

# The digital inclusion role of rural libraries: social inequalities through space and place

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## Abstract

A great deal of scholarship on broadband deployment and federal policies has positioned rural America through a deficit framework: rural parts of the country have older populations (and therefore not tech savvy), are poor (and therefore justifiably ignored by the market), too remote (therefore outside of legitimate profit-making enterprise), and losing population (and therefore significance). This research examines rural Internet connectivity through the lens of local libraries lending hotspots for Internet connectivity. Qualitative data gathered in 24 rural communities in Kansas and Maine undercut simplistic notions regarding how communication systems operate in environments ignored by normative market operations. Financial precarity and pressures from social and economic institutions compel rurally based individuals and families to assemble piecemeal Internet presence and connectivity. The public library plays a crucial role in providing Internet resources and stands out in the rural environment as a site that straddles public trust and local.

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**Background to the problem**

The distribution of information resources across the United States and many regions of the world has changed dramatically over the past few decades. Much of the change, of course, has to do with the presence of the Internet, a technology system that has had both direct and indirect effects on the creation, circulation, and distribution of information.

The primary focus here concerns rural regions and the ways in which rural spaces and places interact with how people experience communication systems. In the past few decades, straightforward broadband access issues have occupied a great deal of research and policy around the globe. Broadband access disparities affect both urban and rural populations, but rural regions have poorer Internet access and fewer noncommercial alternatives in particular. The US Federal Communications Commission (FCC) statistics show that as of 2016, around 36% of the US rural population lacked access to fixed broadband at the FCC standard of 25 Mbps download and 3 Mbps upload speeds, while 4% of the urban population lacked service at those standards. Similar disparities exist in both developed and undeveloped regions of the world. Issues of affordability affect poorer population groups in both urban and rural regions, but the rural setting is compounded by matters of what type of service – if any – may be available and at what costs (Horrigan and Duggan, 2015).

Internet connectivity in rural regions is less robust (FCC, 2016; FCC, 2018), and while wireline systems such as DSL and cable modem-provided services do exist in rural towns, those services are slower. Again, the US situation mirrors that of many countries. In addition, fixed wireless Internet Service Providers often reach rural populations, but those services too may not meet necessary speed thresholds. In other words, rural spaces – the distances and the lower population densities – have been met with certain kinds of ‘market solutions’ (in the parlance of the US economic system), but the infrastructure serving these regions and the consequent technology choices and strategies for people there differ from that of metro regions.

Beyond these statistics about technologies available, however, rural regions experience a sometimes vexing communication environment. People living beyond the reach of conventional ISP systems sometimes rely on mobile phone Internet connectivity. However, cellular phone signals in rural areas are not always consistently available or of sufficient quality. They also typically carry data caps or high expenses associated with an uncapped plan. People’s digital literacy skills may be more fragile in rural areas if only because opportunities to interact with the online environment are more limited; the older population that is more characteristic of rural areas also conventionally has lower digital literacy (National Telecommunications Information Administration (NTIA), 2016). Other information services in rural regions likewise have changed: local newspapers are vanishing or moving toward more limited publishing schedules (Reader, 2018).

Another local information site, the public library, still populates rural regions, but they are economically fragile and face new challenges in terms of meeting their patrons' expectations regarding online information sources. Policy shifts in many countries have meant reduced resources for libraries, often in response to austerity programs or even concerns about their contributions to democratic systems. Moreover, libraries may not be the optimal institution in certain countries for redressing information imbalances (Ignatow, 2011). Radio and TV stations still exist and serve rural populations but in the United States their ownership has consolidated, translating into reduced local content. In essence, the information setting in rural areas of both developed and developing countries presents challenges and creates new visions of places for the people who live there. In communication terms, rural places can be seen as areas – hills, valley, houses 'off the grid', reception sites to which one must travel, or simply be out of reach of a provider – that afford asymmetrical levels and types of interactions with a broader communication environment.

Against this backdrop, many of our social and economic institutions have moved online and assume that people have easy access and that communication resources are distributed homogeneously. The economies and reach of online services are attractive but simply do not operate as well in rural areas compared to metro areas. By this we refer to the lived encounters with media and media technologies, the artifactual dimensions that comprise actual communication practices. The materiality of communication technologies shapes how people are able to use communication artifacts. It implies spatial conditions as well as infrastructures and the ways that people interact with devices, facilities, and systems. Rural materialities include the environmental limitations that compel people to spend time seeking an acceptable location to receive a decent cell phone signal. They may, for example, normalize sitting outside a library at night using its spillover wifi signals.

