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Information Access in Rural Areas of the United States: the Public Library's Role in the Digital Divide and the Implications of Differing State Funding Models

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by

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ABSTRACT

INFORMATION ACCESS IN RURAL AREAS OF THE UNITED STATES: THE PUBLIC LIBRARY'S ROLE IN THE DIGITAL DIVIDE AND THE IMPLICATIONS OF DIFFERING FUNDING MODELS

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In the United States, individual states have different means of determining and distributing funding. This influences library service and access to information particularly as it pertains to critical Internet access. Funding and service trends have changed, especially as it relates to public libraries, with some modifications working to their advantage and some to their detriment. Public libraries struggle to meet the needs of their users as more information becomes available online. This is especially true in rural areas that have unique challenges such as a very small tax base and limited budgets, space constraints and dated buildings, limited opportunities for staff education and training, and poor telecommunications infrastructure. Despite these challenges, public libraries need to provide access to e-government and other key information so that their communities can be a part of a democratic society. This has become especially critical in rural areas where the public library may be the only place to access the Internet and communicate with professionals who can assist in the navigation of digital literacy tasks. It is becoming increasingly important to examine funding models and their impact on information access in rural libraries. What is the impact of targeted federal broadband programs in rural public libraries? Is there a funding model that is most effective for rural public libraries?

Are librarians opting out of government systems to pursue private assistance with connectivity when available? What is the role of the librarian in digital literacy in rural libraries? These questions were answered by examining five states representing varied funding structures including federal grant support, E-rate, state funding, local funding and library system funding. Surveys and interviews with public library directors and library system staff indicated that federal programs such as E-rate and National Broadband Grant infrastructure funding were making a small impact, but this was not enough to assist librarians with their increasing technology needs. Even more concerning was the diminishing state funding and support to rural public libraries and for library systems that once provided technology support. The objective of this research is to determine best practice for Internet and community anchor institution policy in the U.S., and to advocate for increased public funding that is so critical to public libraries in rural areas.

To my dad, who always believed in me.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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Chapter 1: Introduction

1.1 Scenarios

A librarian is sitting at the desk. One of the library's regulars approaches--a homeless man in his late 60s. He is in poor health, and has just recently obtained rental assistance and social security benefits, but is in transition as he awaits funding. He received a cellular phone through a government program, yet needs assistance with many functions. Due to the fact that this man had worked with a librarian when applying for benefits in the past, he is familiar with the library as a resource. The librarian looks over his phone, and sets emergency and local contacts. She shows him how to do it, and to use other functions of the phone.

Thirty miles away, a librarian has a long line of patrons at the front circulation desk. She picks up a large stack of materials from the back and carries them to the counter, talking pleasantly with the patron at the front of the line. She goes to swipe the barcode of the patron's card with the scanner, but the screen is frozen. The librarian has seen this happen before and gazes around the room to gauge who is on the Internet. She notices all three public computers are in use, and two individuals with laptops are using the wireless Internet. She knows that this is enough to cause problems with the automated cataloging system. She calls the help desk at the library system office, two hours away. The technician on the other end tells her that according to his charts, her bandwidth is at capacity. He informs her the person on computer two is using a great deal more bandwidth than the other patrons, and the librarian should talk to him so at least, temporarily, she can check out items. She agrees and walks over to the patron on the

computer. She notices he is playing a popular Facebook game, and asks him if he could exit the game so she can check out books. She goes back to her rebooted computer, and is finally able to check out books, although the system takes several seconds to read each barcode. When the transactions are completed, she discusses the matter with several different technicians whose recommendations range from network segmentation, to blocking certain bandwidth-heavy websites. The librarian weighs these options.

These scenarios are common in today's public library. It is important to examine how the expectations of librarians are changing while funding continues to decrease. The research will first examine the digital divide and access to information, while situating them historically in telecommunication history, utility infrastructures and library funding issues that have occurred in the United States. The researcher will examine concepts of Universal Service, Universal Access and technological literacy as librarians act as mediators to the new challenges of digitization. As the emphasis on federal funding for public libraries has shifted into the technological realm, it will be important to focus on the effectiveness of these programs, while combining them with some of the unique local funding issues in separate states.

1.2 The Digital Divide

The Oxford English Dictionary defines the digital divide as the "gulf between those who have ready access to computers and the Internet, and those that do not." (Oxford English Dictionary, 2014). This dissertation will examine two components of the digital divide—infrastructure and literacy. Both act as barriers to information access. According to Blau (2002), even if the most effective infrastructure exists, half of this equation is still missing. Many scholars have discussed a global digital divide, but there is clearly also a digital divide in

countries like the United States and Canada, particularly in rural areas (Kozak, 2010). Although some have argued that public libraries are historically elitist (Harris, 1972), they continue to be a place where people come to seek government agency information, participate in business, and interact socially. In rural areas, this may be the only place to obtain this information. This is of particular importance now that so much information is online. The philosopher Jürgen Habermas (1962) originally conceptualized a public sphere as the space in between the state (public) and private life. Some scholars believe that the library is one of the last public spheres in countries like the United States, where the emphasis on private and corporate interests is significant (Buschman, 2003).

Legislators and users once conceptualized the Internet, as a private commodity. The United Nations now considers it a human right, although this is controversial among legislators. Michael O'Reilly, one of the two current Republican FCC commissioners, does not believe the Internet is a human right. His human rights definition involves things that individuals will immediately die without—water, shelter, or food. According to O'Reilly, this live or die human rights definition should be one of the most important principles informing Internet policy (Brodkin, 2015). Vinton Cerf, considered by some individuals to be the father of the Internet, holds a slightly different view. He also denies the Internet as being a human right, but highlights its growing importance as an enabler of rights—rather than a right itself (Cerf, 2012). Neither Cerf nor O'Reilly addresses the right to speak and the right to receive information.

These perspectives are concerning, particularly because of the critical role of social media as a vehicle for political action and coordinated social change. Political regimes that find this a threat have limited access to certain websites. In many countries, social media is playing an increasingly vital role in political discourse and organized revolution. One example of this was

the Arab Spring, where youth used social media to help overthrow oppressive regimes in Egypt, Tunisia, Libya and Yemen. Several scholars are studying this Internet used in this way, although this is beyond the scope of the dissertation (Parmelee & Bichard, 2011; Christensen, 2011).

According to Parker (2014), the biggest threat to oppressive political regimes is coordinated action, as the Internet has increased the opportunity to assemble through social media platforms. This manifests differently depending on the country. China, for example, is concerned not only with blocking controversial websites, such as those detailing the events of Tiananmen Square, but is even more vigilant about monitoring the potential for coordinated events and protests. Keeping citizens isolated, is the most effective way to eliminate social change and maintain the status quo (Parker, 2014). In Cuba, on the other hand, very few people have Internet connections. Again, this silence ensures the power of a current regime by maintaining an isolated and fearful citizenry. Several scholars have addressed the importance of speech and assembly in philosophical works. Foucault (1972) examines discourse as related to power structures. He views dominant discourse as a form of power, but also finds meaning in the individuals who are completely silent in critical conversations--those not entitled to speak. These individuals are powerless, as they do not have any input on the conversation at hand. Braman (2009) talks about the concept of power, specifically in the modern day information society, and examines how government controls information processing flows to exercise power. She considers U.S. policy as being self-contradictory despite its goals of being a global leader. Michael O'Reilly from the FCC is correct when he emphasizes the importance of principles informing Internet policy. However, this philosophical grounding would not be appropriate without considering first amendment rights as well.

The Internet, then, can be a merit good, publicly provided because of its social value. A merit good, defined by economist Richard Musgrave (1957), is a commodity that an individual should have on some concept of need, rather than ability and willingness to pay. This transition is particularly challenging in the United States due to the persistence of neoliberal theory. Neoliberalism is a term describing legislative initiatives supporting free trade, privatization, and deregulation, relaxing government control of the economy (Boas & Gans-Morse, 2009). This neoliberal focus on Internet infrastructure is of concern to many individuals in rural areas, where the market is not an independently developing infrastructure. Public libraries have always been government-funded agencies that directly provide access to information in various forms. However, digitization of information presented in other forms and the lack of infrastructure has created additional challenges for public libraries involved in this process. These libraries are struggling to meet the demand of their communities with diminishing financial support from neoliberal supporters who question the need for libraries at all in a private market. The issue becomes, then, a matter of focus on what type of good the Internet is, and how the government and market should support its development. These larger theoretical issues, discussed throughout the dissertation, situate the legislative, funding and connectivity problems.

1.3 Primary Goods, Consumption Norms, and Universal Access

Adam Smith (1776) defined a consumption norm as the barest essentials for the poorest citizen to function in society. John Rawls (1971) described the concept as primary goods. Sawhney, (2000), believes in the universal provision of new communication tools if citizens could not function without it. Braman (2009) describes this as "Information as Resource" something an entity must have in order to function. She specifically applies this concept to

isolated communities. The Internet is becoming critical in many functions of daily life. This is noticeable in public libraries, where community members are shifting the focus of their reference questions. The amount of paper-based applications provided to employment seekers is decreasing. Many large employers have migrated employment information to their websites. Recent initiatives give individuals who meet certain income guidelines emergency cell phones, but to many, this technology is unfamiliar. An individual needs to apply for social security and most other government programs online instead of in a face-to face office environment (Bertot, Jaeger, & McClure, 2008). According to Jessamyn West, a library practitioner in Vermont, even if communities have the best infrastructure in the world, there still needs to be an agency that can assist individuals utilizing these services and technologies (West, 2011).

Graham and Marvin (2001) discuss parallel communication systems online: One for those with income, education and connections, and the other for those without these connections. They discuss the issue of individuals dealing with poor, expensive services of incumbent monopolies. These infrastructural issues complicate matters further as online access is critical for key resources and information, as well as employment and financial opportunities.

The public library is critically important due to these issues, especially to those who do not have the resources to obtain information in any other way. As scholars and politicians debate the definitions of universal service, they also have introduced a concept of universal access. Universal access focuses on connectivity in community center-type environments where home access is unavailable (Prasad, 2013). Public libraries play a key role in this universal access concept because they have historically been a place of traditional information access for communities. However, this need is most obvious in rural communities (Sinclair, 1971). With information technology and broadband Internet, public libraries are sometimes the only place to

receive this access (Information Policy and Access Center, 2013). As more government services are migrating to an online format, it has become critical for individuals to be able to utilize the Internet not only to take part in a democracy, but also to be an active and functional member of society (Karanicolas, 2014).

1.4 Public Library Funding

States have historically distributed public library funding in different ways. This began in the mid-1940s when a funding analysis occurred in the *National Plan of Public Library Service*. There has not been a detailed analysis of library funding conducted since that time, and several changes have occurred that would warrant such a discussion (Joeckel & Winslow, 1948).

Public libraries rely almost exclusively on local funding (American Library Association, 2009) and communities are increasingly relying more on public libraries to assist with federal and economic tasks (Information Policy and Access Center, 2013). Librarians experience funding cuts on the local level, and receive very little federal money. This intermittent and unreliable funding typically comprises less than 1% of general operating budgets for libraries. Some public libraries receive support through the Universal Service Fund (USF), some with federal funds through the Institute of Museum and Library Services (IMLS) or federally funded programs specifically for broadband to supplement state or local funding. In some cases, the lack of support in state funding leads to cuts in federal funding due to maintenance of effort (MOE), a funding average states adhere to in order to stabilize public library budgets. (Campbell & Walters, 2013). The researcher will discuss the particular funding breakdowns in Chapter 4 of this dissertation.

It is clear that technology is disrupting the traditional infrastructure of the public library, which also affects the service and access that public libraries bring to their communities. Several trends are occurring in different states, including consolidation of systems and reduction of state funding for public libraries (American Library Association, 2009). Funding reductions in states occurred around the time of the recession of 2008 and 2009 and continues to decline in several states. Federal programs like IMLS and USF are vulnerable, deemed unnecessary by certain legislators. One example of this is Representative Paul Ryan's 2015 budget resolution recommending that the federal government not have a role in public libraries and that Congress "shift the federal agency's responsibilities to the private sector." (American Library Association, 2014b). On a state level, there is a similar sentiment. When Louisiana completely cut all library aid from the state budget, Paul Rainwater, the governor's chief budget aide, said in a statement, "In tight budget times, we prioritized funding for health care and education. Operations such as local libraries can be supported with local, not state dollars." (Schwartz, 2012).

According to Karanicolas (2014), the Internet has transformed almost every element of daily life, and acts as a delivery mechanism for fundamental human rights. He cites freedom of expression, the right to political participation, freedom of assembly and education, work and healthcare. He believes that states should consider Internet expansion as a core obligation. His recommendation is that obligations are imposed progressively, based on the starting point of the state and their available resources. At present, funding for these resources, especially in public libraries, is poor. Public libraries are often the only places to get Internet access in rural areas, and are often dealing with outdated equipment and extremely slow connection speeds. According to Glynn (2006), rural libraries have not had appropriate funding levels since the Library Services Act (LSA) in 1956. Libraries are also having difficulty maintaining the resources they

acquired during that time such as building upkeep and maintaining materials collections. Additional resource demands and the absence of commensurate funding has created a much larger problem for these rural public libraries, and the communities they serve.

In countries with large rural areas like the United States, developing a new communicative infrastructure is extremely difficult. Access is an expensive and controversial endeavor, but complicating the problem is the sentiment in the United States that the free market will create an infrastructure that will provide this connectivity. Section 254 of the Telecommunication Act of 1996 addressed a few key issues for rural areas including:

1. Quality services should be available at *just, reasonable and affordable rates*
2. Access to *advanced telecommunications* and information services should be provided in all regions of the nations
3. Rural areas should have access to *advanced telecommunications and information services* that are reasonably *comparable* to those services provided in urban areas
4. Services are available at *rates that are reasonably comparable* to rates charged for similar services in urban areas (Federal Communications Commission, 1996, italicized by author for emphasis)

The free market did provide for some telecommunication needs in the 1996 Telecommunications Act, but the bar for "advanced services" was set very low. Rural telephone rates also were not reasonably comparable to rates charged in urban areas. As a result, rural areas have struggled with challenges such as party lines and prohibitively expensive new installation costs (Kozak, 2010). These costs vary depending on telecommunication company fees, the age of the physical building, and several other factors.

Some legislators believe that broadband is not a merit good, or a programmatic funding need (Lasar, 2009; Karanicolas, 2014). In fact, some scholars like Mueller (1997) contend that historically, telecommunications companies did not equate universal service with telephone access to every individual home. Rather, it meant eliminating unconnected dual carriers. At the turn of the century, an individual who subscribed to AT& T could not call a subscriber of another independent carrier.

E-rate is the schools and libraries universal service support program. Schools and libraries can apply for this funding individually or as cooperatives that enable distributions of cost. One form of this cooperative is the library system. Library systems examined in this research are separate entities that assist member libraries with tasks such as interlibrary loan, cooperative buying, technology or consulting. The state, USF, or local taxation funds these systems.

Category one services are used for Internet access and telecommunication services, while category two services deliver basic maintenance of internal connections and broadband services. Discounts depend on the level of poverty determined by the percentage of free and reduced student lunch rates in the district, and if the library is located in an urban or rural area. The Universal Service Administrative Company (USAC) administers the E-rate program. The FCC directs the USAC who monitors the service providers and applicants to ensure that there is compliance with the E-rate procedures (Federal Communications Commission, 2015b).

Contributing to the Universal Service Funding are telecommunications carriers, wireline and wireless companies, and interconnected Voice over Internet Protocol (VoIP) providers, as well as cable companies that provide voice service (Federal Communications Commission,

2016). Some librarians and legislators do not see the current distribution of universal service money as ideal, especially when it comes to connectivity and public libraries. In many states, rural libraries do not receive universal service money at all. This is due to not filing for E-rate rebates, or not having a school and libraries funding pool that would supplement services at the state level. Historical and recent funding of libraries, as well as debates over the usage of the universal service fund is affecting states differently, due to varied allocation of funds. This raises questions about federal funding for libraries, and whether or not this model will be one that is sustainable.

1.5 The First Mile

Sharon Strover, communications professor at the University of Texas at Austin, examined infrastructure issues and proposed the concept of the "First Mile" (2000). According to Strover, most congressional and Federal Communications Commission (FCC) testimony comes from vendors, not subscribers, which is in line with neoliberal practices. This is especially true when examining Universal Service Funding, but also is problematic when dealing with local or grant funded initiatives. The inevitable result when vendor priorities trump patron needs is short sightedness in key issues with the infrastructure development, actual adoption, and usage.

