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MAY 2023

Lessons from the Social Impact Evaluation of Project OVERCOME

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INTRODUCTION

The COVID-19 pandemic exposed the gaping digital divide and alarming digital inequities in the United States. The pandemic-era confinement opened the eyes of policymakers as millions experienced social and economic isolation due to the limited or complete absence of Internet connectivity.

As a nonprofit dedicated to guiding communities into a more connected future, US Ignite partnered with the National Science Foundation (NSF Award #CNS – 2044448) and Schmidt Futures to design Project OVERCOME and test creative solutions to connect the unconnected. The project's design ensured careful consideration of both the technical requirements of broadband access and the community collaboration, outreach, and engagement needed to explore sustainable success.

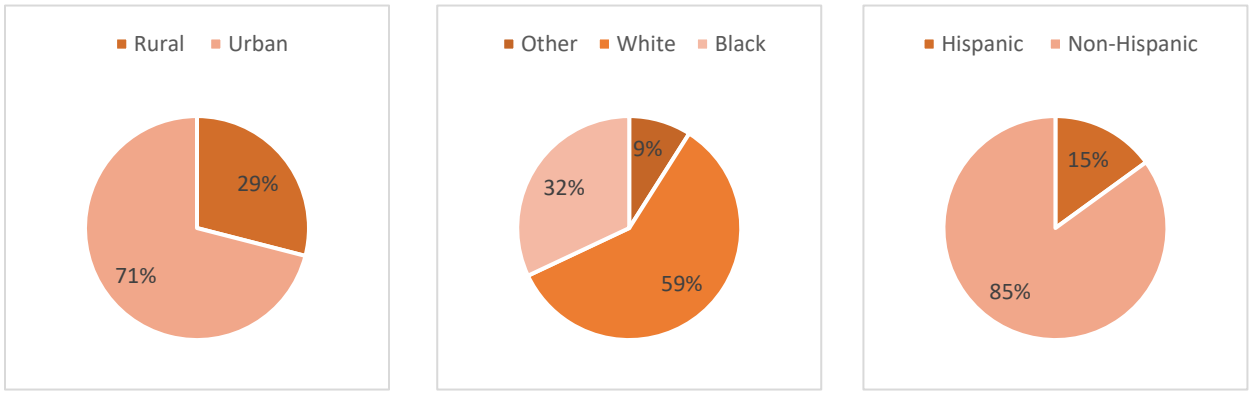
US Ignite selected communities to build proof-of-concept networks across several rural and urban communities, including fiber, fixed wireless, and wireless deployments. Communities received funding to deploy a novel solution to connect unserved and underserved areas and measure the project's social impact. The project aimed to understand the strengths and weaknesses of novel broadband solutions critical to the success of the billions of federal infrastructure funding.

One of the challenges in identifying the impacts of broadband access and investments is that the diffusion of broadband technology is not random. Studies that analyze diffusion and determinants of broadband access find that private firms build broadband infrastructure where it is most profitable (e.g., Greenstein and Prince 2008, Flamm and Chaudhuri 2007, Prieger 2002). This practice leaves more of the smaller or economically disadvantaged communities unserved or underserved, highlighting the need for policy interventions to ensure equal access to digital technologies. Since broadband investments are correlated with economic trends in the area, it is challenging for researchers to empirically isolate the effects of technology from other potential confounding socio-economic factors.

This project provided an opportunity for reliable estimates of the effects of broadband access on education, employment, and access to healthcare. By providing free or low-cost broadband to users as a part of the study and measuring targeted outcomes via a survey, we identified the impact of Project OVERCOME on Internet adoption.

