Rural Communities & Digital Device Ownership

Barriers & Opportunities

A RESEARCH REPORT
September 2022

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CONTENTS

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Introduction

The Infrastructure Investment and Jobs Act passed in late 2021 includes an unprecedented amount of federal funding for broadband availability and adoption (NTIA, 2022; FCC, 2022). Rural households and communities will benefit from these programs, in particular, those locations without any prior broadband infrastructure.

Research shows that internet access and use increases rural economic and community development (Whitacre, Strover, & Gallardo, 2014; Whitacre & Manlove, 2016). However, rural areas are at a distinct disadvantage when it comes to providing and supporting device ownership. This is a crucial piece of the internet use and digital equity puzzle (Gonzales, 2021).

The Purpose of The Report

The purpose of this brief is to raise awareness of the difficulties rural communities face when trying to address the device ownership issue. It focuses on large-screen devices, which are increasingly recognized as superior to smartphones for digital equity work (Correa et al., 2020; Tsetsi & Rains, 2017; Whitacre & Higgins, 2021). These rural-oriented difficulties are broken into three categories summarized as the "Three S's:" Status Quo, Supply, and Support.

1. Status Quo (Socio-Demographics)

a. Higher rates of households with no computers in rural areas right now
b. Rural demographics (lower income, more elderly) less likely to embrace computers

2. Supply

a. Fewer refurbishers and businesses able to donate used devices
b. Fewer providers offering low-cost devices as part of the Affordable Connectivity Program

3. Support

a. Fewer nonprofits to gather devices, distribute them, and help with their use
b. Fewer tech-savvy librarians and digital inclusion organizations
c. Fewer repair-oriented businesses

Status Quo (Socio-Demographics)

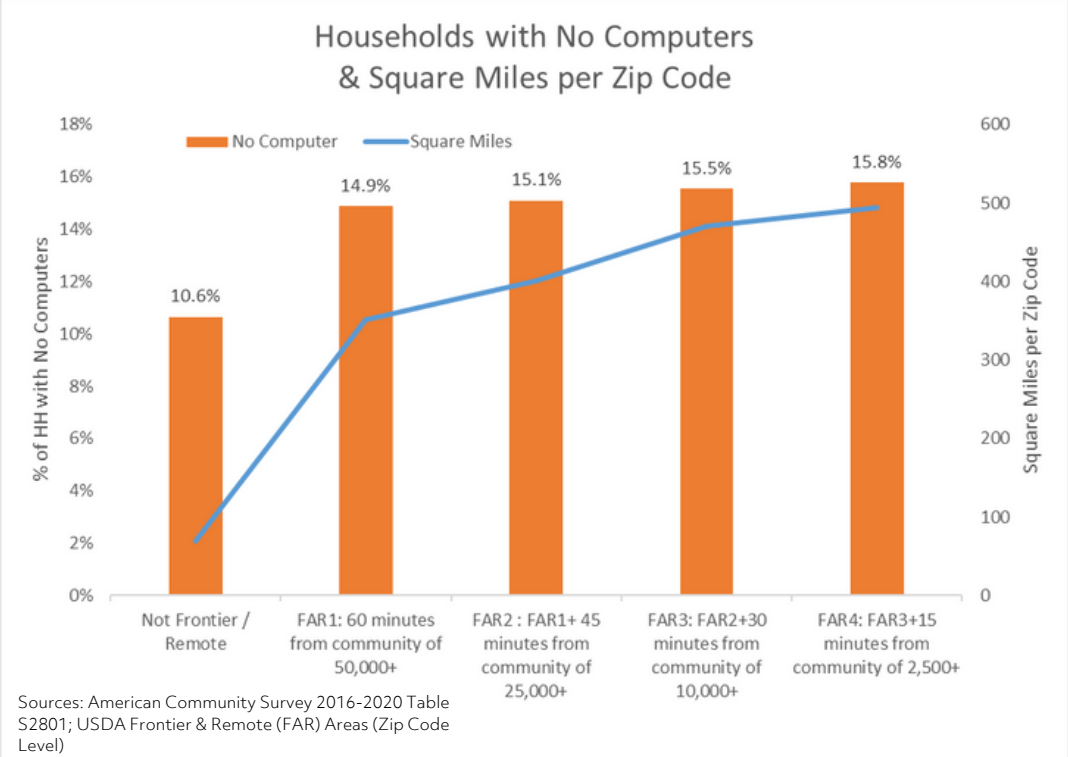
Many studies document the rural-urban "digital divide" in internet access, with rural households adopting broadband at lower rates than those in more urban locations (Whitacre & Mills, 2007; Whitacre et al., 2015; Whitacre, 2021). This rural-urban gap holds for devices as well (Vogels, 2021).