Gurstein (2014) discusses the telecommunications industry's term Last Mile where infrastructure development in rural communities and expenditures related to connecting in these populations to broadband networks is a last priority. This Last Mile approach focuses on profit rather than the needs rural communities. These rural and remote areas are often the last to be connected, and it happens much later than urban areas. From a vendor perspective, the last mile

may refer to the telephone network that connects the customer to the local exchange. However, from the subscriber perspective this link is more critical and is a First Mile issue.

While several countries have recognized their citizens' right to broadband, very few have been able to create access that makes this right a reality. According to Gurstein (2014), there is fragmented government support across the globe, especially in expensive-to-serve rural areas. Gurstein's belief is that First Mile locally owned and operated broadband systems can create local economic and social opportunities. A conflict can occur if government funding does not consider local feedback when supporting a program. The combination of these two factors is important in infrastructure development, but they can act independently of each other. What will be important in broadband build-out will be the combination of factors, including good, consistent, funding sources, combined with communities' ability to offer feedback and information as the process is occurring. Both elements need to be in place for programs such as these initiatives to be successful.

Historically, telecommunications companies have been unwilling to work with government in many cases for granted programs geared towards infrastructure build out, especially in rural areas that are not financially lucrative. James Baller, from the Baller-Herbst Law Group, often represents municipalities in legal matters. An episode of *On the Media* discusses telecommunications companies passing on non-profitable regions in rural areas. When asked why lobbyists stymie the action of municipalities stepping in to fill these gaps, Baller responds by saying: "That is what's happening. It seems that what the cable and telephone companies that do this are trying to achieve is preserve future markets when they figure that it's time for them to get around to them, or they're fearful that the municipal projects will actually be

successful and stimulate others to emulate those successes." (On The Media, February 21, 2014). This perspective has continued to have an impact on development in rural areas.

At times, federal programs can be shortsighted. Strover (2000) discusses electrical outlets and ports proximate to each other in 100-year-old schools. This is not unlike lightly funded rural libraries that exist in Carnegie or other historic buildings and the challenge of utilizing this new infrastructure. Another subscriber-based issue that has come up in the research conducted by Oden and Strover (2002) is the complicated reimbursement process for E-rate money and the difficulty rural schools and libraries have applying for it. This leads to underutilization of the program. Examining why rural schools and libraries struggle with this process is a critical factor if the goal is supporting the policy for which legislators are advocating.

In 2014, then-American Library Association (ALA) president Courtney Young issued a statement in response to this legislation, which expands the E-rate program for schools and libraries:

> In this proceeding, ALA advocated, among other things, that the FCC must address both the lack of affordable high-capacity broadband for the majority of libraries and the long-term funding shortage of the E-Rate program.
> We are very pleased that the Commission, as ALA recommended, has removed restrictions that have prevented many libraries from getting the broadband they so desperately need. In addition, we applaud the Commission for recognizing our concerns regarding the funding shortage. Today, the FCC confirmed that it will add an additional $1.5 billion to the yearly program for libraries and schools (American Library Association, 2014c)

With the expanded legislation, it will be critical that rural libraries have the tools to be able to take advantage of the increased funding pool. A survey of E-rate recipients (2014) revealed reasons for concern. Forty-eight percent of respondents stated that they are not familiar

with the FCC changes to the E-rate program, 55% do not believe that the new E-rate reform efforts will help their library, and 54% do not believe this new legislation gives clear direction in shaping a better program. This data is offset by other survey responses where 92% of respondents stated that the E-rate program is critical for their success. This is despite the fact that the staff spend an average of 39 hours on E-rate tasks each month (Funds for Learning, 2014). If individual libraries do not apply for these funds, celebrating the successes of this policy change will be premature.

1.6 The Role of the Institution

The United States, a highly individualistic society, is very different from collective societies where individuals share resources more equitably. This perspective often makes Americans less aware of institutions that can meet their service needs. This again, is rooted in a liberal perspective of individual autonomy, a perspective engrained in free market belief systems. People sometimes view government intervention as interference, and this avoidance could affect the use of institutions like public libraries, which use government money. This can be problematic when looking at broadband as a merit good. Public libraries have been meeting this need, and there has been some research by Bertot, McClure and Jaeger (2008) on how this occurs. However, there is still a need for research specifically targeting rural libraries.

1.7 States Participating in the Study

The research discussed in the following chapters uses a triangulated methodology to address these questions and devise evidence of best practices for information access. Surveys and interviews focus on library directors and systems staff in five states selected for their differing

funding structures, and types of Universal Service Funding, National Broadband Plan Funding, state funding and local funding. Wisconsin, Kansas, Michigan, Nebraska and Illinois, each represent a different funding model.

Wisconsin has seventeen library systems supporting libraries and their technology in the state's rural areas. These library systems, historically funded with state taxes, use Universal Service Funds exclusively, making Wisconsin one of the very few states funded in this manner. Wisconsin's public libraries receive very little state funding, and rely primarily on Universal Service Funding for their technology support through systems. Wisconsin librarians are currently conducting needs assessments in an attempt to design systems that more effectively meet the needs of their member libraries. According to the DPI 2014 system study, one key area of need is technology, as currently there are only 51 total FTE technology staff working at the system level, the same number serving pre-automated libraries in the 1980s and 1990s. Compounding the problem is the fact that public libraries often have to contract with other systems that specialize in technology to make up for geographic and system staffing inequities. Universal service or state money do not fund these services, and public libraries have themselves absorbed relatively large direct costs for external technology assistance (DPI LEAN System Study Work Group, 2014).

Kansas, unlike Wisconsin, receives a combination of state and local funding to pay for systems. However, Kansas is very similar to Wisconsin in that it has large rural areas and a highly active system structure. State monies supported these systems, although Kansas libraries received at 23% cut in state aid in 2015 (Shorman, 2015). Kansas is slightly different than Wisconsin in that it has a population density of 35 individuals per square mile versus 106

individuals per square mile in Wisconsin. It is important to assess the stability of their state funding, and determine how actively involved library system staff are in technology assistance for their rural librarians.

With few systems, and large rural areas, Illinois is important to consider when examining funding. Illinois is unique in that it scored relatively well on some of the Public Library Funding and Technology Access (PLFTAS) connectivity surveys (Jaeger, Bertot, McClure & Rodriguez, 2007). Illinois is also the second highest library funded state per capita in the United States at $65.15 based on data from Fiscal Year 2011. This is in comparison to Kansas, which had $45.67 per capita, Michigan with $42.55, Nebraska $35.47 and Wisconsin $39.67. These numbers include state, federal and local sources (Institute of Library and Museum Studies, 2012). However, after the publication of the Jaeger, Bertot, McClure and Rodriguez study, Illinois's funding picture began to change. The state of Illinois began consolidating library systems in 2010 due to decreased state funding. According to the system-merger committee website:

> In order to continue to deliver library services in the most cost effective and sustainable way, Illinois library systems were encouraged by the State Library to embark on a restructuring effort. In 2010, the boards of five Illinois library systems agreed to merge and form a single entity beginning July 1, 2011.The restructuring process came about due to the State of Illinois' unprecedented fiscal crisis. Libraries and library systems experienced significant delays in state payments of appropriated funds that resulted in cuts in staff and services. The likelihood of continued delays in state payments and an uncertain funding environment is expected to continue (Illinois Merger Design Team, 2010).

As legislators cut state funding, and library systems are disappearing, therefore, it is important to look at models of technology that are not system dependent (Campbell &Walters, 2013;

American Library Association, 2014a).

Nebraska is one of the few states to provide direct state aid payments to individual libraries. Nebraska's four library systems have public libraries that are more independent. One of the areas examined in this dissertation is whether aid payments are helpful in lieu of directing state aid into several library systems throughout a state.

Finally, as part of the National Broadband Plan, Michigan received the most extensive grants under the Broadband Incentive Program (BIP) last mile funding in rural areas. In some cases, NTIA targeted rural libraries with BIP funding, unlike Broadband Technology Opportunity Program (BTOP) money for projects in both rural and urban areas. Michigan received this BIP funding in 2009, and the state has had some time to utilize it. Michigan's BIP funding was unique in two ways: 1) It targeted community anchor institutions like libraries and 2) These community anchor institutions were specifically rural. The researcher will detail this in Chapter 4 (National Telecommunications and Information Agency, 2015b).

1.8 Research Questions

It is critical that this dissertation build on research examining the role of libraries in addressing digital literacy, defined as the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skill (American Library Association, 2012a). According to Brown (2000), literacy today involves navigating information in complex information spaces, with a focus on text, screen and images. Some scholars consider this discovery-based navigation to be the main form of literacy for the 21st century (Brown, 2000). This issue complements research on connectivity

challenges that librarians experience in their day-to-day work. The researcher will use an explanatory design, and collect, analyze, and merge quantitative and qualitative data, examining these major research questions and sub-questions—

RQ1: What is the impact of targeted federal broadband programs in rural public libraries?

RQ2: Is there a funding model that is most effective for rural public libraries in terms of computer access and speed?

- Do rural public libraries with state funding have increased broadband speed and improved access to electronic information?
- Are the availability and the particular division of Universal Service Funds related to broadband speed and improved access to electronic information?

RQ3: Are librarians opting out of government systems to pursue private assistance with connectivity when available?

- How do private telecommunication interests impact connectivity in rural areas?

RQ4: What is the role of the librarian in digital literacy in rural libraries?

1.9 Conclusion

What is the best model for government support of broadband in rural areas? In addition, why do legislators not typically acknowledge the library's role in the digital divide and funded federally in a more stable fashion? The objective of this dissertation is to examine the most realistic model of universal access, focusing on technology funding to libraries as a resource for

their communities as a beginning point. It is important to look at the role of this funding, making sure that public libraries have access to the funds they need, with a manageable and realistic means of applying for them.

This research examines ways public libraries assist their communities with digital divide issues, and build a case that connectivity has already moved to consumption norm standards, discussed by both Sawhney (2000) and Prasad (2013). It also explores funding models and their potential impact on information accessibility, particularly in rural areas. The goal is to determine the best scenario for meeting the technology needs for communities as much of the information of value to the public is moving exclusively online. According to Real, Bertot and Jaeger (2014),

> Government agencies have for the most part not taken many Americans' lack of digital literacy into account when shifting their primary means of service to the digital realm, nor have they considered the effect this shift has on public libraries as the primary Internet provider for many Americans. This has led to extra responsibilities for rural public libraries but not a direct increase in resources (p.13).

This research fills a critical gap in the literature. According to Jaeger, Bertot, McClure & Rodriguez (2007), further study needs to focus on understanding access, connectivity and services on a state-by-state basis. Some of their findings supported improved connectivity when a state agency took an active role in coordinating access issues. They discuss the fact that there is no systematic description and analysis of state based laws and regulations that affect the public library. According to the authors:

> The personal experience of the authors in working with various state library agencies suggests the need for additional research that explores relationships among those states ranked highest in areas such as connectivity and workstations with programs and services offered by the state library agencies. One state library, for example, has a specific program that works directly with individual

> public libraries to assist them in completing the various E-Rate forms. Is there a link between that state library providing such assistance and the state's public libraries receiving more E-Rate discounts per capita than other states? This is but one example where investigating the role of the state library and comparing those roles and services to the rankings may be useful. Perhaps a number of "best practices" could be identified that would assist the libraries in other states in improving access and services. (p.12)

It also will be important to look back on the all of the state public library operating budgets that legislators grouped and analyzed for state and federal funding recommendations in the mid to late 1940s. There has not been a detailed analysis of the effectiveness of this structure since this time. Have these models historically worked for public libraries? If not, it will be important to address some of the issues that different states face.

Recent studies on BTOP and BIP anchor institution funding examine whether a relationship exists between levels of residential broadband adoption and the prevalence of libraries. Whitacre and Rhinesmith (2015) found that this relationship was only significant in rural areas. Because these findings occurred despite the challenges faced by rural libraries in the prior PLFTAS surveys, they recommend conducting qualitative research to examine this puzzling association. Two suggestions were accessing data on a smaller scale/local library level or even a more comprehensive ethnography in rural areas to get additional information not derived from the quantitative data sets (Whitacre & Rhinesmith, 2015). The data in this dissertation contributes a great deal of qualitative data on a smaller scale to get information that is more detailed in this manner.

Several scholars, like Oden and Strover (2002) and Kozak, (2010) have looked at broadband connectivity and infrastructure failure in rural areas before, in the United States and around the world. This research builds on those findings, specifically examining the public

library's role in this digital divide. This study investigates models for funding best practices. The researcher examines variables including federal and state funding, as well as the impact of private telecommunications interests and special federal programs. More important than mere broadband speed, the research looks more holistically at information access and the barriers that rural librarians face around the digital divide.

As an aside, it is important to note that the author of this dissertation has been a practitioner in rural libraries for several years, working as a director of seven libraries in a county with an approximate population of 43,000. The researcher did not select any libraries in this area, however. The idea for this dissertation research evolved from several years of experience with digital divide, infrastructure, funding and digital literacy challenges. This practitioner experience was invaluable when interpreting jargon, and understanding some of the more complicated connectivity issues discussed by system and public library directors. It was also helpful in developing a quick rapport with the individuals interviewed in this process. The dissertation itself is organized into several chapters. Chapter 2 focuses on critical relevant research, followed by a detailed description of the methodology used in Chapter 3.

The researcher presents the results of both quantitative and qualitative data analyses in Chapter 4, organizing research questions and sub-questions along with hypotheses. A discussion of the findings appears in Chapter 5, with conclusions following in Chapter 6.

Chapter 2: Literature Review

This research touches on many issues that require inclusion of foundational literature on a range of topics. The examination of this literature will occur in several steps. It is important to look at the history both of public libraries and of telecommunications in two separate sections. The initial discussion will focus on public library history, the formation of federated library systems to serve rural public libraries, specifically, and the public library's transition to offering Internet-based services. The researcher will examine this by comparing non-Internet-based Information and Referral (I & R) models and current digital literacy-based tasks. The researcher will then analyze the concept of community informatics in its role within the public library philosophically. This section will touch on library funding, but then quickly move on to a summarization of telecommunication history, and the development of infrastructure for critical communicative networks like the post office and the telephone. Broadband development shows a revealing parallel to these infrastructures. The researcher will then examine the philosophy of neoliberalism and the development of infrastructure, as well as the role of Universal Service and its meaning in rural areas. This will lead to the discussion of broadband and the digital divide in rural areas. A discussion about the librarian's role in the digital divide will transition into how private market interests have affected infrastructure. Finally, the researcher will propose new solutions by viewing access as a consumption norm and discussing how government funding can influence this critical access.

2.1 The History of the Public Library in the United States

According to Glynn (2006), librarians considered the public library movement in the late 1800s to be a noble calling to bring good books to the masses. The New York Library Club, a

forum for idea exchanges about the public library's mission, addressed gaining intellectual control over a large amount of published literature. The language of the club documents was evangelistic, equating the library calling to that of the ministry. A meeting in Philadelphia in October of 1876 eventually resulted in the formation of the American Library Association (ALA). The ALA began to shift the perspective of a library to being more community-based, serving everyone with free collections that circulated to people from all economic classes. This was in contrast to the subscription libraries that working class readers could often not afford to use (Glynn, 2006).

Glynn (2006) discussed the close link between support for public libraries and political reform at the time. According to Glynn, librarians were concerned that government involvement with public libraries would create corruption. However, public libraries were still in need of public funding. This resulted in the Library Law of 1886, approving public funding for libraries with very little to any oversight from public officials (Glynn, 2006). This allowed library boards to act as supervising agents. Passing this law was conducive to the establishment of smaller branch public libraries in neighborhoods, instead of just one large centralized reference library in the main city. Funders targeted these neighborhood branches under the guise of reforming and uplifting poor individuals and molding the masses to the image of the wealthy social class (Glynn, 2006).

Glynn (2006) examined the main mission of these preliminary ALA meetings, which was one of education. Most children during this period left school by age twelve, and public libraries were one of the only institutions that could assist with public education after that point. Book production nearly doubled from 1885 to 1901, creating a heavy amount of work for the librarians adding to their collections. Collection development was a serious task, undertaken by librarians

who viewed themselves as experts in their field. Along with collection development, most librarians also would actively recommend "good books" for patrons that frequented the library.

However, this perspective was not without its controversy. According to Glynn (2006), in 1888 and 1889 Max Cohen and Jacob Schwartz, two founding members of *Library Journal,* had a heated discussion over whether or not there should be a business model for public libraries. Jacob Schwartz argued that the busyness of public libraries prevented librarians from giving personal advice to every user, and that a catalog would be an effective tool to assist readers in finding needed materials. This was highly controversial, according to Cohen, who responded with his dismay over the library being merely "a machinery" for book delivery. During this time, most librarians supported Cohen's perspective. However, through the 1890s there was an increasing sentiment that public libraries should cater to personal taste to some extent. To compromise, some public libraries allowed for the checkout of two books--one fiction and one of nonfiction origin to act as an incentive to read substantial texts (Glynn, 2006).