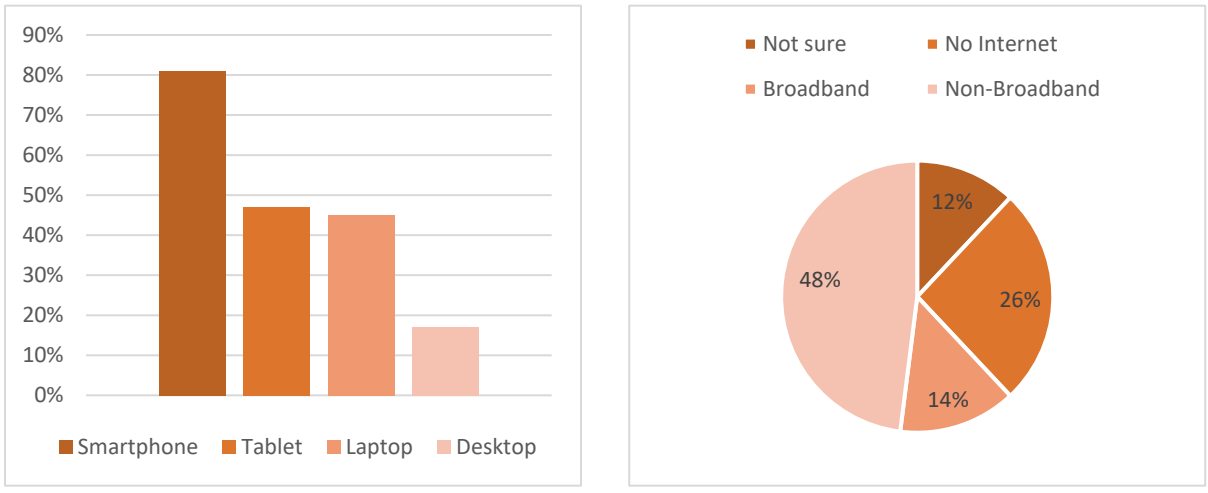
The survey data was used to estimate the impact of broadband access on challenges faced in using digital technologies and any social change created by its introduction in critical areas such as employment, education, and healthcare. The treatment group included households provided with broadband access. In contrast, the control group included households in the same or similar communities that have not received broadband access or could not receive it due to technical difficulties. The final dataset included 632 observations (316 unique households) collected before the deployment of the broadband service and three months after the provision of the broadband service on their purposes of Internet usage, experiences in using the Internet, and whether they have received help and support in using the Internet and devices. Figure 1 & 2 shows pilot communities' demographics and device and adoption rates. The findings (discussed in the next section) offer insights into the nationwide digital divide and equity debate.

Figure 1: Survey Demographics



Source: Atasoy, H. (2023)

Figure 2: Device & Internet Adoption



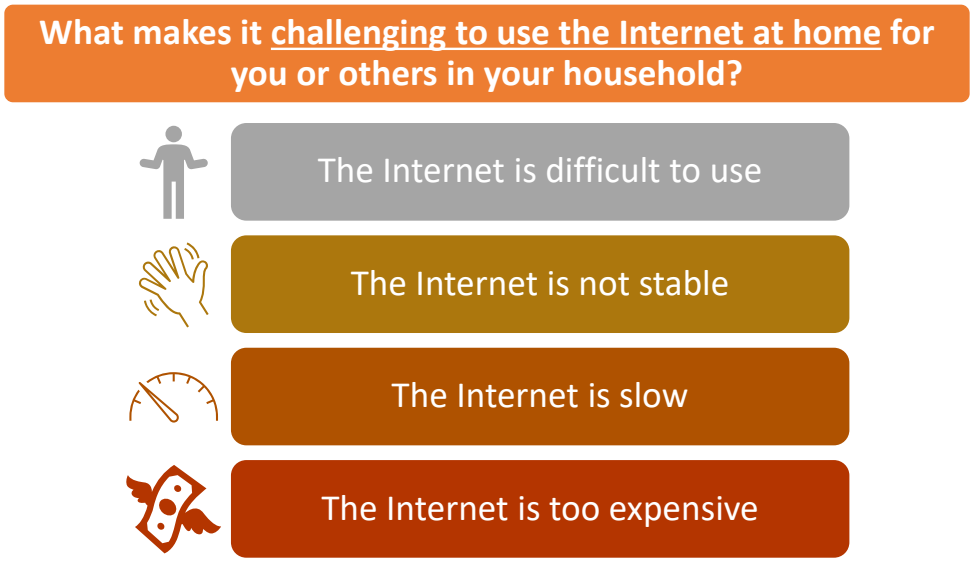
Source: Atasoy, H. (2023)

SOCIAL IMPACT EVALUATION FINDINGS

We outline the findings of how broadband provision to underserved communities impacted (1) challenges in using the Internet, (2) using the Internet for education, employment, and healthcare purposes, and (3) overall Internet use.