Figure 1 demonstrates that rural households are more likely not to have a computer of any type, according to the most recent Census Data. It also shows that the percentage of households without a computer increases with the degree of remoteness. This trend holds for all types of devices:

- Tablets
- Desktops
- Laptops
- Smartphones

If universal computer ownership is the goal, this "status quo" means rural communities face an uphill battle. There are a larger percentage of households to reach and a larger number of miles to cover to reach them.

Figure 1 - Percentage of Households with No Computers by Degree of Rurality



Sources: American Community Survey 2016-2020 Table S2801; USDA Frontier & Remote (FAR) Areas (Zip Code Level)

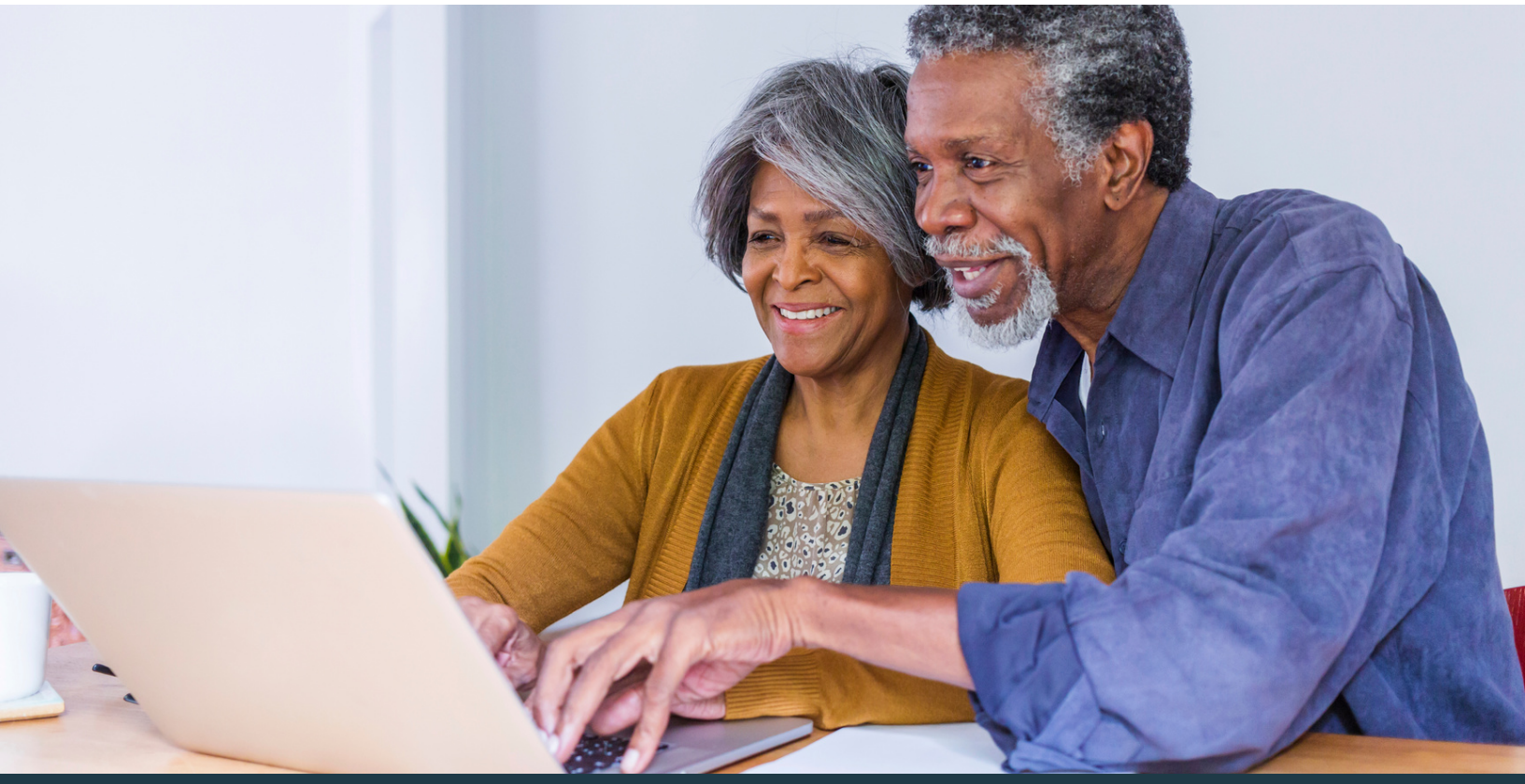
Socio-Demographics

Socio-demographic characteristics of rural residents also make them less likely to embrace technology, and computers, in particular. A wide body of research finds that higher levels of income and education are positively linked to early technology adoption, while age has a negative association (Hindman, 2000; Whitacre & Mills, 2007; Whitacre et al. 2015; Mitzner et al., 2019).

Rural communities typically lag behind their urban counterparts in terms of median incomes and education levels, while having a higher percentage of elderly and disabled residents (Census Bureau, 2016; Pender et al., 2019). In particular, the percentage of residents over the age of 65 is higher in rural locations. This cohort is much more likely to report:

- Never going online (Perrin & Atske, 2021; Faverio, 2022)
- Having never used a computer (Hindman, 2000)
- Being "reluctant" internet users (Petrovcic et al., 2022)

This community composition means rural areas face high barriers to convincing residents about the importance of device ownership.



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Supply

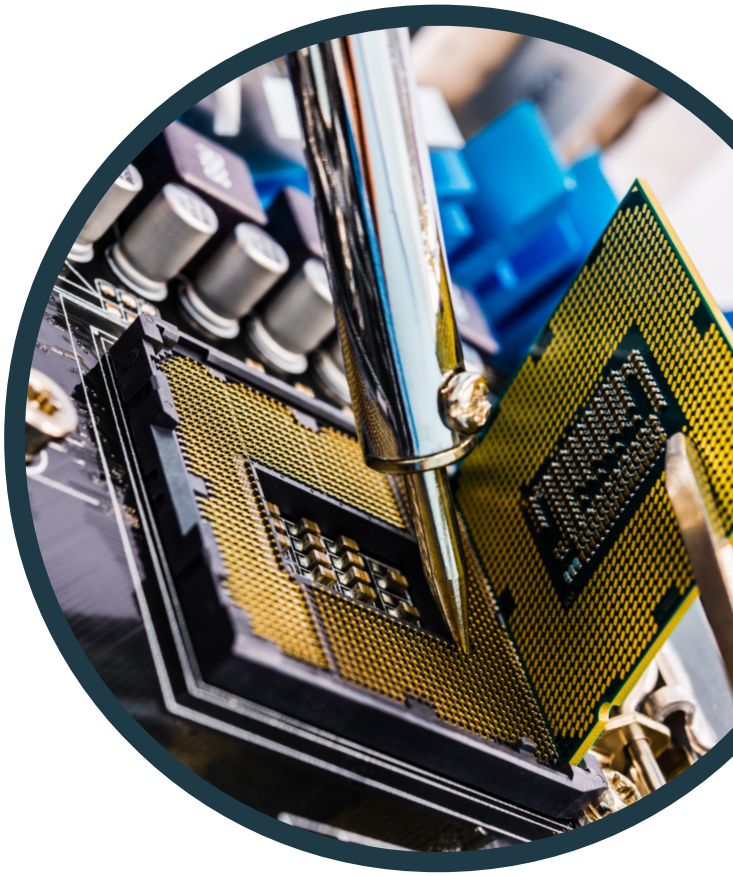
Rural locations typically have fewer options for supplying devices than more urban areas. Local businesses are often an important source of previously used computers. They feature heavily in donation efforts for many device drives (Federal Reserve Bank of Kansas City, 2021).

There are fewer businesses in rural areas, mostly due to the population thresholds required to make a business viable (Harris et al., 1994; Shonkwiler & Harris, 1996; Ring & Chrisman, 2010). Further, one of the distinguishing features of rural areas is the specialization of their economies (Deavers, 1992).

This rural specialization tends to occur in industries like agriculture, manufacturing, or amenity-related services (Wojan, 2000; Porter et al., 2004; Brown & Kandel, 2006; Phillipson et al., 2019). These industries typically use fewer computers when compared to urban-focused industries like finance or professional services (Glasmeier & Howland, 1995).