Many countries with rural populations struggle with similar material conditions that inhibit Internet access. Whether because of challenging topography or circumstances of poverty and limited market size that discourage a commercial provider's presence, such countries face an obstacle course as they attempt to broaden Internet availability or address digital literacy. However, as in the United States, the people living in these regions experience the inexorable trajectory of Internet dependence as more and more markets, services, education, and information move into the networked domain. Hence, the rural populations of many regions experience the inequities associated with poor connectivity (Bauer, 2018).

Blending access, cost, digital literacy assistance, and spatial properties, libraries are important rural information institutions in the United States and elsewhere, and examining them can provide insights into how people construct their information environment. Nearly all libraries have internal computers and wifi, and in the past few years several have begun loaning digital hotspots to their patrons so that people can 'check out the Internet' and have home-based access. As more information migrates to the Internet, and as preferences for how one accesses information and culture change, libraries are challenged to incorporate both the Internet and new user information-seeking behaviors into their operations and philosophy. Providing home-based access devices such as mobile hotspots extends libraries' conventional service and intersects rural populations'

escalating need to be connected even as they grapple with either absent home-based broadband opportunities or high prices for that service.

Finally, these institutions' digital inclusion mission adds them to the communication policy environment in terms of universal service. In the United States, universal service policy dates back to the early years of granting AT&T a monopoly in its service territories around the United States when, in partial exchange for enjoying legal monopoly status, AT&T crafted a policy that included offering phone service to all in its operating regions. The idea of comparable service at comparable rates to all areas of the country was baked into the regulatory and rate structure of telephone service, which until 1984 – the year of AT&T's divestiture – charged business and long distance phone service higher rates in order to subsidize higher cost service areas such as rural regions. With the onset of telecommunications services that went beyond simple phone calls, the significant role of schools and libraries as sites for whatever new services might evolve, including the Internet, was written into the US 1996 Telecommunications Act specifically in Section 254. Under so-called 'e-rate' provisions, telecommunications providers offer discounted rates for Internet connectivity to schools and libraries. This language recognizes libraries' roles in ensuring that everyone has access to contemporary communications technologies, and libraries quickly developed into sites for connectivity as well as sources of digital expertise and literacy training. Mobile hotspots used for Internet access represent a new facet for libraries in creating community and digital inclusion in the face of market-based Internet connectivity gaps.

Framed by literature exploring a materiality perspective and digital inclusion concepts, this research investigates hotspot lending in 24 rural libraries in Maine and Kansas. Two research questions guide this work: first, how do people experience hotspot connectivity in the context of their normal patterns of access and information seeking? In what ways do hotspots highlight the lived conditions of connectivity? Second, how do hotspot adoption and use affect these small communities? Can such library-based programs constitute meaningful routes toward digital inclusion? Our discussion considers how such programs and rural connectivity more generally reflect on libraries' roles in the local information ecosystem of their communities and lead us to consider policy implications we might derive from understanding ways that lived places and infrastructure spaces condition connectivity.

## **Theoretical framework**

The economic, social and civic links to broadband connectivity in general have been extensively investigated by numerous researchers over the past 20 years. While much of that literature has sought to demonstrate connections between broadband infrastructure and improved economic outcomes, during the second decade of this century it has become apparent that work and institutional processes expect one to 'be connected' in some way. Those expectations and the embedded nature of Internet connectivity in the United States mean that where Internet availability and use are unavailable, unaffordable, or otherwise limited, populations are disadvantaged.

In terms of economic outcomes, there are growing indications that broadband connectivity does contribute to local economic growth, typically measured as job growth

(and reduced unemployment) as well as increases in local income. For example, focusing just on a few studies examining the United States, Kolko (2012), Gillett et al., (2006), Jayakar and Park (2013), Whiacre, Gallardo and Strover (2014), and Whitacre, Strover and Gallardo (2015) have all found that increased availability of broadband does appear to lead to enhanced economic outcomes.

The difficulty in making these assessments in the United States, however, has a great deal to do with the locational specificity of different regions. Urban regions traditionally received better broadband networks earlier, and those locations are sites of intense economic activity spanning many sectors. Between high population densities and strong economic performance in metropolitan regions more generally, the causal problem of linking a specific technology to improved economic outcomes quickly becomes clouded with various other explanations. Indeed, some have pointed to the ‘computer paradox’ of the 1990s and suggest that a similar paradox is occurring in the United States with respect to the economic evidence of broadband’s contributions to growth (Holt and Jamison, 2009). In any case, there is at minimum strong correlational data and some well-designed studies that claim persuasively that broadband access as well as subscription or ‘use’ do matter economically.