Challenges in Using the Internet

To determine challenges in using the Internet, we analyzed whether the Project OVERCOME intervention helped reduce the challenges households face while using the Internet. The survey instrument asked the following question:



This survey question allowed us to capture the difficulties residents face in accessing the Internet. We asked about different issues such as Internet usability, stability, speed, and connection cost. We found that Project OVERCOME provided Internet solutions that are easier to use, more stable, and faster. We found no statistically significant impact on concerns about the cost of the Internet (see Table 1). This indicates that the underserved locations are more impacted by the lack of reliable and fast Internet than the inability to afford Internet services.

Table 1. Effects on Challenges in Using Internet

VARIABLES	(1) Difficult to Use	(2) Unstable	(3) Slow	(4) Expensive
Post x OVERCOME	**-0.098****	**-0.169*****	**-0.326*****	-0.008
	(0.038)	**(0.057)**	**(0.055)**	(0.062)
Post	-0.014	-0.007	-0.011	-0.043
	(0.022)	(0.033)	(0.032)	(0.036)
OVERCOME	0.132	1.156***	0.592	1.142***
	(0.256)	(0.380)	(0.369)	(0.414)
Constant	0.243	-0.338	0.499	0.070
	(0.240)	(0.353)	(0.346)	(0.386)
Household-level Controls	Yes	Yes	Yes	Yes
Location Fixed Effects	Yes	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes	Yes
Observations	630	630	630	630
R-squared	0.845	0.778	0.788	0.724
Adj. R-squared	0.683	0.546	0.565	0.435

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Atasoy, H. (2023)

Community Spotlight: Cleveland, Ohio

Since 2017, DigitalC through EmpowerCLE+ has been leveraging legacy fiber assets along with wireless middle-mile and last-mile technologies to provide fast, affordable, and reliable broadband service to customers in communities that traditional providers have historically underserved. Service costs remain less than $20/month for the 50/20 or 50/10 Mbps service packages. Additional subsidies reduce that price point for customers meeting certain qualifications, such as having a child in the Cleveland Metropolitan School District. There are no extra fees for equipment rental or requirements to clear past-due balances. Various payment methods are available, including allowing cash payments at a convenient, safe location for unbanked residents.

Their subscriber network grew to 1,000 households between 2019 and early 2021. Acceptance into the Project OVERCOME cohort of grantees put them on a path to receiving a $20 million investment from the Jack, Joseph and Morton Supporting Mandel Foundation and the David and Inez Myers Foundation. This investment enables DigitalC to expand its network from just six neighborhoods to 34 and increase a subscriber base approaching 2,000+ households.

Internet Use for Employment, Education, Healthcare, and Other Uses

We were interested in looking at the usage of the Internet for employment, education, and healthcare purposes, which are likely to create changes in socio-economic outcomes over the long term. We divided each of these categories into three subgroups regarding the use of broadband for different purposes:

- **Employment:** Work from home, search/apply for jobs, self-employment at home
- **Education:** Online classes, homework at home, search education-related information
- **Healthcare:** Search health-related information, telehealth visits, use online patient portal

We did not find any statistically significant impact on Internet use for employment, education, and healthcare. However, we did observe a significant increase in Internet use to make video or audio calls and streaming.

Connectivity in Conjunction with Help and Support

One of the main challenges in promoting Internet adoption in disadvantaged communities is low levels of digital literacy. We explored whether connectivity provided in conjunction with help and support to the novice user creates a significant impact on Internet adoption. Through the survey, we asked residents about different sources of help and support they received, including formal and informal help. The formal sources of help included local organizations (i.e., nonprofits, libraries, and schools) and remotely located customer service (i.e., device manufacturer or Internet Service Provider), all provided as a part of Project OVERCOME. The informal sources of help included household members and family, friends, and coworkers.