Refurbishment in Rural Areas

Along these same lines, it can be challenging to find a business capable of refurbishing devices in rural locations. Refurbishment is an important part of the supply pipeline in the digital equity field because many businesses and organizations are less likely to donate devices unless they are "cleaned" beforehand (Lynch & Gilbert-Knight, 2016).



If a refurbishing company does not exist in the local community, transportation to the nearest urban center will likely be required. Distance from an urban center is another defining feature of rural areas (Deavers, 1992). This adds cost and complexity to rural device replacement and replenishment programs.

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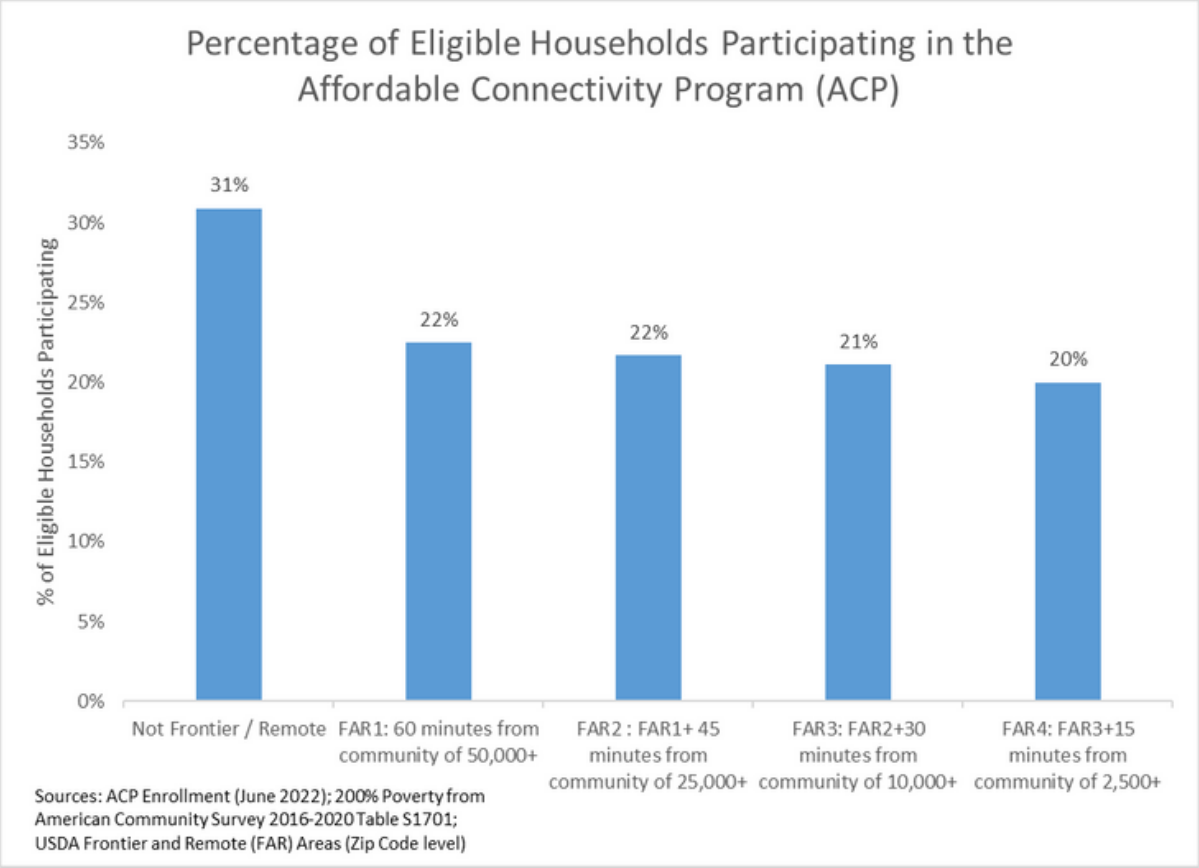
The Affordable Connectivity Program

Recently, the Affordable Connectivity Program (ACP) allowed internet service providers to begin offering discounted devices (laptop, desktop, or tablet) to eligible households. However, rural areas have significantly fewer internet providers.

Over 25% of rural residents only have access to a single provider (Gallardo & Whitacre, 2019). Fewer providers offering and marketing the ACP likely leads to less overall awareness of the program. Further, not all providers participating in the ACP offer discount devices.