Compounding the difficulty of exploring causal relationships between having access to and using broadband and specific outcomes, studies focusing on rural regions are fewer. FCC reports, as well as a handful of other studies (Whitacre, Strover and Gallardo, 2015; Stenberg et al., 2009), find that rural broadband adoption does appear to contribute to improved economic outcomes and that broadband deployment in rural regions is far from complete: for example, approximately 39% of rural populations lacked access to wireline or fixed (cable, DSL) broadband, compared to just 4% of urban populations (FCC, 2016: 39, Broadband Progress Report).

Being online contributes to navigating contemporary life in innumerable ways, and social, economic, educational, and civic institutions in the United States reliably assume that one has access to the Internet. Registering to vote, renewing a driver’s license, filing insurance forms, looking for a job, reading the news are increasingly performed online. The American educational system has broadly incorporated computers and Internet-served resources into all levels, and even with more fragile Internet connectivity, rural environments frequently deploy so-called ‘one-to-one’ laptop programs. Such programs give a public school child a laptop, often a Chromebook, to use during the school year (e.g. see Maine Department of Education, nd). While most schools have on-campus networks to use with those laptops, there is no guarantee that once a child leaves school that Internet access will be available at home. The problem with these programs has spawned the phrase ‘homework gap’ to refer to the predicament of students who are supposed to use computers and online services to undertake their homework but who lack the ability to use those resources once they leave campus (NTIA, 2018). Children in households without computers and online connectivity therefore are at a disadvantage, one compounded in rural areas with very limited alternatives to home broadband.

In addition, social and civic engagement outcomes associated with broadband have been examined in many ways. In general, the social networks that result from online engagement when one has broadband connectivity enhance social capital, especially the bridging social capital that can contribute new information (Granovetter, 1973). There

also is evidence that bonding social capital—deepening ties with friends and family, for example—is enhanced by participating in online environments. Without going into the extensive literature on social capital and the Internet, both social and civic engagement opportunities can escalate when people communicate online (Hampton et al., 2014).

With so much research focused on the advantages or even mandates now associated with Internet connectivity, the situation of rural populations begs for attention. Because connectivity in many rural regions is poor quality, unaffordable, or unavailable, the local public libraries that generally do offer free computers and Internet access become local beacons. Public libraries around the country deliberately or incrementally have become important sites for Internet services.

Public libraries emerged in the 1990s as core digital inclusion sites in many towns and cities. Moving from in-library services that include computers and Internet connectivity, to in-library wifi—public connectivity that usually spills over onto sidewalks and parking lots—to loaning out mobile hotspots, local libraries have assumed multifaceted roles. While there are not many investigations into the relationship between libraries and social capital, particularly with respect to rural libraries, some researchers have found that libraries provide important ‘third places’, or ‘social infrastructure’, noncommercial sites where people can meet (Klinenberg, 2018; Oldenburg, 1999).

As libraries have become locations for people to gain Internet access and skills, these institutions are making investments in broader outcomes for individuals as well as for local communities. For example, small businesses in rural communities experience reduced market entry costs when rural libraries provide stable broadband Internet in combination with a workforce’s Internet literacy training (Allemanne et al., 2011). Beyond this, rural libraries represent an ‘anchor institution of anchor institutions’, serving as a hub for critical information needs and as intervention sites for local government and public health as well as bolstering businesses through training and digital literacy resources (Allemanne et al., 2011; Hancks, 2012). Recognizing such services as assets, the technology challenges of extending high speed connections and bridging the digital divide are top issues for rural libraries (Holt, 2009; Real et al., 2014). Wireless services and hotspot lending constitute ways to extend the walls of the library beyond the library’s physical structure and its limited hours.

Finally, libraries are central to national policy focused on digital equity and universal service. A logical site for tackling the problem of ‘falling behind’ should be public institutions such as schools and libraries since public investment already exists there. The US 1996 Telecommunications Act included a subsidy program to facilitate Internet connections for schools and libraries, an easy concession to a conception of universal service that embodied the philosophy of extensive and equitable access to communication resources (1996 Telecommunications Act, Section 254). With universal service in the 1996 Telecommunications Act, libraries have become part of the official policy discourse around ‘advanced telecommunications capabilities’ as legislators thought about imminent changes having to do with the Internet. Over the course of the 20+ years since the Act passed, libraries continued to solidify their role as key digital inclusion sites across the country. However, requests for federal support from schools and libraries under universal service routinely outstrip its approximately US\$4 billion

annual budget. In addition, state and local funding for libraries is highly variable; the local governance structures for rural libraries are especially varied and these libraries are frequently under-resourced. Consequently, public libraries face the twin pressures of increasing needs from their patrons regarding Internet services but also limited funding for connectivity and limited local infrastructure for Internet access (Information Policy Access Center, 2015).