Community Spotlight: Turney, Missouri

Turney is a small rural community in Clinton County with 60 households. In June 2021, the Missouri University of Science and Technology (Missouri S&T) invited the residents of Turney to an ice cream social to talk directly to residents about the wireless pilot, which will enable residents located outside areas with fiber infrastructure to gain access to high-speed broadband Internet. Over bowls of delicious frozen treats, the community learned about research to program an intelligent router to stitch together multiple low-bandwidth radios to simulate a more expensive high-bandwidth device. Over 20 individuals gathered outside the Train Depot in Turney. Residents asked project managers and developers targeted questions about the proposed network solution. By the end of the event, 18 households had signed up!

Once connected, Clinton County residents also engaged in enhanced digital literacy training. A University of Missouri journalism professor led a series of media literacy workshops, including one at a community meeting and two in high school classes, which provided responsible browsing and sharing strategies in a complex information culture.

We found that broadband connectivity coupled with support significantly impacted Internet use for employment, healthcare, and other types of the Internet (including financial and governmental services). Results also indicated that informal help was ineffective in improving Internet use, except for participants' adoption of video calls which was not influenced by the presence of training. This indicates that household members can help each other with basic functions such as making calls via the Internet. Still, it is unlikely that this effect will spill over to more sophisticated types of Internet use.

Community Spotlight: Yonkers, New York

The Westchester County Association in Yonkers, NY, offered its residents a free Internet connection made possible through CBRS. All participants received consumer premise equipment to establish the connection. To obtain a Chromebook, residents opted to sign up for the 'Access Plus' tier and received 15 hours of digital skills training designed and delivered by The STEM Alliance, a trusted project partner. Users received technology training in cohort groupings based on shared demographics, such as age or native language. Students benefited from the new network and digital literacy classes. Senior residents also learned new skills and enjoyed taking a class with peers, while younger adults learned valuable job-related skills. The participants reported that the workshops taught them to use the Internet to better communicate with doctors, friends, and family. This sentiment was shared widely, as evidenced by a feedback survey where 63% of subscribers indicated that the computer and their new skills would improve their quality of life by giving them "the ability to learn new things."

The findings indicate that deploying broadband access to underserved communities is most effective when service providers and local organizations provide help and support in using the Internet and digital devices. While most policy initiatives focus on expanding broadband infrastructure and device access, the results indicate that **Internet access alone is insufficient to increase adoption.** Digital support and training are essential in the digital empowerment of underserved communities.

CONCLUSION

Project OVERCOME led to a significant reduction in challenges faced by underserved communities in utilizing the Internet. Project OVERCOME intervention made a statistically significant impact on Internet use for several purposes that have relevant social impacts only when help flowed to the households lacking in such support and resources. Community members' and Internet service providers' assistance is vital for reaping benefits from broadband deployment and improving digital literacy for disadvantaged populations. For these households who received increased help and support along with broadband access, using the Internet for job search, self-employment at home, patient portal use, and especially telehealth visits increased.

Similarly, help and support significantly increased other vital usages of the Internet, such as for financial purposes and accessing governmental resources. Device manufacturers, Internet service providers, and local organizations such as schools or libraries provide the types of help and support that impact Internet usage.

Results also indicated that informal help in using the Internet provided by family members and friends is not effective in increasing Internet use, except for video calls. While younger people are considered digital natives, their digital skills are found to vary significantly (e.g., Hargittai 2010). Thus, policymakers should not rely on help from family and friends or younger household members and should focus on systematic help and training organizations provide to increase Internet use effectively for digital empowerment in underserved communities.

Overall, the findings of this study demonstrate that providing support and training increases the value of access. **Providing access is necessary but not sufficient to address digital inequality and empower underserved communities.** By promoting digital literacy and providing resources and support, policymakers can ensure that all citizens have the skills and knowledge necessary to participate in the economy and shape the future of their communities (see Affordable Connectivity Program and State Digital Equity Planning Grant Program).

REFERENCES

1. Atasoy, H. (2023) Connecting the Underserved: Social Impacts of Innovative Broadband Solutions, Working Paper

2. Greenstein, S., and Prince, J. (2008). The diffusion of the Internet and the geography of digital divide in the United States. In Robin Mansell, Chrisanthi Avgerou, and Danny Q. R. Silverstone (Eds.), *The Oxford Handbook of Information and Communication Technologies*. New York: Oxford University Press.