As the turn of the century approached, libraries received much more attention as an institution of importance. It was at this time that Andrew Carnegie began his philanthropy program in order to fund public libraries. While this funding was an enormous push to expand library services across the United States, it also was controversial in several communities. According to Van Slyck (1995), some felt that by accepting money earned by illegal or unethical means, the institutions were condoning these wrongs. Carnegie, a billionaire with questionable business practices, was of the belief that if an individual works hard, opportunities will surely come. Martin (1993) stated that accepting funds under this perception, many criticized libraries for keeping the social control of the industrialized society that favored the rich. Despite this, very few libraries rejected this money, and the reasons for those that did were for ongoing

maintenance issues, rather than ethical concerns (Martin, 1993). Alistair Black examines this concept in much of his work, seeing the library as an institution reflecting the culture of its society. He views the public library as repressive, a structure of domination that controls discourse (Black, 2005). This perspective runs parallel to the public sphere of democracy conceptualized by Habermas (Habermas, 1962).

2.2 Information and Referral

There are other scholars who take a contrasting view of the library as an institution of repression against already repressed classes. According to Gaines (1970), no professional group of comparable size besides librarians had the ability to take the role as information consultant in their communities. Sinclair (1971) discussed the public library's shifting role to a "neighborhood information center" in larger cities as far back as the 1950s. Sinclair uses the example of the Luton Public Library that addressed questions such as "Where can I get my deaf aid replaced?" “How can I get a housekeeper job?" and "Where is there a home for an old man?" In the 1970s, this was becoming a more obvious need in major cities. Referral for services prior to the Internet occurred in these spaces, with librarians assisting with everything from paper-based welfare applications to referral to consumer protection agencies. According to Bishop, Tidline, Shoemaker, & Salela (1999) the federal government responded to this need by providing funding for the library to act as a community information center. A series of educational programs assisted professionals in gaining skills for these Information and Referral (I&R) services. Practitioners and academics contributed articles, analyzed practice and gave public presentations.

The goal of I & R services was to avoid agency "ping pong", a phenomenon where individuals seeking service were bounced from one agency office to the next. Librarians assisted

with navigation of these hundreds of agencies and nonprofit organizations that delivered social services. Some librarians considered this I & R work a complete departure from typical library services. However, other librarians embraced this line of service, seeing a great need for it in their communities. Mary Lee Bundy, a librarian and educator, was at the forefront of this movement. Bundy became involved in the University of Maryland's urban information specialist program to use information in helping liberation struggles of oppressed people. Two of her books, *Alternatives to Traditional Library Services: A Case Book* and *Helping People Take Control: The Public Library's Mission in a Democracy* had extensive resources listed for librarians to use. She believed that it was critical that public tax supported institutions committed themselves to human justice for all people. She also strongly believed that when the rights of people are in jeopardy, there is no place for neutrality. This was a concept that some librarians held to strongly. Even at the time of these books, Bundy had concerns about the impact of mass media manipulation and the need for libraries to act as an information resource for citizen groups (Bundy, 1977).

With federal support, librarians became actively engaged in disseminating information to communities that needed it. In the 1970s, librarians modified the physical card catalog to include online public access. This information was eventually developed and standardized by the Library of Congress to make the information accessible via metadata and subject headings, and provided a foundation for the web-based sites we see today. According to Sinclair, these community information files were a resource completely developed for communities by librarians. These files held critical information about community resources that individuals would need to utilize, such as social service and government agencies (Sinclair, 1971).

The addition of community information files had many librarians thinking about other non-traditional services that could meet their community's needs. Some communities added professional social workers to their staff in response to librarians' anxiety of not having a formal human service skill set. Formal partnerships between librarians and representatives from outside programs was improving service to communities. Offering to give space to a human service agency was not enough. Instead, librarians formed partnerships with these agencies. Liaison employees, ideally ones with human service and professional library experience began to be hired (Sinclair, 1971).

Some initiatives that have occurred since the 1950s do not exactly fit the institution of domination and repression that many scholars like Harris (1972), Popowich (2007) and Black (2005) discuss. This becomes even more complicated when analyzing the library in the digital age and the concept of a virtual public sphere. Popowich wonders whether this new public sphere is just as representative of the social class dynamics as he believes the old print public sphere was. His concern is with e-commerce issues, but also with the same privileged individuals accessing the information. If one believes that the Internet is a public sphere, and the only place to receive free access is the public library, one might say this line of reasoning comes full circle. At the time of this particular article, there was really no way to know how the Internet would evolve. However, one could make a good argument that social media has provided a platform for the discursive will formation Popowich highlights when dismissing the library as public sphere.

Public libraries have experienced a more rapid metamorphosis in the slower to adopt rural areas with the transition of information services in the Internet age. Rural libraries that have not historically offered I&R services, are finding the struggle is two-fold: 1) They have a larger and more critical role as community information specialists than any time in their history and 2)

They need to be technology experts to assist individuals with this type of information access online. These will be especially critical points to examine when researching rural libraries that have been offering Internet connectivity and assistance with community information tasks only recently.

2.3 The Library's Mission

There is still controversy about what needs the library is equipped to address, despite the impact of librarians who supported community information initiatives. Critics like David Lankes (2012) have discussed public libraries as having very vague goals and attempting to meet too many needs with very limited budgets. These critics agree that this dissipation of resources is wasteful and that librarians should have more delineated goals. This is an issue that has not changed with the modern digital age. Crawford-Barniskis (2016) examines the mission statements of several public libraries. While the article itself focuses on power, some of the recommendations resonate with Sinclair's discussion of agency goals. Crawford-Barniskis encourages public libraries to ground library engagement in relevant problems, avoiding claims such as "serving all needs", and connecting access to measurable outcomes.

Measurable outcomes seem to be increasingly important as they justify library output in budget deliberations for public libraries, but many do not necessarily bring this information to the table, so to speak. According to Bohte (2007), surveys of municipal finance officers find that departmental performance data is available for budget decisions. However, officials have a tendency to base yearly budget amounts allocated to departments on prior year allocations. This could be due to the political repercussions in truly assessing programs for their performance data, and the ease of maintaining or slightly increasing funding levels. Municipal finance departments

consistently assess library budgets by prior year circumstances and not actual performance data, and it is easy to see how this influences current funding. While community members find closing public libraries undesirable, increasing a library's budget significantly is also unpopular in communities. Citizens themselves are often unsure of what a library should be, and so feedback has often not had significant impact on this issue. Latham (2002) wonders how these traditional library roles can change in response to an expanding universe of resources. Should the library be a quiet haven with stacks of books, huge fireplaces and dark wood shelving? Alternatively, should it be a community center with children's programming, a lively technology resource and training center, and a meeting place for community agencies? Should it be both? Latham wonders if we are willing to allow technology to transform service (Latham, 2002). A key issue for public libraries is that their most vulnerable patrons rely exclusively on libraries to provide vital information access in areas where no other place provides it free of charge. However, these same community members are not strong political advocates when municipalities cut funding levels.

The ALA does advocate for vulnerable groups in statements about poverty and reducing homelessness through library engagement. They state that it is crucial that librarians recognize their role in assisting individuals in poverty by using strategies such as promoting low-income programs and services into their regular library budgets, instead of supporting these services with "soft money" like grants that expire after a predetermined time. Again, this can continue to be complicated for public libraries that are already struggling with outdated and insufficient funding structures (American Library Association, 2012b).

In 1999-2000, IMLS found that community information provision had undergone an enormous change because of public libraries' adoption of the Internet in their branches.

According to Williams and Durrance (2009), there was increased use of networked community information, digitization projects, a strong Internet presence, adoption of digital reference and an increased collaboration between public libraries and community organizations. Because of these innovations, public libraries had increased visibility and community support. During the 1990s, the support of universities collaborating with communities formed community networks including the Flint Community Networking initiative, a public library Internet training lab at the University of Michigan School of Information and Library Studies. A second example of this was Prairienet at the University of Illinois, assisting with access and computer training (Bishop, Tidline, Shoemaker & Salela, 1999).

Bishop, et al. (1999) examined community information needs, communication channels and computer experiences of people in low-income neighborhoods. This information was a part of the Prairienet and community networking initiative in 1998, which sought to increase participation of low-income residents. Bishop, et al. discussed the relationship between socioeconomic status and the digital divide. They reference Katz's Benton Foundation report (1998) that presents information on low-income communities in the information age, and how: "The information poor will become more impoverished because government bodies, community organizations and corporations are displacing resources from their ordinary channels of communication onto the Internet." (p. 5).

Bishop, et al. interviewed several low-income individuals in their own households on community informatics needs online. Topics mentioned in order of frequency were food programs, legal and city services, local leisure activities and hours of operations for agencies. Second was resources for children, followed by healthcare with easy to understand medical information, educational opportunities for adults, scholarships and tutoring programs,

employment and job listing, neighborhood crime rates and sex offender information. At the time of this article, not many of these services were available online, and less than 10% of those interviewed had a computer with an Internet connection in their homes. Nearly one third of those interviewed had never used a computer. (Bishop, Tidline, Shoemaker & Salela, 1999).

These informational needs were very similar to 1970s-era community information files supported by federal funds. Bishop et al.'s research supports libraries' continuing support for active community engagement and information dissemination. They address the necessity of support for lower income patrons, like those interviewed in this survey, focusing on partnerships with local churches, neighborhood associations and the Urban League. They also encouraged mediated networked information for peers, as well as establishing public access sites in convenient locations (Bishop, Tidline, Shoemaker & Salela, 1999).

The federal funding model of I & R programs no longer exists today, even though it is clear these community needs are still prevalent. Individuals expect public librarians to assist with many varied tasks, more so now that local agencies are outsourcing many of their programs that used to be onsite. Seventy-seven percent of people surveyed in the PEW report on Library Services in a Digital Age (2013), stated that free access to computers and the Internet were very important to them. This ranks third in importance in this survey followed by the more traditional role of borrowing books, and the library staff to assist in finding information (whether that be in digital or paper form) (PEW, 2014). Rural public libraries are highly in need of initiatives for training, as librarians in these areas do not have access to universities and other training institutions that can be hundreds of miles away in other, larger cities.

2.4 The History of Cooperative Library Systems

A review of public library history would be incomplete without examining library system development. Long (2005) examines this history of library development based on funding sources. Childers (1988) defines three types of library systems: Cooperatives, Consolidated and Federated. Cooperatives have the greatest individual member autonomy, in contrast to consolidated systems that have one administrative authority. Childers defines federated systems as something between the two extremes where libraries retain their autonomy but do relinquish some responsibilities to their system.

It was ALA's 1948 *National Plan for Public Library Service* that resulted in the LSA Act of 1956, the funding program targeted at rural libraries. The goal of the ALA was to assist small areas that neglected library service, or did not have library service at all (Sager, 1992). This philosophy informed the advocacy for cooperative library system development in the 1960s and 1970s. The purpose of the library system was to enhance stand-alone rural libraries' effectiveness due to the resource limitations these libraries had. Of particular concern were adequate book collections and cataloging, access to children's services professionals, reference materials and staff. High percentages of volunteer staff had a disproportionate amount of involvement running these branch libraries that were extremely vulnerable to limited local funding. At the time of the library cooperation initiative, 18% of people in the United States were unserved by public libraries, but by 1990, this had dropped to 3%. Sager believes this is due to the emergence of the cooperative library systems (Sager, 1992).

However, Sager (1992) had concerns about systems responding to change, and the fact that systems may or may not adapt to the needs of their members. He discussed the impact of

automation on local libraries and the evolution of interlibrary loan, encouraging systems to look at efficiencies. Donna Riegel, buildings coordinator at the Broward County Library in 1992, had her own concerns about the needs of the underserved. Riegel believed that the technology that prompted systems was making the systems redundant. She states: "The advent of powerful desktops (not to mention laptops and notebooks) …enable even rural libraries to access what only the Big Boys could do ten years ago, or even five years ago. Given this, do we really need to be part of a system at all?" (p. 331). This 1992 perspective, did not anticipate though, how much of a struggle this technology could be for the rural library.

Sager's (1992) article interviews several additional individuals about library systems. Clarence Walters, Director of OCLC at that time, articulated other concerns, stating, "It is important that cooperative library systems continue to develop and extend their role assisting small and medium sized libraries in carrying the benefits of new information technology to those who would otherwise be without access." (p.332). Barratt Wilkins, Florida State Librarian also emphasized support systems for rural libraries referencing the Florida Information Resource Network, a telecommunications network operated by the Florida Department of Education. The department offered to extend its service to all non-profit libraries, and this project had been very successful for public libraries in the state of Florida. Wilkins believed that without that state intervention, library cooperation in Florida would not have happened.

Childers (1988) issued a survey on libraries supported by systems. She found that system counties outperformed non-system counties on volumes added, hours open, registration, circulation, and interlibrary loans. According to Childers, "…system development and support provided additional state-level funding to libraries that would otherwise not have qualified for it. These libraries were invariably small and not well supported at the local level. They have

received benefit from system membership that non-system libraries, have not by definition." (p. 452). Seavey (1988) also conducted a system study in Wisconsin. These findings were similar, reporting increased service levels, with Wisconsin's library expenditures rising above the national average in the 1970s.

However, rural libraries have been experiencing fiscal difficulties for years. Kirks (1989) states that in 1972, urban counties averaged one and one half times higher per capita local government expenditures on libraries than counties in rural areas. Kirks had concerns particularly because school library services were "inadequate or non-existent" and that rural libraries were extremely important to the isolated poor and elderly. According to Kirks: "Third-party money (state, federal and foundation grants) is needed as telecommunications expenses and integrated automation systems acquisition and operating costs are beyond the limited resources of remote, disadvantaged, rural libraries. Without this assistance, rural libraries and their library systems are effectively excluded from state and national library resources." (p.37). Kirks discusses the increased demands for information on self-employment, which is almost twice as common in rural America. His concerns center on the increased demands for information on computers, and high technology occupations (Kirks, 1989).

Finally, there was some discussion about library cooperatives, similar in function to the library systems present in four of the five other states studied here. A 1986 survey of Michigan Public Library Cooperatives found a disparity in those rural libraries surveyed versus the larger, urban libraries. There was some concern in the survey that one of the problems with the cooperatives is funding benefits to small libraries, seemingly at the expense of larger libraries. This reappears in some current library system initiatives, where systems divide geographically instead of by size or population. (Library of Michigan, 1987).

2.5 Funding Issues in Libraries

Funding for libraries has historically depended intermittently on local and federal support. In 1931, the American Library Association made a proposal to Congress to appropriate $1 million over a ten-year period to states based on their rural populations. This funding was concentrated on rural libraries because of the inadequacy of library service in rural areas at that time. This bill did not pass. Many more attempts for federal funding followed that were not limited to rural libraries or considered as part of education bills. However, these too did not pass. (Advisory Commission of Intergovernmental Relations, 1980). Fry (1975) discussed how in 1944, Congress began to create and fund social programs as Americans began to focus on domestic social problems after World War II. Public library support was part of this social funding, and legislators began to discuss the issue of federal aid to public libraries. In the mid-1950s, a meeting of librarians in Washington D.C. conceived the Library Services Act (LSA), which is the beginning point of most modern library legislation. This funding was limited to rural areas, a temporary arrangement until local funding bodies were able to absorb the cost (Fry, 1975). Representative Edith Green from Oregon authored H.R. 2840, the basis for LSA, and President Eisenhower signed LSA into law on June 19, 1956. Green was a strong advocate for federal aid for public libraries, arguing that a need for public libraries existed for educational reasons. President Eisenhower and Congress agreed, supporting an effort to increase library services to these rural Americans, providing an appropriation of 7.5 million dollars for improvement and extension of rural library service until 1961. Rural areas were defined by any population of 10,000 people or less, and states could match this funding on a per capita income

basis. Because rural residents at that time had inadequate or few public libraries, the act was the first step in providing improved service. Librarians allocated these funds for salaries, books and other materials as well as equipment and operating expenses. The only exception was purchasing land and erecting buildings. (Fry, 1975).

According to Fry (1975), the LSA had a significant effect on library service in rural areas. Librarians added more than five million books, with circulation numbers reaching upwards of a 40% increase. Two hundred new bookmobiles brought service to remote areas. In 1960, legislators positioned the act for an extension under S. 2830. Some representatives did not support the legislation because they did not believe that federal funding should support public libraries. The bill passed by a large margin with LSA extended into 1966. This Act continued to appropriate funding for the improvement of library service in rural areas (Fry, 1975).