Figure 2 shows that ACP participation rates are markedly lower in rural zip codes, suggesting that rural residents are not taking advantage of this program. This likely includes participation in the discount device option, although ACP data is not broken out at this level.

Figure 2 - Percentage of Eligible Households Participating in the Affordable Connectivity Program by Degree of Rurality



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Support

An important piece of any plan to provide reliable service to a geographic area is local support networks that can gather, distribute, and repair devices among area residents (Gonzales, 2022). These networks include technical support for those wanting to learn more about their device or experiencing problems (Baker et al., 2016).

These networks often revolve around nonprofit organizations, which are less robust in rural America (Stauber, 2004; Cohen, 2011; Neuhoff & Dunckelman, 2011; Pender, 2015; Walters & Wallace, 2021). In particular, rural nonprofits provide only about half of the average value per person compared to nonprofits in urban locations. About 1/5 of rural counties had no nonprofit grant recipients at all from 2005 - 2010 (Pender, 2015).

Technology-focused nonprofit spending is especially low in rural locations, with $40 spent by an urban nonprofit for each $1 spent by a rural nonprofit (Neuhoff & Dunckelman, 2011). Other studies found that organizational capacity is lacking in rural nonprofits (Walters, 2020). Part of this may be due to significantly more square miles being covered per organization (Neuhoff & Dunckelman, 2011).

Libraries' Role

The local library system is another vital component of the device support network. However, training opportunities for using new technologies are significantly lower in rural libraries (Real & Rose, 2017).

Other studies note distinct disadvantages for digital support in rural libraries, including fewer librarians, lower staffing, and lack of IT specialists (Real, Bertot, & Jaeger, 2014).

Over 80% of rural libraries have only a single full-time employee, but have a higher percentage of visitors using a computer (Real, Bertot, & Jaeger, 2014; Morgridge College of Education, 2018).