## **Research methods**

Our research focuses on 24 rural libraries that joined pilot programs for hotspot lending. We gathered qualitative and quantitative data from 18 rural libraries in Kansas and six in rural Maine, focusing our data gathering on librarians, the hotspot users, local community stakeholders, and some non-users. While libraries in Maine, all in one northern county, were chosen for this program by their State Librarian, those in Kansas self-selected with their State Librarian (Table 1). The locations targeted in the program were generally small and predominantly non-Hispanic White in terms of population. A few Kansas locations, although small, were in the umbrella of a more metropolitan region in northeastern Kansas. The smallest town had a population of 546, and the largest had 16,000.

Both states partnered with New York Public Library for financial support in their hotspot lending programs, but Maine and Kansas State Libraries had their own unique implementations. The program in Kansas ran for 1 year, after which libraries were expected to find their own funds if they desired to continue with the hotspots. Kansas libraries loaned the devices to anyone with a valid library card, generally a week at a time although the libraries developed some innovative lending practices as well. The hotspots provided by Verizon came with a 6Gb data plan that later changed to ‘unlimited’ at the libraries’ urging.<sup>1</sup> The six Maine libraries had a 2-year program, and the State Library expected the hotspots to be loaned to families with children in school. Their hotspot company, US Cellular, offered a program with a 2Gb data cap.<sup>2</sup> Both States loaned hotspots for relatively short periods renewable on a waitlist or demand basis. The participating libraries publicized the program locally under the banner of ‘Check out the Internet!’ and the State Libraries provided some advertising materials. Most libraries had Facebook sites that announced the hotspots program, and they also used in-library flyers to announce the program. Some collaborated with newspapers to announce the program.

During 2016 and 2017, we conducted 11 focus groups with hotspot users and some non-users, interviews with approximately 30 librarians at the participating libraries or in library support services, and interviews with over 100 stakeholders including school officials, city managers, regional library service center personnel, teachers, and phone and utility managers in the communities of the participating rural libraries. The interviews were face-to-face and lasted anywhere from 20 to 90 minutes; two were conducted by phone. Focus group participants in Kansas were recruited by the participating libraries; participants in Maine were contacted through Facebook posts, a newspaper ad, and flyers posted around libraries and the towns.

The current investigation relies predominantly on the focus group participants’ observations. The groups met at the local libraries, and all comments from the groups were

**Table 1.** Rural library locations for hotspot program.

Location	Town	Town population	State	County Population
Atchison Public Library	Atchison	11,201	Kansas	16,924
Clearwater Public Library	Clearwater	2481	Kansas	498,365
Lyndon Carnegie Library	Lyndon	1054	Kansas	16,295
Meriden-Ozawkie Public Library	Meriden	813	Kansas	19,126
Carbondale City Library	Carbondale	1437	Kansas	16,295
Jay Johnson Public Library (Quinter)	Quinter	918	Kansas	2695
Coffeyville Public Library	Coffeyville	10,295	Kansas	35,471
Independence Public Library	Independence	9483	Kansas	35,471
Effingham Public Library	Effingham	546	Kansas	16,924
Wetmore Public Library	Wetmore	368	Kansas	10,178
Goodland Public Library	Goodland	4489	Kansas	6010
Mary Cotton Public Library (Sabetha)	Sabetha	2571	Kansas	9984
Great Bend Public Library	Great Bend	15,995	Kansas	27,674
Haysville Public Library	Haysville	10,826	Kansas	498,365
Jetmore City Library	Jetmore	867	Kansas	1916
Stanton County Public Library (Johnson)	Johnson City	1495	Kansas	2235
Hamilton County Library (Syracuse)	Syracuse	1812	Kansas	2690
Cherryfield Public Library	Cherryfield Town	1232	Maine	32,856
Calais Free Library	Calais City	3123	Maine	32,856
Henry D. Moore Library	Steuben Town	1131	Maine	32,856
Lubec memorial Library	Lubec Town	1359	Maine	32,856
Peabody Memorial Library	Jonesport Town	1370	Maine	32,856
Peavey Memorial Library	Eastport City	1331	Maine	32,856

Source: US Census Bureau (2010, 2013).

recorded, transcribed, and then analyzed using a qualitative data analysis program (Dedoose.com). The coding proceeded inductively with codes emerging as themes across the focus groups. The questions the groups explored addressed the conditions of local Internet connectivity; how people engage the hotspot program (or why they did not engage it); their needs and uses for library-loaned hotspots; the advantages and disadvantages and ease of using mobile hotspots; and how this particular connectivity compares to other ways to access the Internet. The University of Texas Institutional Review Board reviewed and approved our study and methods.