It is important to note that this funding did not include allocations directed for construction, only operation (Fry, 1975). In 1963, President Kennedy recommended authorization for a three-year program of grants for library construction, planting the seed for the 1964 Library Services and Construction Act, as Carnegie Funds donated by Andrew Carnegie for libraries had been redirected forty years prior. These library buildings were aging, and needed funding to develop their buildings for the growing needs of their communities. However, there were other libraries that needed support, and the act included not just rural, but all public libraries, including schools, colleges and universities. It was due to this change in support that the act was renamed Library Service and Construction Act (LSCA). Again, legislators articulated concern that if the federal government were funding construction, it would be possible that a bureaucrat could dictate which towns could receive funds and the content of the collections of these institutions, a common critique of federally funded public libraries. The response to this

emphasized the role of the library board and their authority over funds and staff who monitored collection development. Several more extensions occurred on LSCA funding after this fact, combining the elements of the construction and services act. This ensured the funding existed until President Nixon submitted his 1974 budget, proposing termination of this grant program to public libraries. This administration believed that public libraries then would be the responsibility of state and local governments and that revenue sharing would be an alternative to federal aid. Librarians had mixed feelings on this issue, wary of having to compete with local services like police and fire personnel. Fry quotes Joseph F. Shubert, the state librarian of Ohio, who said:

> You have two problems (with revenue sharing). One is that the money in some cases has already been allocated and the other is that the general attitude towards revenue sharing is (not to) make long-term commitments. You can't put together systems or regional cooperative operations out of bits and pieces of revenue sharing where you have to get maybe 35 different local governments each to contribute a sum of money to run a $40,000 bookmobile in three rural counties. And not one of these three rural counties can afford to run a bookmobile program by itself. (p.22).

Legislators renewed LSCA despite Nixon's budget recommendation, and the program continued (Fry, 1975).

Both the Reagan and H.W. Bush administrations had a philosophy of smaller federal government, and worked actively to have LSCA and all federal funding for libraries removed (Fuller, 1994). Reagan proposed zero funding for LSCA every year between 1983 and 1988. When this did not pass, the administration shifted its focus to replace LSCA with a program called Library Improvement Act (LIA). This new legislation would have reduced the federal role in library funding (Fuller, 1994). The Bush administration attempted this same legislation with the Library Service Improvement Act (LSIA). According to Fuller, although both presidents

proposed these reductions, neither seriously pushed the agenda, which may have contributed to the lack of success. Organizational and interest groups were also a factor, as ALA formed relationships with advocates like the National Education Association (NEA) and the American Federal of Teachers (AFT). The ALA also formed collations to support the Emergency Jobs Appropriation Act (PL- 98-8). This partnership resulted in a $50 million library construction grant as a provision of LSCA (Fuller, 1994). These combined coalitions had broader goals of social equity and opportunity, key American values that appealed to many generalist legislators (Fuller, 1994).

LSCA morphed into the Library Services and Technology Act (LSTA) under President Clinton in 1996, shifting the focus from construction to technology (Advisory Commission on Intergovernmental Relations, 1980). The George W. Bush presidency was supportive of this act, likely because Bush's wife was a librarian. LSTA saw key increases despite the fact that much of the domestic discretionary spending was restricted. In FY 2008 state grants were increased by $10.6 million, national leadership grants for libraries were increased by $556,000, recruitment of librarians for the 21st century had an increase of $3.16 million, Native American library services was increased by $143,000 and there was an increase of $1.54 million for library policy, research and statistics. This was not long lasting, though, as the Obama administration made steep cuts to these programs. (American Library Association, 2008).

In addition, librarians have not always used LSTA funds for technology related initiatives within the states. Many rural libraries do not receive a great deal of this money, and if they do receive supportive services or resources, they are targeted at all libraries and do not always meet their specific needs. LSCA, on the other hand, had more funding dedicated to social equity and

construction programs that better met the objectives of communities with special needs (American Library Association, 2008).

Kathleen Molz (1973) believed that LSCA was not meeting the needs of rural libraries. If LSA/LSCA/LSTA were to manifest into another program, that program again could be targeted to the rural libraries it was originally meant for, Rural libraries and the ALA must take a more aggressive stance in forming common coalitions that would support this funding, much as LSCA did during the presidencies of Reagan and Bush. ALA support for the Universal Service Fund is one-step in this process, but taking this funding to the next level for rural libraries is critical for ongoing service.

This debate over federal and state funding of public libraries continues today in some form or another. Federal money continues to have proposed cuts, most recently with the proposed 2015 budget that was $2 million dollars short, and public libraries are increasingly relying on local funding which is also being diminished (American Library Association, 2012c). This can take the form of elimination of maintenance of effort legislation as discussed earlier, or simply diminishing federal money through federal programs that address targeted need-based areas in communities. It has created challenges for public libraries on many levels, especially as digitization has become more prevalent. According to Mossberger, Tolbert, and McNeal (2008) policies that support digital citizenship are underfunded and piecemeal. Public libraries typically receive a very small amount of direct federal funding for their branches, mostly through small grants funded by the library services and technology act (LSTA) administered through the states.

LSTA is one of the only federal funding programs for public libraries. The Institute of Museum and Library Services (IMLS) administers this funding, and the states distribute it. There

is a requirement for a state match, of approximately three to four dollars for every federal dollar invested. Many of these grants include support for special needs accessibility, literacy, digitization and preservation and technology (American Library Association, 2015). Even though public libraries do rely on these services, the administration of the program itself is challenging. According to Bertot, McClure and Jaeger (2008), LSTA has complicated requirements and grant guidelines. Larger system-wide grants are more successful, leaving more individualized and smaller rural public libraries with unmet individualized needs.

Another federal program that schools and libraries can apply for is the E-rate program, coordinated by the Universal Service Administration. Bertot, McClure and Jaeger (2008) found that half of public libraries do not apply for E-rate funds. Reasons for not filing included the application process being too complicated, and the funding not worth the time it takes to apply. Bertot, et al. also mentioned compliance with the Children's Internet Protection Act (CIPA) as a deterrent to applying for this funding, mainly due to the cost and expertise necessary to maintain the necessary filters involved for content regulation under the act. This mirrors the Public Funding and Access statistics where 45% of rural libraries applied for the discount vs. 59% of urban libraries (Information Policy and Access Center, 2012a). For a rural library that may want to apply for a LSTA or E-rate grant, for example, they may have to rely on their system staff or consultant to fill out the application.. For those public libraries who already have technology support through a system, it is a possibility that the system has rules against individual adoption of filters due to maintenance and other local issues. This will also be a roadblock to receiving federal funding (Bertot, Jaeger, Langa & McClure, 2006).

State funding has also been problematic, as historically this has been extremely diverse. According to the Advisory Commission on Intergovernmental Relations (1980), the states have

not played a major role in library service provision as they do with higher education. According to Joeckel and Windslow (1948), certain states were better supporters of their public libraries than others, and a reliance on local funding to some degree was always present. They state:

> In 1946, the extreme range in expenditures was from $1.24 per capita in the District of Columbia to .03 in Mississippi... But marked differences are also found between states in the same geographic regions. Some degree of national equalization of these greater differences between the states in library support must be a major concern of library planning. (p.30).

This has not changed over time. Data from 2008-2009 shows that certain states drastically diminished state funding for libraries. New Mexico's legislators cut state revenues by 44.9 percent, Alabama's by 32.8 percent, Florida by 30.7 percent, South Carolina by 23.5 percent, and Kentucky by 16.9 percent and Arizona by 16.9 percent. Overall, in this time the 51 state library agencies collected $34 million dollars less for state library funding in the 2009 fiscal year. The biggest losses in absolute state revenue occurred in Florida with a loss of $14 million, New York with $5.6 million, Alabama and Georgia with $3.9 million, South Carolina with $3.4 million, Pennsylvania and New Mexico with $3.3 million, and, finally, Kentucky, Hawaii and California with $2.4 million (Henderson and Lonergan, 2011). Despite this, state aid programs have historically provided more than twice the amount of funding than the federal government provides (Advisory Commission on Intergovernmental Relations, 1980).

2.6 Telecommunications History: The Post Office, Telephone and the Internet

As the telecommunication needs of public libraries are growing, it is important to trace the history of the technology and infrastructure of the Internet in comparison to other infrastructures vital for a functioning society. Richard John is a historian and communications scholar at Columbia University who studies infrastructure development. Innovations, in John's

(1995) opinion, are dependent on government support. He discussed the steamship that British admiralty subsidized, and the telegraph financially supported by Congress. John notes that from 1906 until present, several generations of historians and social and cultural critics have downplayed the government institutional influences on technological innovations and civic ideals.

2.6.1 The Postal Service

The Greeks and Romans established democratic regimes in which the major political decisions were made by the portion of the citizenry that could take part in public affairs—those who lived in the cities. If someone wanted to participate in public life, s/he would need to relocate to urban areas to get important information. According to John (2010), this may not have been completely inadvertent, as often times political and religious leaders have labored to prevent people from securing access to information.

John's earlier work discussed the postal service as a "great link between minds", that gave access to ordinary Americans to get information about the wider world that they could obtain no other way (John, 1995). According to John, historians saw the post office as an agent of change and one of the most effective elements of civilization. John saw the post office as critical for freedom of press and the dissemination of information. Unfortunately, what made this service so critical also made it vulnerable—a state owned monopoly that had censorship power. John gives several examples of this occurring during the Civil War when politicians feared certain documents would incite slave revolts. This fear led to mail censorship in many cases.

2.6.2 The Telephone

The telephone is a structure much like the post office, a critical infrastructure for communication. According to Horwitz (1989), the telephone industry in the U.S. has had alternating periods of monopoly and competition. In the 1880s monopoly period, Bell's service developed quickly in metropolitan areas. However, there was competition in the markets of the smaller rural areas, with the establishment of more than 4,000 independent telephone systems by 1902. Bell utilized its political power to diminish the growth of independents, refusing to interconnect these companies into the long distance or local network. However, these techniques were largely unsuccessful. It was in 1899 that AT&T, the long distance division created by Bell, acquired the assets of the Bell parent company (Horwitz, 1989).

In 1907, AT&T began a moderately successful campaign to buy out many of these independent telephone systems. By 1912, 65% of independent telephones connected with the Bell system. Theodore Vail, president of AT & T at this time, began to talk about the redundancy of infrastructure build-out, referring to the telephone as a stabilizing force, or "natural monopoly". He maintained that competing telephone systems ate up resources and were duplicative (Vail, cited in Horwitz, 1989). According to Preston and Flynn (2006), Vail's conception of universal service was different from the modern egalitarian definition. It was actually used as a strategy to neutralize criticism of AT&T's advocacy for a telephone monopoly (Preston & Flynn, 2006). Mueller (2011) also shares Preston and Flynn's perspective on Vail's definition of universal service. Muller believes that Vail wanted to diminish the role of these independents. This was because a person who was subscribed to a competing independent carrier, could not call a friend or family member who was an AT&T subscriber. Universal service, then, meant one telephone service for everyone.

According to Horwitz:

> In telegraphy and telephony, regulatory policy meant acceptance of monopoly...AT&T was permitted to exercise monopoly control over long distance voice telecommunications and to operate local monopoly telephone operating companies. In return for not interfering with the industry's monopoly status, the FCC could enforce common carrier legal obligations. It could command mandatory interconnection of carriers and change carriers... to serve all who requested service. (p. 127).

The FCC then required all new telecommunications services under common carrier regulation in AT &T's control (Horwitz, 1989). In exchange for the exclusive rights in the more lucrative urban areas, they were also to develop the less lucrative rural ones.

The Telecommunication Act of 1996 replaced the Communications Act of 1934. It was expected that competition would succeed, decreasing the need for FCC involvement. Aufderheide (1999) discusses the deregulation initiative of 1996, when communications and media interests influenced legislation. The Telecommunications Act did set up specific guidelines for universal service criteria, something not included in the 1934 act. Section 254 outlined several principles of universal service including quality services being available at *reasonable and affordable rates*, access in rural and high cost areas including *advanced telecommunications and information services that are reasonably compared to those services provided in urban areas,* and *access to advanced telecommunications services for schools, health care and public libraries* (Federal Communication Commission, 1996). Graham and Marvin (2001) discuss uneven telecommunications markets, where competitive models benefit the large telecommunications companies. However, what responsibility do the telecommunications companies have to those without access? Schiller (1996) discusses how the 1996 act instead of fostering competition only resulted in creating mergers with the largest companies. According to

Aufderheide (1999), "…very large media firms became much larger, without either offering new commercial services or expanding their social obligations" (p.102).

2.6.3 Telecommunications Act and the Internet

According to Crawford (2008), the Internet required that telephone companies provide services on a basis of "common carriage," not discriminating against anyone wishing to connect to the network. Consumers could attach a modem and get a dial up service at a flat rate allowing their computers to act like phones. However, cable and wireless companies acted as private networks without regulation and were unhappy that cable modem providers had an unfair advantage. In 2002, the telecommunications companies then fought to have their own regulatory obligations removed. Telecommunications company representatives feared they would not grow if they did not have control over their networks as the cable companies did. In 2005, the FCC issued the Wireline DSL order so that network operators providing DSL, Fiber and Cable communications to be categorized as non-common carriage.

Kozak (2015) discusses the fact that common carriers not only cannot refuse to transmit information for message content, they also have to provide access to reasonable prices. Title 2 of the Telecommunications Act has only recently reclassified broadband Internet as a telecommunication service with common carrier status. America's broadband network must be fast, free and open, and according to the FCC, broadband providers have increasing incentive to interfere with this openness. Under Title 2, Internet service providers cannot *block any legal content*, they cannot *impair Internet traffic based on content*, and they cannot *create fast lanes or prioritize content*. The order also requires that broadband providers disclose rates and fees. According to the FCC, the Universal Service Fund will have a partial application of section 254.

While this legislation does not require broadband providers to contribute to the Universal Service Fund at this time, according to the FCC, separate unrelated proceedings are occurring to address USF specific policies (Federal Communication Commission, 2015c).

These policy changes are important as the United States is rapidly falling behind the rest of the world in high-speed Internet connectivity. At the time of this dissertation, the U.S. ranks 17th in the world for penetration behind countries like Uruguay and Israel (Woodward, 2015). Complicating this is the disparity in speeds for each state in the U.S. Bly (2014) claims that in most governments in the world, there is some recognition that communications are a utility, and have implemented regulations and funding to ensure that these services (including broadband) should be available. In the United States, some legislation is addressing this gap, particularly in rural areas where the incentive to creative an infrastructure is not lucrative enough without support.

2.7 The National Broadband Plan and Universal Service

The FCC published a National Broadband plan in 2010, which called for transforming the Universal Service Fund from supporting legacy telephone services to supporting broadband communication service. This was controversial to many individuals in the legislature. Heated discussions about the necessity of the Universal Service Fund continued to occur among supporters of a completely free market telecommunications system. Many wondered if the government should have any role at all in a free market economy. Some also questioned the Internet as a necessity that would warrant the use of government funding (Hart, 2011).

In the National Broadband Plan, the FCC was tasked with determining a detailed strategy to make broadband affordable, and to maximize use of broadband for things such as education,

job creation, and health care. The FCC highlighted three keys to broadband adoption—*affordability*, *access to service with capabilities that are sufficient*, and *literacy skill development* to take advantage of broadband access. Part of this plan included having access to anchor institutions like schools, public libraries and hospitals (Federal Communications Commission, 2014).

2.8 Universal Service vs. Access

According to Prasad (2013), a universal service policy is dynamic in nature. Prasad discusses shifts in technology and markets that create policy obsolescence. He advocates for the use of state funds when externalities make markets ineffective. Sawhney (2000) discusses the concept of "consumption norm" where citizens cannot function effectively without the communication technology. Preston and Flynn (2006) argue a society not meeting a consumption norm is in violation of democracy, a two-tiered society with the unconnected being isolated from their communities.

Preston and Flynn (2006) illustrate this concept by referencing Marshall's (1950) focus on basic dimensions to citizenship rights. Civil rights encompass freedom of speech, movement, thought and ownership of property. Political rights give individuals the right to vote in elections or hold office. Social rights include everything that allows an individual to participate actively in society, including economic welfare and security. This mirrors the United Nations Universal Declaration of Human Rights.

According to Preston and Flynn, the reason that advocates of universal service have made slow progress with their arguments is that it has not been a committed policy goal. The lack of consensus even over the definition of universal service causes problems in forming a

justification. Preston and Flynn believe it is critical to answer this "why" question with consumption norms and citizen rights as a universal service justification (Preston & Flynn, 2006).

