfort with computers *increased* in the eight-month timeframe were also were more likely to use the Internet to apply for a job. Having received training was a significant and independent contributor to higher levels of using the Internet to apply for a job.

The finding that *both* variables are significant is important because it shows the power of formal training on people's behavior. One could discount the contribution of training using the rationale that people become more comfortable with computers over time, which in turn draws them more deeply to online use. In other words, training doesn't matter. Yet these findings do not support such a conclusion. While the findings show that people's comfort with computers may be a function of exposure to them over time, the results also show that training reinforces this growing comfort level significantly and with an effect that is independent of whatever changes may come about due to the passage of time.

Comfort with computers: The preceding discussion raises the question of whether having formal training on the Internet or computers contributes to changing people's perception of their comfort using computers. Here, the longitudinal data is particularly useful in that it's possible to develop a model that examines change in reported comfort using computers from January to September and see whether training had anything to do with the change over time. Simply comparing levels of comfort with computer use at a specific time to reported incidence of training has limits; other factors (some discernible from the data and some omitted) may explain any relationships between the two. However, linking change over time to training strengthens inferences about statistical relationships; especially because the survey includes data on whether, in January, respondents had received any computer or Internet training in the past.

The results point to the importance of computer training and the Internet as contributors to increases in respondents' reported comfort with computer use. IE customers were *significantly* more likely to report an *increase* in levels of comfort using computers from January to September if they had formal training (as reported in the September survey). This holds true controlling for age, income, race and education—as well as whether they had ever had training on the computer or Internet before having IE service (as reported in the January survey).

The finding shows that respondents' growth in comfort with computer use is not just a matter of experience accumulated through time. Having received formal training at a library, community center, the Internet Essentials program, or another program *since* starting IE service explains a significant portion of respondents' increase in comfort with computer use. The effect is independent of training they may have had before receiving IE service and other demographic factors such as income or education.

Although the link between training and the changes in computer/Internet use is clear, it is hard to make an airtight claim that training is the causal factor behind the changes. The analysis design does not include a control group of a similar set of low-income Americans with school-age children for comparison. It is also impossible to include all possible variables that might influence change in behavior over time. This said, the statistical findings that link change in behavior to training—while controlling for other relevant factors and tracking individuals over time—strongly indicates that the connection between the two is far from a coincidence or a statistical fluke.

Size of Impact

With the nature of formal training's impact on behavior established, the question is its extent. The statistical technique used here helps to explore how increases in the levels of respondents with training would change overall results for relevant variables. The following table focuses on job searching online, job applications online and growth in comfort with computer use and asks three questions:

- What happens if the share of people receiving training goes from the current level in the IE sample (31%) to zero?
- What happens if the share of people receiving training goes from the current level in the IE sample to 75%?
- What happens if the share of people receiving training goes from the current level to 100?

Table 9: Model results for different levels of training in IE population

Internet Use in	If 0% have training	Overall sample (31% have training)	If 75% have training	If 100% have training
Looking for a job	52%	57%	62%	65%
Applying for a job	52%	55%	61%	63%
Becoming more comfortable with computer use	13%	15%	19%	21%
Helping to access government services ("a lot")	31%	35%	41%	45%
Helping to stay in touch with family & friends ("a lot")	54%	57%	63%	65%

The first thing to note is that the model results do not perfectly match the results respondents reported. That is because the variables included in the model may not capture all of the reasons behind a response —and thus vary from the actual response given. This introduces variation of a few percentage points. As reported above, for example, 51% of respondents with no training said they had used the Internet to apply for a job (compared to 52% in the model's prediction) and 67% with training said they had used the Internet to look for a job (compared to 65% in the model's prediction).

To summarize the size of impacts, for the population of IE respondents surveyed:

- Having had training on the Internet or computers adds an average of about 10% to the general incidence of the activities listed.
- If 75% of respondents received training, the general incidence of activities listed would be, on average, about 25% higher than in the absence of training.
- If 100% of the sample had received training, the general incidence across the activities listed would be on average about 33% higher than if no one had Internet or computer training.

About the Author

John B. Horrigan, PhD, is an independent communications and technology policy consultant. Horrigan's work focuses on consumers' adoption and use of information and communications technologies, as well as ICTs' impacts on states and localities.

Horrigan has served in senior positions at the Pew Research Center, the Joint Center for Political & Economic Studies, and TechNet. At the Federal Communications Commission in 2009-10, he led development of the broadband adoption and usage portion of the National Broadband Plan. Among his recent work is the report: "Broadband and Jobs: African Americans Rely Heavily on Mobile Access and Social Networking in Job Search" and "Adoption of Information and Communication Service in the United States: Narrowing Gaps, New Challenges." At TechNet, he authored "Preparing America's 21st Century Workforce" and the 2012 "State Broadband Index."

Horrigan has a PhD in public policy from the University of Texas at Austin and his undergraduate degree in economics and government from the University of Virginia. He can be reached at horrigan.consult@gmail.com.

The Comcast Technology Research & Development Fund