**Findings**

Our results are structured around the experiences and outcomes reported by hotspot users and the impacts of local Internet connectivity in these rural locations. Our final section



considers the library's role in the local information ecosystem and implications for policy solutions to Internet access and use in rural areas.

### *Using the hotspots: juggling connections and finances*

The primary two themes that emerged from focus groups attest to the lack of affordable broadband options locally and the poor connectivity options that people experience. The two can be related: sometimes a poor quality service does not seem worth the money it costs to maintain it. This meant that free hotspots with good signal reliability offer a user-friendly contrast. In general, users in these sites faced profound financial challenges, suggesting that the contemporary market environment with its high charges for broadband services is simply not sustainable in these areas.

Location limits connectivity options – even wireless options. If people lived outside of a town, their choices were generally limited to dial-up or to satellite service. One participant reported 'I went to AT&T and US Cellular and the rest of them – and they basically just laughed me right out of the office when they saw where I lived'. Fixed wireless has a small presence in some of our locations, but that service too could be tenuous. One person volunteered,

They come out and looked to see if we could get – have a line of sight. But then they never come back to actually do anything. So – but a close neighbor within like a half-mile said that it is terrible. And their antenna is on top of the [grain] elevator in town.

Another person from Maine said,

'Like I live on a road with five other homes. It's a little dirt road, off of a road off of Pigeon Hill. And it's not that far off Pigeon Hill, but it's the same thing. They just say it's not worth our while to go that quarter mile to get those five people.'

followed by 'And if it's not cost effective, they won't do it. And you have no other choice you see. There is nobody else. It's not like we have 10 companies to choose from. And that's how it's always been here'. A former satellite subscriber in Maine said,

It was only in the last six months that we could get anything besides HughesNet. We used HughesNet because that was the only thing. So, yeah, access is definitely – and probably if I didn't have to have it, I probably wouldn't have it. It was expensive.

The prices for wired services and for smartphone plans seemed high for this population. One person volunteered,

I looked at prices, honestly, for the MySpot .... I don't know how they get such a – or what kind of deal they [the library] get, but to go and buy one at the store and to an activation, it's almost as expensive as regular internet.

Another person followed up 'Being part owner in a tower. It seems pretty expensive' and 'I was floored when I saw how expensive it was'. Most people in our samples used

smartphones and were acutely aware of where they could and could not get a signal, as well as the cost for data such as music, streaming movies or YouTube videos and other resources.

### *Maneuvering around uncertain connectivity*

While most of our Kansas hotspot users had a smartphone, not all had data plans or unlimited data plans. They found the library hotspots to be a useful way to both speed up certain services and to ‘extend’ their phone-based data limits. In one case, a mother and her family struggled with connectivity:

That’s why we check this [hotspot] out. We had dial-up before. And that was very slow. And so just checking e-mail was like painful. So we were checking into other options. And we are kind of in a valley, so our options were very limited. So we ended up getting our own hotspot through Verizon. But we only buy 2 Gb a month, which isn’t very much. So yeah, we hit the limit – I mean, we mainly just do like e-mail or check weather ... Otherwise, if we want to research anything, we wait until we have the hotspot.

Another exchange captures the problem in this rural region:

- Interviewer: What’s the most frustrating thing about internet service in this area?  
 Female1: For me, price.  
 Female2: Even with [provider], it always – you always have problems with it.  
 Interviewer: Problems like it goes out?  
 Female2: It doesn’t work or it’s disconnecting.  
 Female1: I would have to reboot quite often.  
 Female2: [Provider] is the only one, really, that’s out here. And you always have problems with it, with [provider].  
 Interviewer: So there’s no choice. How about you? The biggest problem?  
 Female3: We don’t have choice – we have to choose [provider]. We have to pay.  
 Interviewers: Yeah, the price.  
 Female3: The price, yeah.  
 Female2: The price.  
 Female1: We don’t have option.