Some scholars have attempted to define universal service. Prasad (2013) advocates USF funds to act as a supportive structure to national broadband policies, complementing them and addressing groups that the current market is failing. However, Prasad differentiates between universal service and access, stating,"... the policy should clearly differentiate between areas that need universal service (service to every household) and those that can do with universal access (service provided through community centers). Areas with very low potential should start with universal access alone" (p.231). Prasad does not specifically define low potential; however, he does equate this with large rural areas globally. Universal access is a concept especially important when looking at public libraries as these community access points. In areas where service to every household is challenging, having universal access is a starting point for infrastructure build out. Gilder (2000) examines failed universal service in remote places like Alaska, where permafrost and cold make it impossible to extend phone service to the hundreds of households in the northern coastal regions, where the cost could reach between ten and thirty times as much as service does in cities. There are areas that are so remote that phone and Internet services are extremely challenging to connect to every home. This would be a scenario where institutional access could be a starting place.

It is tempting, according to Sawhney (2000), to symbolize universal service and not think through connectivity in a concrete and realistic way. He states that we need to go beyond seeing information as a strictly democratic force. He is wary of universal solutions, warning against "mistaken notions of information egalitarianism." Community-based solutions for information

and participation from local people are critical in getting clarity of the current problem. This is important because, according to Mossberger, Tolbert, & McNeal (2008) rural regions may have the most to gain from broadband.

2.9 Community Informatics, Digital Citizenship and Social Capital

Community informatics is a discipline generated from the larger umbrella term of social informatics. Community informatics is "the interdisciplinary study of the design uses and consequences of information technologies that takes into account their interaction with institutional and cultural contexts" (p.1). (Kling, 1999). Kling discusses community informatics going beyond business and government settings to the third realm of social activity. Community informatics practitioners are in public libraries, but also in a range of economic development activities in private, public or nonprofit areas. At times, the library itself is a grassroots, community organization, one of the only local establishments that a community might have. Putnam and Feldstein (2003) discuss this very issue in their book *Better Together*, where they focus on the North Branch of the Chicago Public Library. The library is between two contrasting neighborhoods--one in a wealthy area along Lake Michigan and the other in what was the low income housing area of Cabrini Green. The interaction of these two communities is one example of social capital. These communities came together at the North Branch, interacting through programs like homework help, computer classes, and book discussion and writing groups with attendees from both neighborhoods in a safe and familiar environment (Putnam & Feldstein, 2003).

The Internet, once thought to be the library's demise, has become another source of community integration for libraries. In the mid-nineties, several organizations participated in

research and created Internet labs. *Project GAIN* was one example of this, where several partners funded Internet initiatives in rural northern New York. These projects brought together schools, libraries, and community groups, as they were able to access information not available to them before (Senkevitch & Wolfram, 1995).

One study examines Dunn County, Wisconsin, where researchers found small non-profit organizations struggling with promotion and Internet literacy as it pertains to social media and their organizations (Bogner, Tharp, & McManus, 2014). The small case study examines the issues that local nonprofits have with navigating social media, and the low usage of ICT technologies in their communities. AmeriCorps volunteers collaborated with the University of Wisconsin, Stout to study this phenomenon over a two-year period and determined that small nonprofit organizations (NPOs) were in need of digital literacy training and skills, which was a larger issue than the connectivity levels itself. Libraries in rural areas fill this role in their communities that need point of service assistance.

According to Ferguson (2012), if public libraries are to generate social capital, they need to do several things, including develop their capacity as meeting space, work with voluntary associations, and develop their current role as the providers of universal public services. This concept only works when public libraries serve the needs of all. Historically, this community role has existed in more urban libraries, as Mary Lee Bundy discusses. However, rural libraries have fulfilled this role as well, particularly in areas where the public library might be one of the few public places that exist at all.

Johnson (2010) discusses the key importance of social capital in public libraries and asks if the library contributes to social capital and civic engagement. She examined a Midwestern community of around 600,000 people (with over a million people in the surrounding suburbs).

Individuals from the community filled out a questionnaire at a table set up at library branches at different times of the day, and different days during the week. Johnson compared this population to a random sample of city residents. She concluded that although there is no way to prove causality between library use and social capital, a relationship does exist. The sample of library users differs significantly for social capital than the random sample, showing higher levels of trust and community involvement.

2.10 Broadband and Libraries

Rural public libraries have important roles in addressing community information needs. It is in this capacity that librarians function as a change agent in a library that is a key point of access (Senkevitch & Wolfram, 1995). In areas of declining income levels, high unemployment and population loss, access to online education, job applications, and e-commerce can be beneficial to these communities. In the mid-1990s, Miles Fidelman, president of the Center for Civic Networks talked about this issue, discouraging rural users from settling for low bandwidth access. He emphasized social equity, as rural areas are slower to adapt to innovation (Fidelman, 1995).

This is especially true in rural public libraries where there is less access to workstations, high-speed connectivity and wireless Internet for patrons who own computers. There are large differences between accessibility in rural public libraries versus non-rural public libraries, with the rural public libraries more likely to have lower levels of broadband connectivity. Along with broadband issues, some public libraries are running out of space to provide additional public access workstations. These same public libraries also struggle with resources to maintain and upgrade workstations that are already in existence (Information Policy and Access Center,

2012b). Seventy percent of rural public libraries do not have a formal computer replacement schedule, compared to 30% of their urban counterparts (Information Policy and Access Center, 2012b). Vollmer, Clark and Davis (2009) state that some public libraries declined when offered a grant to obtain a high-speed broadband connection because of the inability to pay for increased ongoing costs or equipment upgrades.

2.11 Digital Literacy

Several scholars discuss digital literacy in their research. According to Ellen Tise, former president of the International Federation of Library Associations (IFLA) (2012): "At no other time in the history of information provision has there been such a dire need for public libraries to drive access to knowledge and information. The exponential growth of information, fueled by the exploitation of media such as the web and social networking demands that there be a mediator with the skills and capacity to extract trusted and authentic information." (p. 17). Darryl M. West (2005), public policy professor at Brown University, discusses some of the barriers to access alone, citing the fact that the average government website requires an eleventh grade level of reading comprehension. This occurs despite the fact that half of the U.S. population reads at less than an 8th grade level. Between 21-23 percent of Americans are unable to read complex instructions or comprehend a few pages of text. This limited literacy can cause a barrier to Internet use (Kaestle, Campbell, Finn, Johnson, & Mickulecky, 2001). Hargittai and Shafer (2006) observed participants' ability to search online independently for jobs, political candidates and tax forms. Fifteen percent of these individuals failed to complete the tasks, even with limitless time to retrieve what they were looking for. This could be due to a myriad of issues, including familiarity with Internet resources, or minimal basic literacy skills. Rural

communities are particularly vulnerable to digital divide issues. Warren (2007) discusses a "digital vicious cycle" where digital inclusion and social inclusion combine to create a more challenging situation for rural residents. According to Warren, solutions for the urban poor, do not work as well for vulnerable rural populations, as they lack participatory processes and peer-to-peer support within neighborhoods. Warren gives the example of a friend who may help an elderly woman send emails to her family, or a neighbor who helps a single mom without transportation order items online for her children. Individuals learn from collaboration with other individuals, or "digital intermediaries" and lacking this support system can be an additional challenge for rural populations.

Jessamyn West (2011) talks about the digital divide that continues to exist in the population. She identifies public libraries as important in this divide, and goes beyond seeing the library as just a point of access for individuals to use the Internet. Instead, librarians are active participants in digital literacy tasks. According to Lankes (2012), as governments withdraw direct support to social service agencies, public libraries are increasingly picking up the slack as a public contact point. As more e-government and other critical services move online, responsibility shifts from the government agency to the community member who is to actively attempting to do things that they used to be able to do directly within the walls of an agency. Examples of this include filing taxes, FEMA forms, and Medicare applications. Many people who come to the library own home computers that they could utilize, but need assistance with this process. It is in this regard that government assistance shifts from the office itself to the library (Lankes, 2012). This transition of government services is an illustration of a consumption norm. Community members cannot function in society without access to the Internet, where most e-government resides. Filling out tax forms, Medicare and social security and job

applications are all things that community members need to do to be a functional member of society.

Bertot, Jaeger, Langa and McClure (2006) examine consumption norm issues in their article about public access computing in public libraries. Although public libraries have had the role of being the central public Internet access point within their communities for some time, it is becoming especially prevalent now as a wide range of government services are moving online. As federal, state and local government agencies migrate their services, they often do not offer community access points for these services. This is a recent role for the rural librarian, without supportive additional funding from the federal, state or local government. In fact, there are policies that affect the ability for the library to function in an e-government context. Jaeger and Bertot (2009) recommend that if public access computing and Internet access in public libraries are to continue to function, there needs to be an ongoing means of funding, and this should be a government priority. This is important because as agencies shift the burden of e-government to public libraries, they reduce their own cost.

Another issue is the shift toward more knowledge intensive industries. Mossberger, Tolbert and McNeil (2008) examined the movement away from manufacturing, which is creating a demand for higher levels of education as well as technology use. Technology use on the job is associated with greater wage increases, while the use of the Internet for distance learning is also associated with higher weekly earnings, particularly for less educated employees. These are all areas where the Internet is becoming a consumption norm.

2.12 Library Connectivity Surveys

There has been a great deal of research done through a collaborative effort between the American Library Association, The National Commission on Libraries and Information Science, and The Bill and Melinda Gates Foundation. Since 1994, fourteen national surveys asked questions about the issues of Internet connectivity in the public library. This longitudinal data tracks trends in Internet access and public access computing provided by public libraries to their communities. In 2006, *The National Public Libraries and the Internet* series of surveys became part of the larger *Public Library Funding & Technology Access Study* (PLFTAS), where the Information Policy and Access Center manages the public library section of this bigger study (Information Policy and Access Center, 2013).

The survey sampled several populations to meet objectives, including providing library branch/outlet, system, national and state data in regards to Internet connectivity and use. It also examined E-rate use, BTOP/BIP funding and library operating and technology funding expenditures. The survey researchers obtained data to determine whether the library was urban, suburban or rural. The most recent study completed between September and November 2011 consisted of 7,252 responses with a response rate of nearly 83%. This, in combination with the varied locations of the branches/outlets, increased the generalizability of the findings.

The 2004 and 2006 data examined in Jaeger, Bertot, McClure and Rodriguez (2007) emphasized the fact that 99% of public libraries are online. This was broken down on a state-by-state basis, with an examination of the best and worst connectivity and access levels. Five states appeared in the top ten for both years for the number of workstations per library. These included Florida, Indiana, Georgia, California and New Jersey. Virginia, Kentucky, Rhode Island and

New Jersey had the highest level of public access wireless Internet connectivity per outlet, while Washington DC had the fewest workstations per patron request. As far as sufficiency of connection at all times, Georgia, New Hampshire, Iowa and Illinois had the most satisfactory levels in 2006, while Virginia, North Carolina, Alaska and Delaware were insufficient most of the time. Only 14% of public library outlets reported that there were always sufficient terminals to meet patron needs. In 2006, the states with the highest amount of E-rate discounts included Louisiana, Indiana, Mississippi, Minnesota and Tennessee.

Bertot, McClure, Wright, Jensen and Thomas (2009) presented the information from the 2008-09 study in a report integrating public library outlets and survey responses. These surveys addressed more than just broadband issues, but gave a general picture of how public libraries are faring in recent times. Some of the findings included problems such as rural public libraries experiencing closures and hours cuts, as well as issues with technology service. High poverty areas and rural areas experienced greater decreases in computer workstations, and were least likely to have computer replacement plans or to get computers running again after they were out of service. This could be because more rural public libraries than urban libraries did not have access to technical staff, and relied on library directors for their IT needs. Of note was that the poorest marks on these technological issues came from rural public libraries.

One finding from the study was that public libraries continued to increase wireless capabilities as more than three quarters of public libraries supported wireless access. However, managing access points and updating routers posed an issue. There was significant data about the management that occurred when there was a shared connection. Here again, rural outlets dominated the category of being most likely to share connections and use no management techniques to alleviate traffic. One salient statistic that primarily affected rural libraries was the

lack of network management. The researchers found that sixty-four percent of rural public libraries had no network management at all, an enormous number when compared to larger urban libraries that have internal IT staff managing the network. Finally, nearly sixty percent of public libraries reported that their connection speeds were insufficient to meet needs some or all of the time (Bertot, McClure, Wright, Jensen & Thomas, 2009).

In March of 2014, Real, Bertot, and Jaeger (2014) released an analysis of this longitudinal data specifically addressing rural libraries. The parameters for rural service populations were 25,000 people or less, a definition consistent with what the American Library Association considered small or rural. Their findings from the survey focused on why rural libraries have less access to broadband and how they are compensating for this, why the rural libraries offer less training and patron support, what policies help rural libraries close the digital divide, and the effect of financial discrepancies on service levels as it pertained to technology. According to the surveys, rural libraries on average have weaker technology infrastructures, both with fewer computers and slower connectivity and less support for digital literacy than libraries in urban and suburban areas.

2.13 Conclusion

What is the role of government in infrastructural development, and when does an infrastructure become so critical that it moves from a private good to a merit good? Historically, there are definite instances where the market leaves behind the most vulnerable, making the development of these infrastructures one of social justice. This is true in rural areas where individuals do not have access to basic telecommunications services. This is especially

challenging in the United States where a market model dominates many perspectives, and where neoliberal criticisms of new and existing public service models continue to be prevalent.

Even if a service is determined to be a merit good, the development of infrastructure can be complicated. Is an individualistic model one that meets the need in the most appropriate way, or does a community or institutional model become the most effective method of insuring the best access for all? Complicating the matter further is the issue of community feedback. Once an infrastructure is a public service model, individual communities have a limited voice in how the development of the infrastructure occurs. This phenomenon has occurred throughout industries such as the railroad, the postal mail and the telephone. The concern is that the same will happen with the development of Internet infrastructure.

One important issue is the role of the library as public sphere. Although the concept of a virtual public sphere is still controversial, it is becoming increasingly apparent that the Internet is critical for daily functioning in society. For those who do not have access due to infrastructure or financial reasons, it is important that there is a community access point to obtain information, participate in a democracy, and to discuss critical issues with other citizens. The public library plays an important role not just for access, but also for assistance and training in digital literacy.

The focus of this dissertation is two-fold: 1) focusing on connectivity levels in public libraries, and 2) examining the role of the librarian in digital literacy. This will occur with the backdrop of infrastructure development and funding levels in rural areas, looking at what strategies librarians are using to cope with their new technology roles and challenges. States have different funding philosophies, with a large amount of variance in local funding. Due to this fact, it will be important to determine strategies that appear to be working to create better connectivity levels. Building on some of the connectivity surveys by The Information Policy and Access

Center in some of these states, this survey and interview process will expand upon how rural public libraries can continue to meet the needs of their users, in the most effective way possible.

Chapter 3: Methodology

The study's primary aim is to examine different funding structures in five states, and analyze the impact of this funding on technology access and infrastructure. In order to reach this goal, feedback from library directors in their public libraries, as well as from system IT and networking staff where library systems exist is critical. Many library directors may not have access to technological issues that are occurring behind the scenes to make their networks functional, so it was important to include system staff in the study. Research questions in this study were most appropriately answered using a mixed methodological approach combining surveys with detailed interviews and document analysis. The research obtained this information in two steps – initially with the survey to cover a larger amount of a specific rural library population, and secondly selected interviews, to get a richer picture of the survey responses.

3.1 Mixed Methodology

According to Creswell and Plano-Clark (2011), mixed methodology can be challenging, as it requires the researcher to be familiar with both qualitative and quantitative approaches. However, mixed methodology can be ideal as it encourages the use of multiple paradigms (Creswell and Plano-Clark, 2011). The population of study was rural public library directors, employees and any applicable systems that are responsible for the technology needs of those public libraries. The research design most appropriate to this study was that of an explanatory design. According to Creswell and Plano-Clark, an explanatory design obtains both quantitative and qualitative data. The research explored the topic in both ways because of the need to explain why certain trends are occurring.

Creswell and Plano-Clark (2011) discuss the first step, where the researcher implements a "quantitative strand" which is used to collect and analyze the quantitative data in a study. The second phase, then, identifies the specific quantitative results that need explanation. According to Creswell and Plano-Clark, these quantitative results will guide the development of the "qualitative strand". It is in this regard that the qualitative phase will depend on the quantitative results. These qualitative results add insight to the quantitative results, but rely on collecting one type of data at a time (Creswell and Plano-Clark, 2011).