3. Flamm, K., and Chaudhuri, A. (2007). An analysis of the determinants of broadband access. *Telecommunications Policy* 31:312–26.

4. Prieger, James E. 2002. The supply side of the digital divide: Is there redlining in the broad-band internet access market? *Economic Inquiry* 41(2): 346–63.

5. Hargittai, E. (2010). Digital Na(t)ives? Variation in Internet skills and uses among members of the "Net Generation". Sociological Inquiry, 80(1), 92-113.

APPENDIX: METHODOLOGY

Among the datasets collected by six teams, two are not included in the analyses due to sampling problems such as low sample size (Cleveland, OH) and a low number of observations in the follow-up survey (Yonkers, NY). Results are robust to include these households. The final dataset includes 848 total observations and 632 observations from repeat households that responded to both pre-and post-surveys. 34% of the samples are treatment observations.

We use regression analyses with a difference-in-differences research design and test the statistical significance of coefficients that systematically estimate the treatment's effects. That is, we use broadband deployment in communities and estimate average changes in the frequency of relevant outcome measures pre- and post-Project OVERCOME broadband deployment. We use the repeat sample for the analyses to investigate the changes within the same household between pre- and post-responses. To estimate the effect of Project OVERCOME connectivity, we model the outcome for household i, in community j, in time t. Formally:

$$Outcome_{ijt} = \beta_0 + \beta_1 OVERCOME_{ij} + \beta_2 Post_{ij} + \beta_3 OVERCOME_{ij} \text{ X } Post_{ij} + \beta_4 X_{ijt} + \theta_i + \mu_j + \vartheta_t + \varepsilon_{ijt}$$

- Outcome is the dependent variable that changes in each specification.
- OVERCOME =1 if the household is a treatment observation, =0 if a control observation
- Post=1 if the response is in post-survey, =0 if in the pre-survey
- The treatment effect is the interaction term between OVERCOME and Post (3).
- We control for household composition, size, and the number of devices (Xijt)
- We control for location-fixed effects (j)
- Household fixed effects (i) added to control for time-invariant unobservable household characteristics. Within-household changes in outcomes drive the identification.

ACKNOWLEDGMENTS

The Project OVERCOME initiative led by US Ignite was conceived of and funded by the National Science Foundation (NSF Award # CNS-2044448) with additional support from Schmidt Futures. Project OVERCOME illustrated successes across rural and urban communities, bridging the digital divide with various technologies. Thanks to the financial support and input from the NSF and Schmidt Futures, participants expanded job opportunities, increased access to health and educational resources, and strengthened community ties.

The success of Project OVERCOME is a testament that multi-disciplinary teams of engineers, social scientists, researchers, and community organizers are critical to understanding and closing the digital divide. This project would not have been possible without the teams' hard work across six communities. We also extend our gratitude to Dr. Hilal Atasoy - Assistant Professor of Accounting and Information Systems at the Rutgers Business School - who spearheaded the social impact evaluation of the project. Dr. Atasoy meticulously analyzed the survey data across the communities and grounded the findings in academic rigor and empirical evidence.

Each funded project had dedicated researchers and advisors who led local efforts to gather data to make this research possible. We thank Dr. Margaret Kaufer, Dr. Sunha Kim, Dr. Jane Bolgatz, Dr. Amy Sheon, Dr. Luis Rosario Albert, Dr. Larry Gant, Maureen Okasinski, and Dr. Casey Canfield for their dedication and commitment to the research effort.

We want to acknowledge the contributions of the US Ignite staff, including Hani Almasoud, Lizzette Arias, Lee Davenport, Nancy Jemison, Glenn Ricart, Ph.D., Jigyasa Sharma, and Mari Silbey. These professionals worked diligently to see the project through to the finish line. Without them, advice for critical network management, advanced wireless solutions, community-identified communications efforts, project reports, financial drawdowns, and comic relief would have been severely lacking in the project.