From a Coffeyville participant:

- Male1: I tried [a purchased hotspot] at Wal-Mart once, but – they said it was unlimited. I used up my data in like one night.  
 Male2: It just sucks.  
 Female: And I can relate to that, because we just went and bought one of those hotspots. What was it, two months ago? And we got that unlimited card. Two days later, we’re out of data.  
 Male1: I wasn’t even a whole day. It was like –

- Female: That night we were out of data after spending \$45, \$50 for the card and \$50 for the machine.
- Male2: That's exactly what I did. I've still got the darn thing.
- Female: If you watch movies on there, it takes your data and you've got to go buy another card.
- Female: They should tell you certain things – if you do this, you know, it'll take all your data.

These comments illustrate the need for connectivity as well as the hurt and surprise people experienced when they understood the commercial costs they face in order to use Internet services. The uncertain quality and high costs of Internet access from a dedicated device or subscription were untenable. The moral outrage accompanying the frustration people expressed might be surprising for what many consider to be a discretionary purchase. However, it may indicate how the levels of need and dependency are incommensurate with the costs among this population.

### *The value of the Internet for rural areas*

Not too surprisingly, the participants highly valued connecting to the Internet for a range of reasons, many of them the same reasons that come up among people living in urban areas. They included social as well as economic and educational reasons, but these users also have distinctive relationships to the rural location that highlight their differences from urban experiences or that might undercut assumptions about information connections in small towns. Library-loaned hotspots did not lead people to 'new' Internet uses so much as they offered them new chances to connect in more convenient places at more convenient times, and sometimes for greater time periods so that more intensive work, education or transactions were possible.

Social reasons for using the Internet came up frequently: 'That's why I have Internet. My family communicates daily. I mean, I would miss out on what was happening with my family in Illinois. I would be out. Nobody's going to call me daily' said one person in a remote town in Kansas. Participants frequently brought up Facebook and Skype as helpful for maintaining family and other social ties. Indeed, people used Facebook even to stay in touch locally: several people noted that community information and even the local newspaper was available through Facebook. Our participants shared one Facebook group that profiled Eastport, Maine and publicized local events and activities and enabled them to network with others in the town. A Jonesport, Maine focus group member talked about the Working Waterfront publication that follows the high school sports teams through Facebook. Although many people noted the prevalence of 'gossip' and 'word of mouth', Facebook was also a very fast response to the question 'how do people find out about what's going on in town?' The libraries themselves publicized their hotspot programs using their Facebook pages.

Economic reasons for using the Internet seemed obvious to these participants. Some people found they could sell locally made items using Facebook. Individuals who craft items and live in very small communities in northern Kansas, for example, post their

items for sale online on Facebook or Craigslist, likening the service to ‘an online garage sale’. Another person explained that her mother was a representative for a highly distributed sales organization who put all her materials and her classes online. Many people knew others who sold on Etsy and use social media to promote their businesses. A carpenter living in a small town in northern Maine used Facebook to communicate with customers and obtained most of his business that way. A farmer in northern Kansas uses the Internet for going online and viewing cattle catalogs for bull sales or calf sales. More broadly speaking, the farming community is tightly linked to Internet-provided price and crop information:

- Male: I guess I’m thinking outside rural agriculture, farm. Boy, boy, boy, boy. I mean, those farmers are just as married to their cell phone to check the markets, to check the weather, to check water, as well as for communication to their suppliers, as far as I need this part, so you call. So as part of the agriculture business of Kansas and Atchison County, boy I don’t think farmers would give up cell phone to receive their internet capabilities.
- Female: That’s the thing, like you used to be able to get by without internet.
- Male: It makes me so much more efficient.
- Female: I mean, they went without internet for so long, but nowadays everything that you buy is geared towards internet. You can’t buy, you know, like even just going to school, they’re now making it where you have to have internet. Everything is gearing itself towards internet.

A John Deere outlet near one of our sample sites elicited conversations about how farmers are using drones to monitor crops and the value of ‘smart’ tractors, all requiring some sort of easy Internet access to be most helpful to farmers. One of our stakeholder interviews with a small telephone company in the region also prompted a conversation about their partnership with Microsoft in a ‘White Spaces’ demonstration for precision agriculture experiments.<sup>3</sup>

The Maine focus group participants were especially keen on the Internet’s utility for enhancing entrepreneurship in the region since northern Maine is an area that attracts many highly skilled people. However, much of the work of these ‘new recruits’ to Maine requires Internet connectivity, and the area lacks reliable service. Consequently, improved Internet services are high on the region’s list for economic development purposes.

Some other uses for the hotspots included telecommuting, banking, entertainment such as music and movies (Netflix), getting health information or even health services, shopping, finding work, reading and downloading ebooks, and tourism. Numerous veteran hotspot users remarked that they used the device for data-intensive downloads or transactions, often augmenting their cellphone data plan. The pressure for *routine* access and use emerges in many ways.