3.2 Institutional Review Board Approval

The researcher obtained approval from the Institutional Review Board in two phases--the first phase discussing the quantitative phase, and the second, the proposed qualitative phase. This was amended and re-filed in a second phase based on results, as the data collection evolved from the results of the first phase. The first phase began with a survey methodology, utilizing a modular survey instrument to differentiate questions directed at systems and library directors, as these were slightly different. These surveys were sent in email format using Qualtrics (www.Qualtrics.com), the university's survey instrument platform, as well as a paper survey via postal mail to libraries without an identifiable email address. The researcher sent surveys to library directors in the states of interest, as well as system staff members.

3.3 Selection Process

The samples in this study were of varying sizes. The qualitative component relied on a self-selected subset of the survey respondents who volunteered to participate in a follow up interview. The American Library Directory, a comprehensive subscription-based service that

lists all public libraries in the United States, provided the information for the public libraries selected for inclusion in the study. This database includes information such as population served, type of institution (public library vs. system), staff members in major areas of the library, annual circulation numbers, percentage of funding sources (federal vs. state and local), databases subscribed to, hours of operation, year established, amount of professional versus paraprofessional staff, and type of automation system utilized.

The US Census does not provide a specific definition of rural areas, only urban areas. This limited the rural libraries selected to those located within municipalities of less than 10,000 residents. It was important to examine not just at population data in the search but also the population of the surrounding county itself. This is critical because an urban county could have a variety of smaller suburbs within the county. In order to address this, the researcher utilized data from The United States Department of Agriculture (USDA) Economic Research Service (ERS), which uses rural-urban continuum codes, distinguishing metro and non-metro counties. USDA defines codes 0 to 3 as metro and 4 to 9 as non-metro counties. These codes eliminated suburban areas that are close to large, urban centers. The researcher obtained the data via census, and via downloadable spreadsheets from the U.S. Department of Agriculture website that lists the Rural-Urban Continuum Codes (U.S Department of Agriculture, 2015).

3.4 Sample Size

Based on this data, the researcher compiled a list of survey recipients, initially including any municipality or system that has a population or service area of less than 10,000 people, in non-metro counties in the five selected states. This initial sample pool included library directors and system directors. Sample sizes for each state were determined according to Connaway and

Powell's (2010) *Table for Determining Sample Size from a Given Population*, to increase the validity and reliability of the samples

As library system staff may have a different office than a physical library location, the researcher sent surveys to those administrators individually in emails to ensure they received the survey. Follow-up emails and letters sent to specific public libraries and systems two weeks after the original survey served as reminders to the libraries. An institutional dissertation grant covered the expenses required for copies and stamps.

3.5 Survey Questions

According to Connaway and Powell (2010), survey research does not allow the researcher to manipulate the independent variable, and provides very little control of the research environment. It is because of this that surveys are not capable of establishing causal relationships. Surveys make it possible to study large numbers and geographically diverse samples, which this research has examined. These surveys represented experience surveys because they gathered and synthesized the experiences of practitioners in a field. However, by including both directors and IT managers of systems and library directors the surveys also permitted the collection of data from parallel samples..

It was important to group the questions with one module geared towards library directors, and the other toward system directors and technology staff because public librarians' primary customers are library patrons, while library systems' customers are the librarians themselves. The survey questions were also grouped by types of information sought. This particular survey looked at demographic, technological, staffing, patron and community issues, collaboration of

resources and funding. The modules for system staff versus public library directors were slightly different in the language used and applicable questions.

Demographic inquiries on the survey included the length of employment with the library or system. The researcher did not ask questions about additional education or library/technology degrees during the survey stage as someone who has more experience in the everyday function of the library might have a greater experiential knowledge of that particular library that can be shared. However, educational data obtained in later interviews supplemented the earlier data. The demographic portion also addressed participant interpretation as to whether or not they considered themselves rural, urban or midsized.

The second portion of the survey examined technology-related issues within the library itself. This piece was modular within states--one survey for system staff if applicable, and one survey for library directors. This area was a self-assessment of computer access and functionality, and it was perspective-based. However, in surveys directed at library system IT departments, there was the potential for monitored data to support issues. These include broadband ceiling maximum charts, and other quantitative data. Library directors also potentially had access to this type of information via local servers or specialized login sites. To examine these topics, survey questions addressed if there are any particular times computer slowdowns occurred, and whether or not there are modifications in procedures during these slow times.

Librarians were best equipped to answer local budget issues, however in many cases system staff had access to this information and provided it. The researcher directed questions about replacement plans to library directors as these the directors would often negotiate these plans through local funding bodies. However, sometimes library systems do directly fund

hardware and software for their public libraries as specialized grants or negotiated replacement plans. The library technology staff at the system level also addressed the computer specifications needed to run their ILS and their local software (if shared) and whether or not many of their public libraries met the current specifications. An example of this would be the loss of support of Windows XP. Since some systems shared a network, they may have certain rules as to how certain public libraries participate. These rules may determine whether computers that do not meet specifications can continue to be a part of any shared network due to security and other issues. It is of interest to get both perspectives in case this is an access burden for public libraries that struggle financially. In some states, local systems required technology plans, thus creating goals with which some rural libraries struggled.

Both system and library staff had a unique perspective on computer additions based on the bandwidth availability at each branch. If librarians noticed slowdowns that influence purchasing decisions, systems may work with them to encourage certain hardware purchases or shared discounts. Some of the more technical, behind the scenes assistance included network segmentation, the division of a network within or across libraries, so bandwidth is not shared and tiered computer updates when automatic updates are available. On the public access side, library directors might create a local policy and informal rules like not scheduling a large laptop lab class during bandwidth bottleneck times after school, or blocking an individual who is consistently utilizing a significant portion of the bandwidth on a public computer or laptop. To address these issues, the survey included questions about the association between the addition of public use computers and connectivity speed, and the influence of purchase decisions on current speed levels.

As some public libraries are part of a consolidated local system within a county, library directors had the potential to have additional information about their various branches and their connectivity concerns. Asking about consolidated system membership and branch connectivity addressed some of these issues happening within systems. This was important, as several library directors spoke about more than one library for their survey answers. This portion included several questions about speed differences between branches of a county or city municipal system. This was a minor challenge in the survey that was expanded upon in the follow-up, open-ended questions and face-to-face interviews. Consolidated municipal systems, however, are rare in the five states studied here.

To address the patron aspect of this topic, the researcher gathered responses from library directors on whether or not they received patron feedback on speed or connectivity, as well as system feedback about patron impact on the system. Also addressed in this section was how the library mediated some services required by their communities, which is important when examining consumption norm issues. Some questions in this area included inquiries about patrons' usage of the library for e-government services like taxes, Medicare, social security or unemployment benefits. Another question addressed whether/how library staff assist individuals with these processes.

The next section of the survey involved training issues. With more continuing education and coursework now offered online, rural public libraries can experience challenges with streaming audio, video or meeting software such as Go to Webinar, Collaborate, and some others. Already geographically isolated, these public libraries may find that web platforms may offer training that is more effective. However, this was potentially challenging in areas with

poor access and little bandwidth. Some of the questions asked in this section addressed topics such as the impact of connectivity speed on access to online continuing education and how libraries address these issues when they occur. Another issue addressed was online versus traditional training opportunities and how they are handled. The research slightly modified these questions for system staff as well, as library systems were often responsible for continuing education and technology training. If system public libraries were not performing and in need of technical support, the system should be aware of this and be able to speak to how issues are resolved when they occurred.

The next area of the survey examined resources and collaboration. The questions addressed how public libraries are using their systems, and these questions were mainly in the library director modules. Library systems serve different functions for different libraries, so it was important to determine what functions the systems play in assisting public libraries in their technology, funding and training needs. In this collaborative section, it was important also to address some connectivity portals funded via the system, state or school. Wisconsin is one state that has these networks heavily supported and maintained by library system staff. Library directors and system staff can answer questions about this collaboration and how it affects information access. Resource and collaboration issues can also overlap into funding as there may or may not be a financial impact of gaining or losing these services.

The final section of the questionnaire focused on funding. Most states do fill out annual reports with funding breakdowns; however, it was important to get a perspective from library directors as several issues and challenges cannot be expressed in state annual reporting. The questions focused on government assistance or grants for connectivity, payment for this

connectivity and costs not covered by these funding sources that public libraries might have to absorb locally. As for the financial area, questions addressed the receipt of any grants for connectivity in the past five years in addition to the typical operating budget. There were follow-up questions included to find out if the connectivity increase had any associated costs not covered by the additional funding. The survey also asked about who pays for the library's Internet connectivity. Addressed in this section are whether or not the library receives state funding at all and whether the public libraries have to make payments to other systems or public libraries for services. This is another technology funding issue, and one that can create hardship in many rural areas. A list of the survey questions for both the library director and system modules is located in Appendix A and B.

3.6 Interviews

The second phase was more qualitative in nature, in order to get a thicker and richer picture of the answers provided in the actual survey. Given (2007) gives recommendations when choosing to do qualitative research as a library and information studies (LIS) professional. She recommends that researchers select methods that best suit the LIS question. In this particular case, it was beneficial to get qualitative information to supplement the less detailed responses from the survey itself. The interview questions expanded on the survey questions about connectivity, and some of the more detailed timelines of events after the fact.

According to Connaway and Powell (2010), both structured and unstructured questions are important. The questions in these interviews were a combination of these, confirming some survey answers, while also eliciting new information not captured in the survey. The researcher interviewed participants who volunteered after they completed the survey. This was a challenge

because those who did follow-up might be the individuals more likely to have certain traits, such as fewer time constraints or a stake that could create bias. However, gathering large amounts of data increased the generalizability of the findings.

It was important to establish rapport as much as possible, and to be flexible with times and places of interviews for those who may not want to meet at their place of employment or their homes. Word of mouth and snowball sampling did occur in the interviews via recommendations. Many times, the most knowledgeable individual was not a director and IT administrator, but instead a staff member who has the technical knowledge and has taken initiative in this portion of library services.

3.7 Supporting Documentation

Connaway and Powell (2010) examine the differences between primary sources, testimonies or firsthand observations that lie closest to the event, and secondary sources, everything written about the past, including histories, journal articles and textbooks. Primary sources in this research included statutes to determine differences in legislation across states, annual reports, and budget reports. Statutes provided supplementary information for some of the different funding issues discussed. Other primary documents included information from state committees working towards legislative change and advocacy for public libraries. These were included as well.

3.8 Data Analysis

Quantitative data from this particular survey was analyzed using primarily descriptive and some categorical analysis. Descriptive statistics summarize and describe the data suggesting

relationship, however, it will also be revealing to look at some of the data using inferential statistics. According to Connaway and Powell (2010), survey analysis involves a process of coding the responses and placing them in the appropriate category, while tabulating and performing statistical computations. They discuss the importance of creating the necessary categories before the data is collected, and that these categories should follow four rules. First, the categories should derive from a single classifying principle, which will align with the research question. For example, when measuring self-assessment of computer speed, the overarching category is computer speed, with the categories listed under that umbrella being divided into areas of improvement, decline, or staying the same. The second concept is that the categories should be exhaustive, with the ability to place every observation in one of the categories. If a large percentage of observations are categorized under "other", it will be necessary to create another category that is a better fit. The third issue is that categories within each set should be mutually exclusive, not placing an observation in more than one category. Finally, good knowledge of the subject and likely responses should guide the development of these categories. This can be challenging to anticipate, but response prediction may be possible with enough information.

Categorization of all qualitative answers may not be possible. However, the researcher utilized categorization with the beginning portions of some of the questions without the more qualitative follow-up portions. This included how many years the individual was employed with the library or system, if the library is considered a rural, urban or midsized library, whether or not the public libraries have enough computers, and the average age of computers in areas. Other questions that yielded themselves to categories were whether or not the library has a replacement plan and if the library experiences slowdowns due to heavy public computer use. Another set of

questions included whether or not the connectivity speeds have gotten better or worse historically and if connectivity speed is adequate in the opinion of staff and patrons. There were a few questions with multiple-choice answers like frequency of webinar attendance, techniques to alleviate slow speeds by the staff, and system use for technology. The conversion of new data to numerical codes SPSS followed category creation data assignment to each category. Chi-square analysis was used for these easily categorized questions, as there were two or more categorical variables to compare. Because the majority of data was nominal, without any meaningful rank or order, Chi-square was the best choice for analysis. If any of the tests for association showed that the expected and observed values are different enough to be significant at the .05 level, a Cramer's V test determined how strong the effect size was. The researcher used SPSS software (version 21) to analyze these categorical trends and Excel to create visual presentations.

After this initial analysis, interview participants were selected and scheduled. Version 10.0.3 NVIVO and manual coding occurred concurrently with the interviews. After the interviews were conducted, the last months of research included analysis of the results holistically and completion of the open coding process. The documents were analyzed with close readings to compliment the information received from both the survey and interviews. Utilizing all of these sources gave a more complete and rich picture of the issues of literacy, funding, rural broadband and universal service.

3.9 Design Challenges

There were a few challenges with this design. One issue was survey response. Librarians, like many professionals, receive many emails requiring their assistance with surveys, but they

also get large quantities of email from their own staff members, committees they are a part of, and listservs to which they belong. To attempt to combat this issue, the researcher sent a combination of written surveys and email surveys to maximize return rates. Email reminders were also sent.

Ethically, it was important to ensure the confidentiality of the participants in the study, as much of the data gathered was sensitive, potentially endangering respondents' jobs or damaging the relationships with other librarians or political bodies. A librarian that criticizes her/his local library or county board, for example, might experience disciplinary action for this kind of communication. The researcher did not request names and personal information unless the participant was comfortable leaving this information public. This information was kept on a password-protected computer, and the researcher was the only one with access to it. Names and data were held in separate locations to ensure that the data was not altered or traced.

There are some limitations of the research, including the fact that only a few representative states were selected for each type of funding examples. Complicating this were the unique factors that may occur in other states that are not addressed in this particular study. However, this area requires further research to make the results more generalizable to the rest of the United States.

It is the hope that these research findings will inform practice, offering recommendations for technology and access issues for libraries and communities. As funding cuts continue, librarians will need to utilize their resources to create a better model for information access to those who are not currently connected. Comparing funding programs and resulting practice may highlight areas for future examination both in research areas and within practice.

Chapter 4: Results

4.1 Pilot Study and Preliminary Work

Fifteen library directors who completed the Qualtrics survey as a pilot study provided input on the questions asked. The researcher recruited individual utilizing the Public Librarian (PUBLIB) listserv. Librarians in other states also distributed the email to those they knew who did not subscribe to the email list. Pilot participants were then able to look through the questions and make recommendations for any unclear wording, or any additional content that they felt needed explanation in the questions. Two individuals from underrepresented states and two county library directors were also recruited by personal email to get a perspective from libraries with multiple branches. The researcher modified the questionnaires and forwarded them to the IRB for approval based on the feedback and comments from the pilot study participants. At the time of this initial pilot, all libraries with populations of under 10,000 people were recruited, not just the ones later limited by the rural-urban continuum codes.

Concurrent with this modification process, all five of the state library representatives from Nebraska, Kansas, Michigan, Illinois and Wisconsin were contacted by the researcher to see if they would be able to encourage librarians in their state to complete the surveys sent. Three state representatives did agree to do this, but two expressed hesitation due to fear of survey fatigue and not having the ability to support every survey by researchers in the area.

4.2 Participant Data and Recruitment

In January 2015**,** the researcher downloaded lists of libraries serving fewer than 10,000 people from the American Library Directory, followed by a comparison analysis with the rural-

urban continuum codes listed on the USDA website. Once this was completed, the researcher created a new list of participants that met the criteria for a population of fewer than 10,000, and in a non-metro county continuum code. The total pool of qualifying libraries was then narrowed down to approximately 545 libraries with 122 libraries in Nebraska, 80 libraries in Michigan, 110 libraries in Kansas, 114 libraries in Illinois, and 119 libraries in Wisconsin.

After identifying libraries, comprehensive searches were conducted for library websites in each state. The researcher entered contact information for every library into a spreadsheet. Wisconsin and Nebraska had the most comprehensive email address availability online. Wisconsin had a lengthy email list located on the Department of Public Instruction's website, and Nebraska had a searchable database of websites that had contact information for all the libraries in the state. It was extremely challenging to obtain emails for libraries in Michigan, Illinois, and Kansas.

Due to the poor availability of email addresses for library staff in Kansas, Illinois, and Michigan, supplementary survey links were sent through Facebook (if a library presence was located). The researcher also sent paper surveys with a notation that the participants did not also have to fill out the paper survey if they had filled the survey out online. Eleven other paper surveys were sent to libraries for which emails were returned as undeliverable.