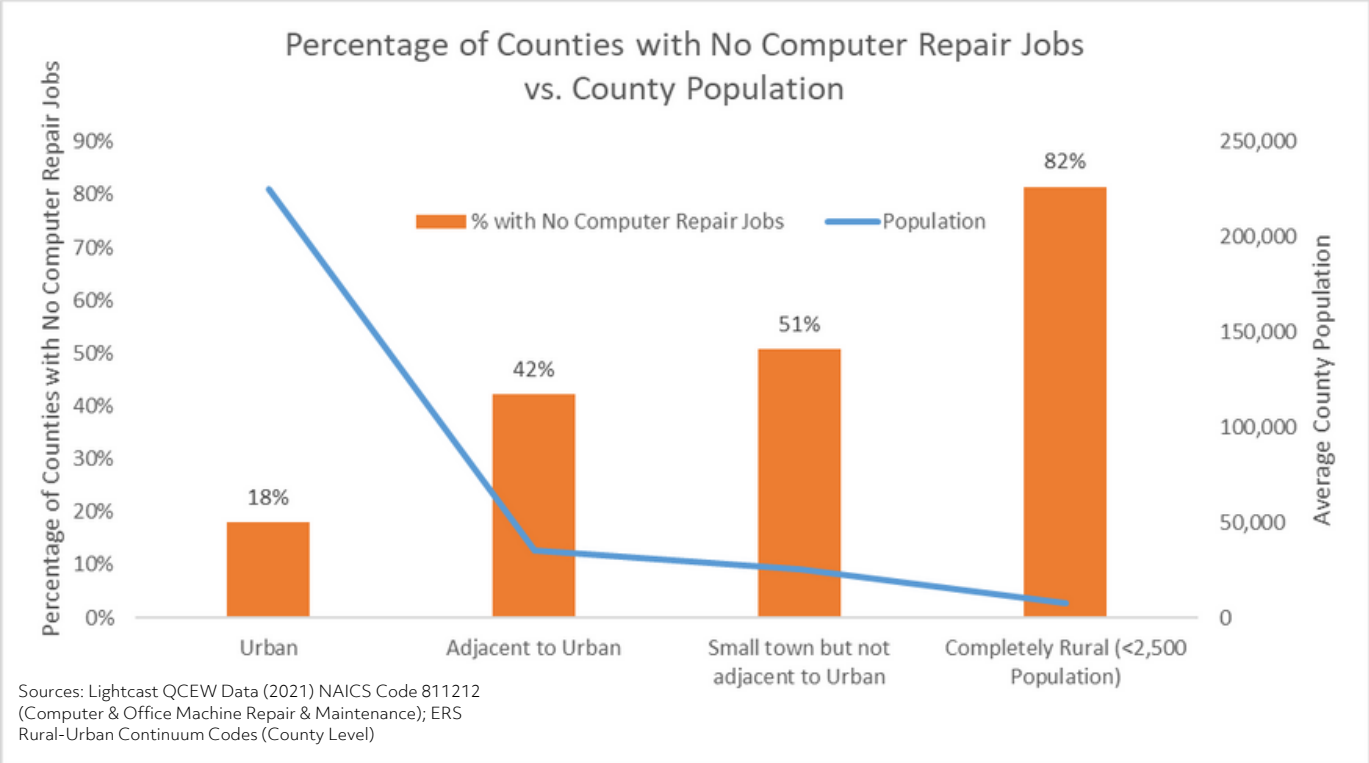
Digital Inclusion Organizations

Digital inclusion organizations have grown rapidly in the past five years. Device support is part of their job description. Funding opportunities for digital equity and inclusion programs are growing. However, rural communities often lack the personnel and skillset to successfully apply for grants (Mayer, 2022; Atkins et al. 2021).

Further, most digital inclusion organizations with full-time employees are based in large cities (NDIA, 2022a). A notable exception is the National Digital Navigator Corps, which focuses specifically on rural and tribal communities across the U.S. (NDIA, 2022b). A local place to repair devices is also important for device support.

In rural locations, however, such jobs are rare. Figure 3 shows over 80% of counties classified as completely rural lack a single job focused on computer repair and maintenance. This situation, again, requires travel to the closest urban location where such expertise is available.

Figure 3 - Percentage of Counties with No Computer Repair Jobs by Degree of Rurality



Sources: Lightcast QCEW Data (2021) NAICS Code 811212 (Computer & Office Machine Repair & Maintenance); ERS Rural-Urban Continuum Codes (County Level)

Conclusion & Recommendations

Individuals choose to live in rural areas for a variety of reasons including proximity to family, a slower pace of life, lower cost of living, space, or natural amenities (Hunter et al., 2005; Artz & Yu, 2011; Chi & Marcouiller, 2013; Deller et al., 2001).

However, rural residence comes with its own set of challenges, including those associated with internet access. This brief has outlined rural disadvantages associated with large-screen digital device ownership.

These included the socio-demographic composition of rural areas, fewer businesses and internet providers offering reduced cost devices, and support networks that lack the robustness of those found in more urban locations.

How Can Rural Communities Proceed?

Two recommendations stand out that can help to address the "Three S's:"

1. Build on What You Have

Rural areas tend to have a higher percentage of lower-income and elderly individuals, and less robust nonprofits and libraries to engage with them. However, other support networks also exist in rural America, such as religious organizations, book or quilting clubs, or farm cooperatives that often work with these exact demographics.

Rural communities have a strong tradition of supporting their neighbors. They are used to contributing to different causes in any way they can (Smart & Russell, 2018; Snavely & Tracey, 2000; Shields, 2005). Constructing device support networks in rural areas should include reaching across organizations and building on these local strengths.

2. Develop Rural-Urban Linkages

Distance to urban areas with device refurbishers or computer repair businesses is another rural disadvantage. However, once a relationship is established, opportunities exist for mutual benefit (Mayer et al., 2016).

For example, bringing regular rural donations and devices needing repair to an urban computer business has the potential to benefit both the business through additional revenue and the rural community by "bridging" social capital with device donations from urban households and businesses (Agnitsch et al., 2006).

Regular interactions between rural and urban partners may also lead to other opportunities to support each other. For example, Zoom sessions for rural residents to learn basic device skills or exploring the feasibility of a satellite repair shop.

About the Author

Brian Whitacre is a professor and Neustadt Chair in the Department of Agricultural Economics at Oklahoma State University. His main area of interest is rural economic development, with a focus on the role technology can play.

He has published over 70 peer-reviewed journal articles, with most exploring the relationship between Internet access and rural development.

He developed innovative outreach programs to help small towns benefit from the Internet. Whitacre has won regional and national awards for research, teaching, and extension programs.

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