It became a matter of routine to be on a hotspot waiting list at the library. The Coffeyville, Kansas library had 47 people on its waiting list on one day that we visited. One person explained,

'It's like as soon as you turn it in, you put your name back on the waiting list because you know it's going to be another three-four weeks before you can .... It's worth it ... just for that week of getting to stay connected for whatever reason or home or ... just catching up.'

Using the hotspot was so valuable to people that they planned for the week they could check it out. One person said, 'Any kind of scheduling things online or any stuff that you take care – like if you have it do you do your online shopping that week ...' or 'I schedule a chunk of time to spend at the library' when this individual did not have the hotspot. Before getting the hotspots, people used the library's wifi or its in-building computers. In fact, many librarians commented that people sat outside after hours either near the building or in cars in order to use the wifi.

The hotspots were widely appreciated. Their mobility and ease of use enabled them to be at least partial solutions for people's connection problems. That said, the hotspots did not work in all of the originally selected communities; Verizon's signal did not reach 2 of the 18 communities, and their hotspots were moved to other locations. In Maine, the US Cellular hotspots often seemed to lack good signal quality and the program was less heavily used. However, where the signal quality was high, the hotspots operated well. The mobile quality of the hotspot enabled people to take with them when they traveled – which might include vacations, various job sites around the state, or even 'down to the barn' while the parents are doing chores there. One person commented, 'For me, it's the convenience and being able to share it with multiple kids'.

That mobile quality facilitated people using the hotspots when they needed Internet connectivity but could not get to the library. For example, one working couple shared the hotspot, with the wife using it in the morning to complete course requirements for her GED, while her husband used it in the evening after work for the same thing. They both graduated because they could take advantage of online classes around their work schedules. Another person had off-site work obligations and often had to send large files – a task for which a smartphone was not helpful. The hotspot enabled her to juggle files and to send them when they needed to be sent no matter where she was.

### *Communities: education and sociality*

People especially cited the utility of the hotspots for educational and community purposes. Given the community investment in local education, enhancing children's Internet connectivity for educational purposes emerged as an important community outcome. With their mobile connectivity, hotspots enabled children traveling to sports events in rural regions to stay up-to-date with homework.

We also note that several towns in our sample had groups of homeschooled children, and they rely intensively on online resources. One homeschooling mother said,

I think it's a great thing that they're doing with the Mi-Fi's. Because in rural areas, people's finances aren't as much as if you lived in the city or whatever. And you don't have the access to all the other smaller competition stuff. And with our school going to the iPads and stuff ....

Another offered,

... some of the kids don't – they need access to get their homework done. If somebody is playing a game or listening to music and someone else says, 'I need to do homework', then you're off. We just prioritize that way.

As noted earlier, Maine had adopted a statewide program that provides laptops to schoolchildren and families without a home connection felt at a loss for helping their children with homework:

- Male1: You can use it – you know, if you look at the number of students that are using our little mobile Wi-Fis, that's because they don't have Internet at home. So you can get some idea of how many kids in school that relates to that families' don't have Internet.
- Female1: Then you also have online college students and people trying to get a nursing degree online, stuff like that.
- Male2: Yeah. Well, but you know when it comes – Internet, yeah, it's expensive.
- A substitute teacher commented: 'Ours love [the hotspot], oh yeah'.
- Female1: My kids like it because when we are gone for different events from school, it keeps them able to be caught up and they don't get behind on their homework. They take assignments with us and they work on it, so they're meeting deadlines.

One couple explained that they simply could not afford Internet access at home:

... when we are able to have [the hotspot], our kids are able to keep up or catch up on stuff they've got to do because a lot of the stuff in the schools nowadays, has to be online. You have to turn it in online. So, those who can't afford it – our kids are automatically, it seems, getting punishment. You get held back a little bit because you don't have the internet to turn their stuff in online. Plus, lack of transportation, we can't always let them stay after.

Some towns realized communal benefits of hotspots through community uses. The coach who borrowed the hotspot for long bus rides volunteered,

[Students connect] mostly just on the iPad. Like I said, with coach and me kind of restricting [the hotspot] with the kids on the bus because we would have a lot more than 10 [users – which is the maximum]. And then would want to – we restricted it to just their iPads only. They had to come up to us and we'd put in the code for them – they couldn't get on themselves. Strictly just iPads on the bus. We did use, for varsity boys and girls basketball – sometimes you'd go to a school and they couldn't film the games – not the – it wasn't live streaming, but they would film the game and afterwards, they would want to download it to the internet. So, they would use – every time, they'd always ask me if I brought the MiFi because they wanted to use it to download the game onto the internet on the bus ride home. That way the kids could watch it – a couple of them would get together to do that. We did use it for more than homework on the way home anyway.