4.3 Library Director Survey and Interviews

Several individuals contacted the researcher in the five states after the survey completion in response to the inquiry about participating in interviews. Of the five states, the researcher scheduled three interviews in Wisconsin, four in Michigan, five in Illinois, two in Kansas and two in Nebraska. The majority of respondents found that a lengthy phone call would be a

hardship due to the nature of their rural library and not having time off-desk for discussion. The researcher also found face-to-face visits to be helpful to see the library environment firsthand, something that may not be evident in phone or Skype interviews alone. For those libraries, in person visits were planned for the end of February 2015. At that time, the researcher visited Wisconsin, Illinois, Michigan, Kansas and Nebraska to meet with library directors at their branches. There were 16 formal interviews scheduled, with representatives from each state. Visits were made to several libraries that had not responded to interview requests for conversations, tours, and brief observations along the driving route. There were 14 of these visits as well. The researcher assigned participant numbers for clarity in the reported findings.. These numbers were derived from the type of response (I for Interview, S for survey), the state the respondent was from (I for Illinois, K for Kansas, M for Michigan, N for Nebraska, and W for Wisconsin). The last number was the identification code of the Interviewee. As far as system staff coding, the researched coded the abbreviation Sy for system, followed by the state and identifying number. These numbers are in no special numerical order, and are provided only to identify one survey or interview participant from another.

4.4 Library System Survey and Interviews

The researcher sent surveys to library systems in the five states after the library director interviews and surveys were completed. However, in many cases, these library systems did not have connectivity information about their member libraries. This was because most libraries used local ISPs for their connectivity, and there was no management or participation by the library system. It was beyond the scope of this research to contact these private entities. Despite this being the case, the researcher sent surveys to any library systems and/or co-ops in the five states.

The pool was small, as some states had only two rural systems (Illinois) or four systems (Nebraska). The researcher coded this data and used in a supplementary manner for any additional insights by the staff in these systems. The research contacted only systems serving rural areas, including twelve in Wisconsin, seven in Kansas, two in Illinois, nine in Michigan, and four in Nebraska. There was at least one respondent from each state including one respondent from Illinois, three from Nebraska, six from Michigan, seven from Wisconsin, and two from Kansas. Two survey takers—one from Nebraska and one from Michigan did not fully complete the survey. While the overall response rate was over 50% for the system portion of the survey, some individual states had higher-level responses, with Michigan at 56% and Wisconsin at 58%. Both Illinois and Nebraska had a 50% response rate, but Kansas only responded at a 29% rate. These numbers did not count the individuals who dropped out early in the survey. In addition to this, there were three interviews conducted, for Wisconsin, Kansas, and Michigan systems. The researcher conducted these interviews via phone, as most system individuals had private office space.

4.5 Research Questions

The survey and the qualitative interviews addressed the following research questions with the quantitative and qualitative perspectives divided to answer best each question by this categorization.

RQ1: What is the impact of targeted federal broadband programs in rural public libraries?

RQ2: Is there a funding model that is most effective for rural public libraries in terms of computer access and speed?

a. Do rural public libraries with state funding have increased broadband speed and improved access to electronic information?

b. Are the availability and the particular division of Universal Service Funds related to broadband speed and improved access to electronic information?

RQ3: Are librarians opting out of government systems to pursue private assistance with connectivity when available?

a. How do these private telecommunication interests impact connectivity in rural areas?

RQ4: What is the role of the librarian in digital literacy in rural libraries?

4.6 Response Rate

There were 153 responses to the online survey, with 51 replies from Wisconsin, 37 from Nebraska, 17 from Michigan, 19 from Kansas and 29 from Illinois. In addition to these, there were 69 written surveys returned with 30 of these from Illinois, 15 of these from Kansas, 22 from Michigan, and 2 from Nebraska. The total number of surveys returned was 222 from the initial sample pool of 545, for approximately 40% return rate. This differed between each state where Illinois had a 54% response rate, Kansas with a 31% response rate, Michigan with a 49% response rate, Nebraska with a 32% response rate, and Wisconsin with a 43% percent response rate (Table 1).

Table 1

Survey Response by State

State	Number of Valid Responses Received	Percent
Illinois	59	26.6
Kansas	34	15.3
Michigan	39	17.6
Nebraska	39	17.6
Wisconsin	51	23.0
Total	222	100.0

Utilizing Qualtrics as a software tool, the researcher downloaded and divided the data into categories. After receiving all of the data, and entering it into SPSS, the researcher completed a Chi square analysis to look for relationships among the states and the responses of the library directors on the surveys for questions that involved tallies. The interview data and some open-ended question data for the library director and library system feedback was coded, with two interviews coded by another doctoral student for intercoder reliability.

4.7 Computing and Connectivity Speed Reports

Before addressing the specific research questions of interest, it will be important to first report on computing and connectivity findings, which influence the research question findings. The library director survey addressed several questions about Internet connectivity speed at the library. The purpose of these questions was to assess speed of the public PCs, the staff PCs, and

some of the self-reported speed assessments by patrons. Overall, there was a great deal of concern with the speed of the computers, especially during busy times in the afternoon. The first question emphasized speed in a general way, looking at public access in the library.

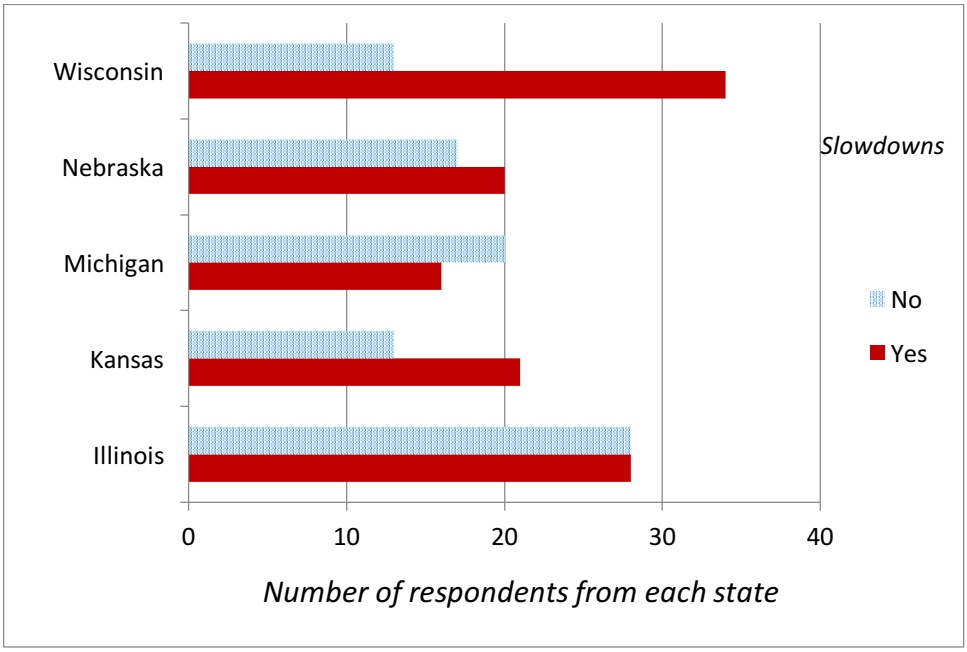


Figure 1. Do you ever experience public computer responsiveness slowdowns when patrons access the Internet?

A total of 210 respondents answered yes or no to this question. Twelve individuals responded that they did not know the answer to the question. It is important to look at the data in Figure 1 to see that there are clear differences between the perceived speed values, particularly affirmative slowdown answers in Wisconsin and Kansas, in contrast, with perceived speed in the other states. There were issues with slowdowns within the open-ended survey questions as well. One library director from Michigan stated in the survey:

> If the library is closed and I had planned to get some extra work done, I give up and go home. If we are open, I need to either use the backup program for circulation (which will then require uploading what I have done once the Internet is responsive) or I

> write down bar codes. If this is the case, I cannot catalog, cannot work on grant applications, etc. As for what the patrons are attempting to do, they can't do anything. Sometimes they are applying for Social Security, taking exams, etc. Very frustrating for all of us! (In fact, I just attempted to go on to the next portion [of the survey] and got an "unexpected error" message. That's how my day goes) (SM1)

The researcher also compared library directors and system staff responses. System staff were asked, "In your opinion, have some member libraries experienced slow broadband speeds?" Of the sixteen respondents who answered that question, 100% said yes. The same held true for the question: Have any of your libraries ever experienced staff computer slowdowns due to heavy use of the public computers? Eighty-eight percent (15 of 17) of respondents answered affirmatively to this question.

Some libraries divided their networks so bandwidth was not shared. Because of this, the survey asked about the librarian's perceived speed of staff computers. The majority of librarians in each state reported that they have not experienced staff computer slowdowns due to heavy use of the public computers as noted in Figure 2. It is possible that this could be due to some sort of network segmentation, as reported in the system surveys. Four of the five state systems mentioned assisting libraries with implementing procedures to combat broadband limitations. Kansas and Wisconsin had the highest reported rate of assistance in the system surveys, with both Kansas respondents answering affirmatively, and five out of seven Wisconsin respondents doing the same. The Nebraska and Michigan systems did report helping to assist at times as well, but less than 50% of the respondents gave an affirmative answer to this question. However, when asked specifically about network management, Wisconsin was the only state that reported system staff would try various methods to help alleviate network slowdowns (blocking

bandwidth heavy websites or IP addresses, etc.); although no formal, policies on this assistance were mentioned or located.

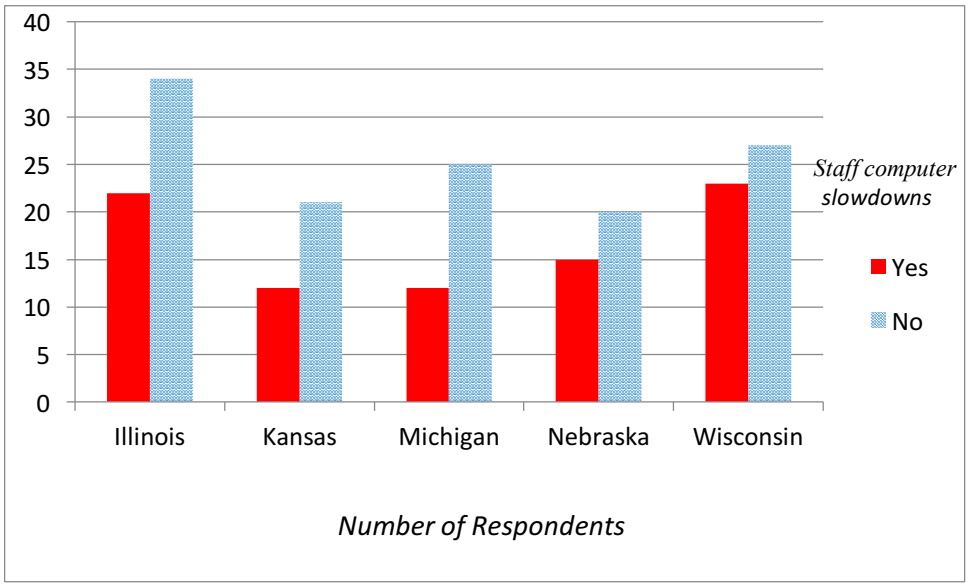


Figure 2. Have you ever experienced staff computer slowdowns due to heavy use of the public computers?

The third question asked if patrons communicated computer speed issues to staff. Many of the respondents stated that this was not the case, but for those who did have these discussions with their patrons, there was a mix of answers as to the nature of these conversations. Some of the supplementary comments as to the specifics of these conversations yielded some interesting results. A few librarians indicated that the arrival of fiber optic infrastructure made a speed difference that was highly noticeable and increased conversations related to speed and connectivity. Some patrons asked librarians which company they received access through, as they could not get any connectivity at home and wanted to check on the status of availability. There also were noted conversations about low speed, and an attempt to discuss this with patrons playing games, etc. Staff mostly initiated these conversations. One Wisconsin director referenced

an online game that caused some connectivity issues, stating, “The game...it was sucking up all the bandwidth, upload speeds. I said, you guys just can’t do this because you are knocking everyone else off. So, it works ok, it’s just one of them plays and then the other one can play after...it’s a father and daughter.” (IW1) One librarian surveyed in Illinois sums up the issue holistically: “Living in a rural community we are just used to disruption in service. Our patrons know they just have to be patient or they come back later.” (SI2)

Table 2

Speed Reports by Patrons

State						Total
	No communication with patron on this issue	Mostly positive	Mostly Negative	Combination of Negative and Positive	Other	
Illinois	45	4	2	8	0	59
Kansas	15	3	3	13	0	34
Michigan	22	8	1	6	2	39
Nebraska	26	2	2	9	0	39
Wisconsin	28	4	9	9	1	51
Total	136	21	17	45	3	222

Although there were very few patrons that discussed Internet connectivity speeds with staff, there were some differences between the states on these types of discussions. Michigan experienced mostly positive discussions on speed mainly due to reported enhanced fiber

development in rural areas. Librarians reported that since the new fiber infrastructure was accessible, patrons were noticing positive differences with connectivity. Wisconsin librarians reported the highest level of negative patron connectivity discussions among the states as speeds did affect many tasks. However, librarians expected better connectivity levels when the Universal Service Connect America Fund (CAF) fiber build out was completed in 2015 (Federal Communications Commission, 2015a). Many libraries reported a combination of negative and positive conversations when discussing these issues with their patrons (Table 2).

Figure 3 represents the responses to the open-ended question of when computer slowdowns take place. There were definite similarities between states. When asked about computer responsiveness slowdowns, the most frequently reported reason for all participants was during peak hours after school between the hours of three and six pm, or when single or groups of patrons were using a great deal of the bandwidth playing online games, watching movies, or downloading large files. However, there were some issues mentioned less frequently that did influence speed in the opinion of the library director. Seven directors mentioned weather along three librarians from Michigan, and one from Kansas mentioned problems specific to Wi-Fi when multiple people brought in mobile devices. Three librarians from Illinois, two from Wisconsin, one from Michigan, and three from Kansas were frustrated with their local service, which did not have the speed or reliability that the library needed. Five librarians mentioned that they accepted slow speeds as a part of doing business, but were more concerned with total losses of connectivity randomly and for no given reason. One issue, seemingly specific to Michigan, was slowdowns in connectivity when the west coast began to experience peak times. It is possible that this is due to specific servers or vendors (Figure 3).

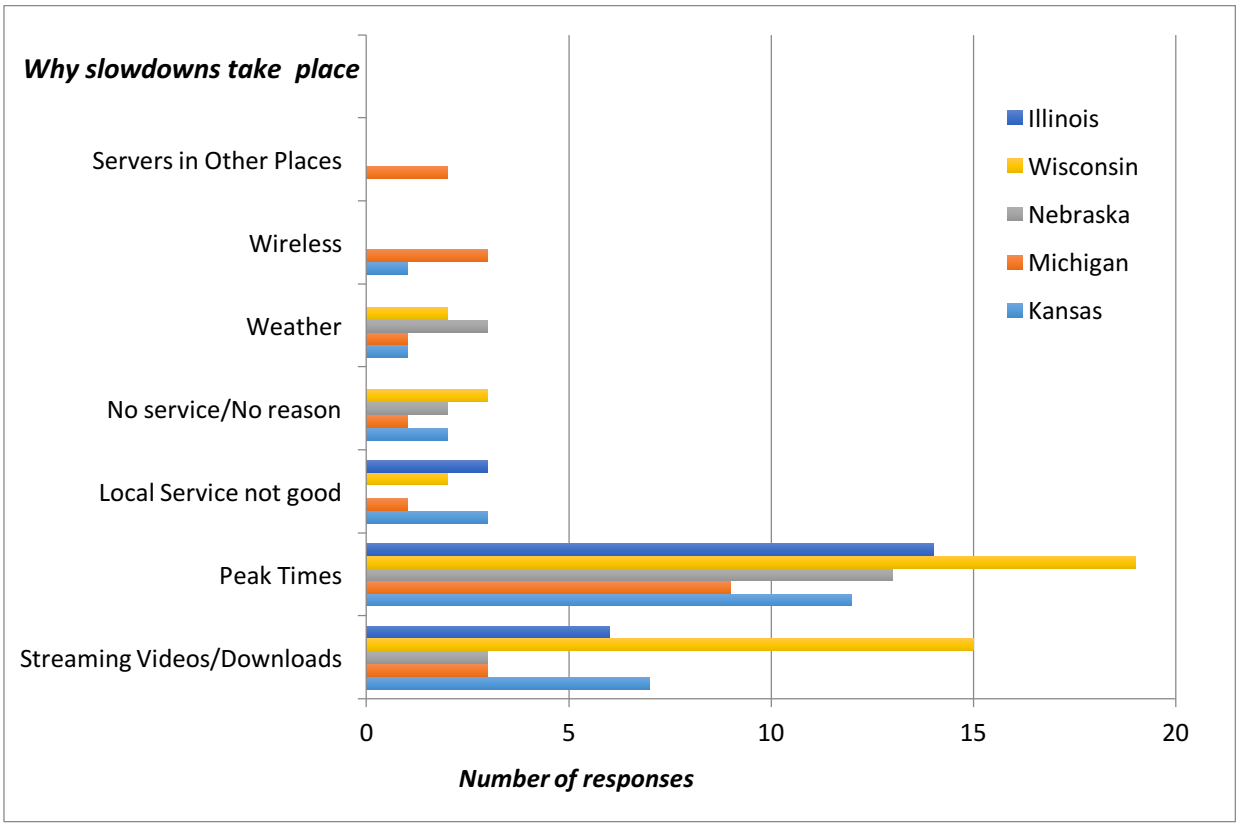


Figure 3. Do you ever experience public computer responsiveness slowdowns when patrons access the Internet? If yes, why does this take place?