Expressing the same communal sensibility, other patrons understood the need to assist with children's needs. One mother commented about rationing her own use of the hotspot and trying to put local children's needs first this way:

... she [the librarian] went to a meeting with our superintendent and the board I think, and I emailed her and asked her about the kids up there, because there are kids up there that are way less fortunate than my son that don't have a cell phone with data on it that he can turn a hotspot on. If he was doing his homework, I'm not going to ground him from his hotspot on his phone, if he's really doing homework. If he's on Snapchat I can tell. So I would not ground him, but there's other kids up there that don't have that advantage, and they need the Wi-Fi. And for a kid to come here and sit in front of the library or sit in the library, how did they get here? Did it cost gas to get here, are they missing dinner, or is mom or dad, you know, there's a lot of things that ...

Female2: Yeah, or are they going to have a ride to the library?

Female1: Yeah, if they are far enough away that they can't walk, you know? Or just different situations that a lower income family would be into if they couldn't do this and come here or take the Wi-Fi thing home.

Finally, in other interviews we learned that some libraries reserved hotspots for special functions – competitions, fairs, events – that might need Internet connectivity to process credit cards or track scores, another communal benefit to the local citizens. One library reserved a hotspot for just such special events, checking it out on a daily basis.

## **Conclusion: libraries and policy relevance**

Policymakers from local, state, and national – and international – domains are confronted with the problems of inadequate rural broadband. This research looking at rural libraries and their hotspot lending programs is directly relevant to the question of what policies might function well in rural regions in many parts of the world and provides some information on the shape of the information environment in rural regions. While libraries may not constitute a solution in all countries, other public institutions can provide similar functions. Broadband has now entered the arena of basic infrastructure in many countries, but few viable solutions exist in market-based economies that answer the challenges of rural regions. In this, the case connects to the environments and policy situations typical of many countries. The broader agenda of providing adequate Internet infrastructure throughout rural regions troubles many countries, and while some nations have fostered innovative approaches, many have simply fallen back on predictable incumbent providers for whom the sparse, rural markets are secondary concerns. Some US federal policies complicate the problems by suggesting that certain regions have broadband access when in fact it is absent, a testament to the poor mapping data available. As well, certain states have policies that discourage local innovation by prohibiting municipal involvement in providing connectivity services beyond government offices.

For the communities examined here, improved Internet connectivity was important for multiple reasons. Indeed, several libraries felt the hotspot program was valuable enough for them to find additional funding to continue it. For some households, the

library program extended the uses they already found for the Internet. Depending on one's circumstances, it saved money, an important utility in many people's lives; the hotspots also gave people easy and convenient connectivity, something they simply did not or could not have, and enabled them to be connected to family, friends, and the broader information environment; for families, it proved immensely helpful for children's education. Rural libraries identified ways their hotspot program could assist with local community building, responding spontaneously to social circumstances. The list of ways that hotspots 'helped' can be long.

Even more than this, however, the current research demonstrates broader connectivity problems and illustrates some deficiencies in how policymakers are both gathering data about and trying to solve the problems of rural connectivity. Even if there were widespread hotspot lending programs, difficulties would still exist because cellphone signals are not uniform in the United States and elsewhere. On top of this, the costs for service with unlimited data plans are out of reach for many rural families. As one person put it,

I just see you moving the bottleneck from one spot to the next. So if we all had these devices then cell services would be the bottleneck and we'd still have slow internet instead of this building over here that runs our DSL being the bottleneck.

The material circumstances of spotty or expensive connectivity tell a story not only of creativity but also frustration.

Our research begins to document the texture of the problem and points to some of the roles that rural libraries might have in contributing partial solutions. The problems transcend the capabilities of local libraries, but as local institutions that are typically respected and supported locally and often receive some state and/or federal support, libraries should take their place as important sites for offering rural broadband solutions. Libraries are valued by their users, and in some places even function on high speed networks. National policies in the United States should consider enhancing the services libraries already provide and making the most of these resources. In so doing, they may provide models for other approaches around the world.


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## Notes

1. Gb is shorthand for gigabit, a standard metric for digital data volume.
2. Those two companies, Verizon for KS and US Telecom for ME, were chosen based on an assessment of the cellular signal availability in the targeted regions.
3. White Spaces refers to a range of spectrum and also a technology that operates in that spectrum. At this writing Microsoft is demonstrating White Spaces technology applications in the United States and elsewhere.

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