A sub-question on the survey asked what the librarians did when slowdowns occurred. Interestingly enough, most of the open-ended feedback was workflow-centered for the librarian and the impact of the slowdowns on the staff computers. Three librarians said that they completed their work on paper; four said they would forgo all computer-related tasks and catch up on shelving or something else. One librarian mentioned putting off cataloging materials. However, some of the solutions involved patron management. One individual stated that she "Limited the number of people allowed to play an [online] game to one person" (SW5) while another "asked the boys to stop playing games." (SN3) A third individual stated, "We don't normally change many procedures unless someone is clearly hogging bandwidth- updating a

GPS, for example. Then we ask them to disconnect and finish during our slower-traffic times." (SW1)

Due to the remainder of the open-ended system survey data having a larger response rate, the researcher selected structural (or utilitarian) coding as a method to look at some of this particular open-ended survey data. According to Saldana (2013), structural coding is appropriate for research that has multiple participants, and is particularly suitable for interview transcripts and open-ended survey results. This type of content-based coding categorizes the data by commonalities, differences and relationships between segments. Structural coding relates the information to the research question and identifies larger segments on topics that are broader based on frequency (Saldana, 2013). When modifying procedures for broadband speed issues, the researcher divided the open-ended data on system assistance into four major themes. Definitions of the categories noted are provided in the appendix glossary.

These themes, along with specific examples were ten mentions of network segmentation with sub-themes including staff computer priority, bandwidth shaping (regulating network data transfer for higher performance), router settings, IT staff monitoring and adjustments, IP priority (for staff computers), and scheduling of bandwidth. Four individuals mentioned waiting it out or having no intervention including issues such as lack of a shared ILS, lack of an impact on patron services from cooperative library system, libraries independent from system/co-op for bandwidth, apologizing to patrons, and financial issues. Three individuals mentioned blocking sites and limiting use by throttling popular streaming sites (blocking), limiting patrons' Wi-Fi connections, and limiting torrents (large audio or video downloads). Four respondents responded in the category of recommendations and education. Issues that were mentioned included sharing

technology information, preventing users from throttle distribution, recommending separate networks for staff and public, and working with vendors to set up bandwidth schedules by controlling bandwidth in real time.

Those interviewed were an IT manager from a Kansas system, a director of a Wisconsin system and the director of one of the Michigan cooperative library systems, an entity contracted by local libraries to assist with technology and connectivity-related tasks. These interviews were valuable because they filled in some of the detail and supported much of what the public library directors were saying about technology assistance. One Michigan co-op technology staff member stated:

> They (rural libraries) are doing it all. And some of them, they know a little bit so they are able to contract and get some local assistance but others not so much, it really depends on where they are. One of the challenges is that they'll go get someone to help them with their tech and then that person will go away to college or they'll get another job in a different community and so they're not there … for the follow up. Or trying to buy new computers…like there are a lot of libraries around this time last year (May, 2014) that were still running Windows XP… and so it was we need an upgrade. What do we choose? How do we do it? (ISyM1)

When asked about the libraries this co-op staff member serves, she emphasized that most of her time is spent with the more rural libraries that need her help much more than the larger libraries. She stated:

> The bigger libraries, sometimes I don't see them at all. They don't need the professional support. I just speak with the librarian and so what my members need, it varies by day. I've had an email this morning, "call me ASAP". One of my members had a little tricky situation and she wanted to talk to make sure they did it right.

The survey questions yielded information about the role that some systems play in technology for their member libraries. Fourteen out of seventeen system participants stated that

the system/co-op staff make recommendations to member libraries for computer purchases. The library's available bandwidth speed did not influence computer recommendations, as only two participants changed their recommendations based on speed levels. In some of the open-ended questions, it was clear that having a myriad of different member libraries would make this very challenging, and many times, there were other factors involved with computer recommendations that did not only include the current speed. Only 3 out of the 17 participants stated that there were technology replacement plans to which libraries had to adhere. The three participants who answered affirmatively were not limited to one state, but instead included Wisconsin, Nebraska, and Michigan.

When library directors were asked if speed was better, worse or stayed the same over the past two to three years the responses mainly stated either the speeds were the same or better than what they were. A high rate of Wisconsin participants indicated speed improved. This was also indicated in the interviews, as much of Wisconsin was in the midst of a fiber upgrade when this research was being completed (Figure 4).

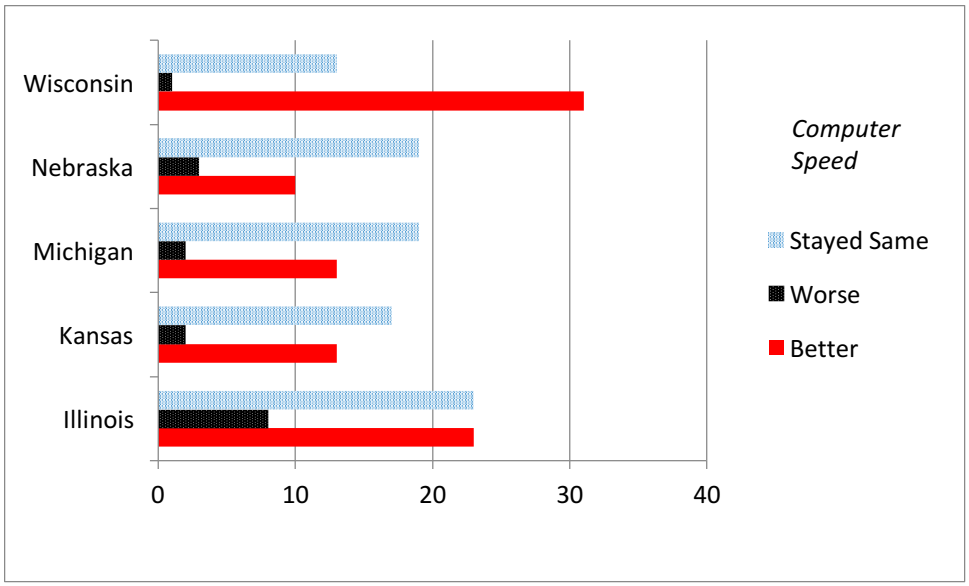


Figure 4. In your opinion, has your computer transmission speed gotten better, gotten worse or stayed the same over the past 2-3 years?

When the survey asked library systems this question, the majority said that speeds had gotten better, with eleven reporting improvement and three saying that speeds stayed about the same. None of the system respondents stated that speed got any worse.

A follow-up question asked why the librarians believed this occurred. The responses were extremely challenging to categorize, however, there were unique issues that occurred in each state. Fifteen librarians in Wisconsin mentioned the fiber project build-out as a reason for improved speed. A few participants in Wisconsin also mentioned an increase in the bandwidth they were allotted by their library system (moving from three Mbps to 10 Mbps, for example). A few individuals mentioned BadgerNet, a shared network that the majority of schools and libraries opted into in the state of Wisconsin. One individual reported increased speed by opting out of BadgerNet connectivity, while another individual reported increased speed by opting in to BadgerNet. Other positive changes included router replacement, network segmentation and

increased library system assistance. Three individuals mentioned opting into a library system's T1 or cable line, which made a positive speed difference.

In Illinois, one participant mentioned the overselling that occurred with Internet service providers. In this case, speed was promised to several customers, but because there was insufficient bandwidth to go around, the speed did not actually increase. Librarians mentioned lack of provider choices, as many rural areas only had one or two companies that provided Internet connectivity. As far as positive speed differences were concerned, four participants in Illinois mentioned opting into a fiber infrastructure, while seven individuals mentioned switching to a private Internet service provider to increase speed. Other positive changes mentioned included updates in house (routers and wireless issues) and BTOP grants.

In Kansas, two individuals said that fiber was improving connectivity speed. Articulated positive impact on speed came through library system assistance, as one individual mentioned, along with upgraded wiring. Some negative issues mentioned in the Kansas surveys included increased demand, and the fact that there were few ISPs that wanted to provide service to the area. A concern in Nebraska was that the local telecommunication company would not update their infrastructure, and the fiber optic lines were sitting unused. A respondent in Michigan mentioned this same issue of old telecommunication equipment, as well as the issue of ISPs taking on more customers than they could manage. Some librarians mentioned positive speed increases due to the fiber grant that Michigan received via the BIP program. Finally, a Nebraska librarian mentioned the improvement of speed issues when fiber was developed locally and new computer equipment was purchased in the library. A few mentioned positive speed differences

when opting into the Rural Health Network, which was mandated to provide service to the library through a federal grant.

This same question appeared on the survey to the system staff members. When discussing why they believed broadband speeds have gotten better or worse, several themes and examples emerged. One theme was fiber upgrades. Four responses referenced fiber upgrades as helping with speed issues. Respondents noted positive impacts from programs such as the American Recovery and Reinvestment Act (ARRA) Broadband Initiatives Program (BIP) and Broadband Technology Opportunities Program (BTOP), as well as state fiber upgrades. There were six positive responses related to ISP development and options for technology improvement including private sector cost decline, ISP backbone improvement (data routes between networks), alternative vendors, and increased broadband availability. Respondents noted no impact on speed due to increased use, with a specific reference to after school usage as a critical time of slowdowns. One participant comment related to faster equipment replacements, and another reference for connectivity upgrades in house. These improvements included router upgrades, additional wireless access points and switch upgrades, to keep packets moving quickly.

When system staff respondents responded to why they believed that speeds were improving, one individual stated:

> I think it has been a function of four things. First: I think the ISPs have, over time, had access to more bandwidth available at better costs to distribute to their customer base. Second: the ISPs have improved their network infrastructure. Example: Three independent local telcos in our area of Kansas have installed fiber to the house/library. Third: Libraries are replacing their computers on a 3 to 6-year cycle allowing individual local computers to better

> utilize the library's available bandwidth at faster speeds. Fourth: We have upgraded Local Area Networks (LAN) within the libraries from 10/100MB networks to 1000 MB networks by upgrading local routers, switches and wireless access points (AP). (SSyK1)

It was clear from responses like this that hardware and connectivity were critical issues to examine. This was addressed in the next question section for both the library director and system surveys.

4.7.1 Hardware and Connectivity

A few questions appearing both on the survey and in the interview addressed the need for, and purchase of, computer hardware. These questions asked how equipment could play a role in broadband speed issues. One of the initial survey questions was whether the library had enough computers to meet needs. It appears from the data that there is enough equipment for patron needs as seen in Figure 5. However, there are still many that struggle with equipment needs. Follow-up questions asked why that occurred.

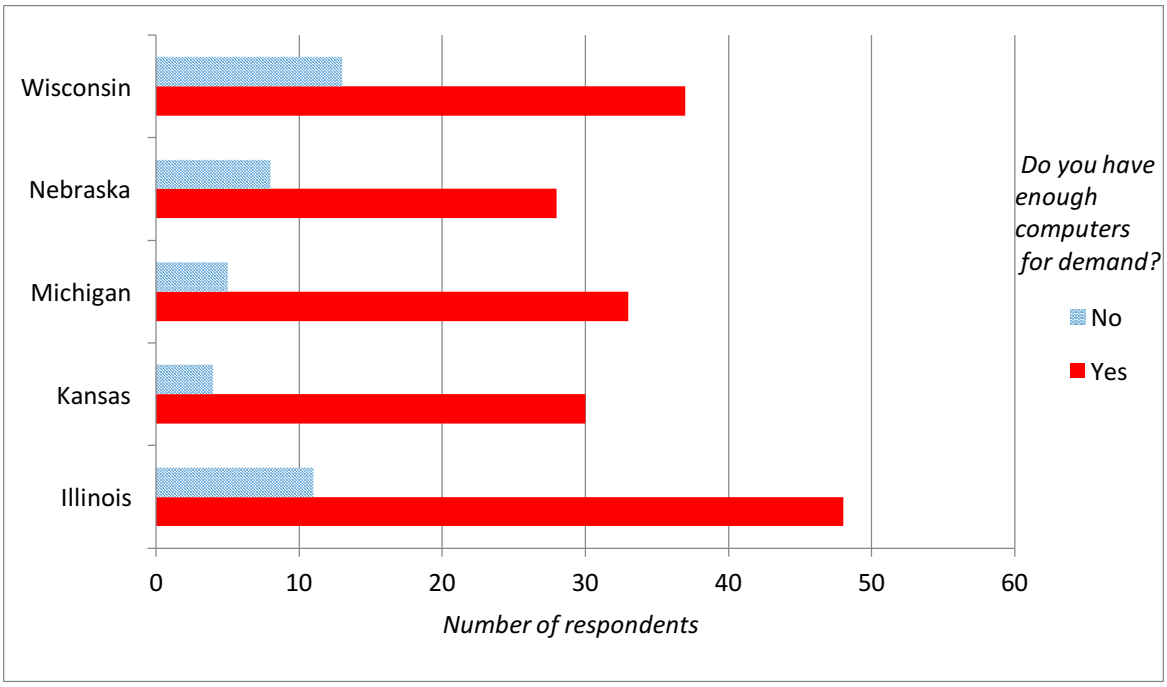


Figure 5. Do you have enough computers to meet your current demand for patrons?

One question posed to both system staff and librarians asked how broadband speed influenced the purchase of computers. Twenty-five out of 116 (22%) library director respondents stated that increased broadband did not have an impact on purchases. This percentage was slightly higher for the system participants that were asked. Of the 13 individuals that answered that question, only six stated that there was a relationship between increased broadband and computer purchasing. One system staff member states, "When I started in 1998, most libraries were using dedicated 56kb data lines with a couple of larger libraries using T1 (1 Mbps) or partial T1 lines (256kb to 500kb). Once Comcast started offering affordable broadband in our area around 2001, libraries doubled or more their PC purchases." Another system member said:

> In some ways they are mutually exclusive - if a library receives E-Rate funding the cost of additional bandwidth is much lower than new computer equipment. Additionally, libraries are

> also feeling the need to upgrade or install Wi-Fi with the rise of BYOD [bring your own devices]. However, there will always be a need for public computing and updated equipment, and in many cases additional broadband is a prerequisite for adding computers. (SSyK1)

When asked about slow broadband speed influencing computer purchases, just over 57% of system staff stated that it made a difference (4 out of 7 respondents). Many of these system staff members believed there were other issues that were more critical to hardware purchases, like budget or space.

There were a number of other reasons why librarians decided to purchase additional or replacement computers. When replacing computers, it was clear that broadband speeds were not critical to the decision to purchase more or fewer computers. Many other issues took precedence. According to one Michigan librarian:

> Even if increased speeds are available it does not always translate to actually what you can access on a regular basis. Also, our income is static, if not decreasing, at the moment. There simply is no funding available. Property taxes are down…and other township projects capture funds as well. We do have a computer line item in our budget but it is mainly to have a service tech come out each month to maintain what we have. We have a computer now that is brand new… however, somehow the Deep Freeze software we were using wasn't active on that unit. A virus crashed the computer to the point that it is unfixable. I had to make a judgment call on whether to fix it now or wait (SM2).

One Kansas librarian surveyed referenced the Carnegie building impacting purchase of equipment. She stated "Another determining factor of whether we get more computers than we already have is the electrical output and outlay of our over 100-year-old building." (SK2) One of the survey questions asked if there have been factors that influenced decisions to purchase more

or fewer computers for the library. If a participant answered yes to these questions, the researcher asked the librarian to give an open-ended response as to why this occurred. These hardware questions were manually coded under two categories: Reasons why the library added and replaced computers, and reasons why the library did not add or replace computers. Libraries that replaced computers did so due to increased usage, the existing computers being old or obsolete, the library needing more mobile technology or the library receiving donations or grants (Figure 6). The libraries that did not replace computers cited reasons such as people bringing their own devices as well as not enough money, space or available bandwidth (Figure 7).

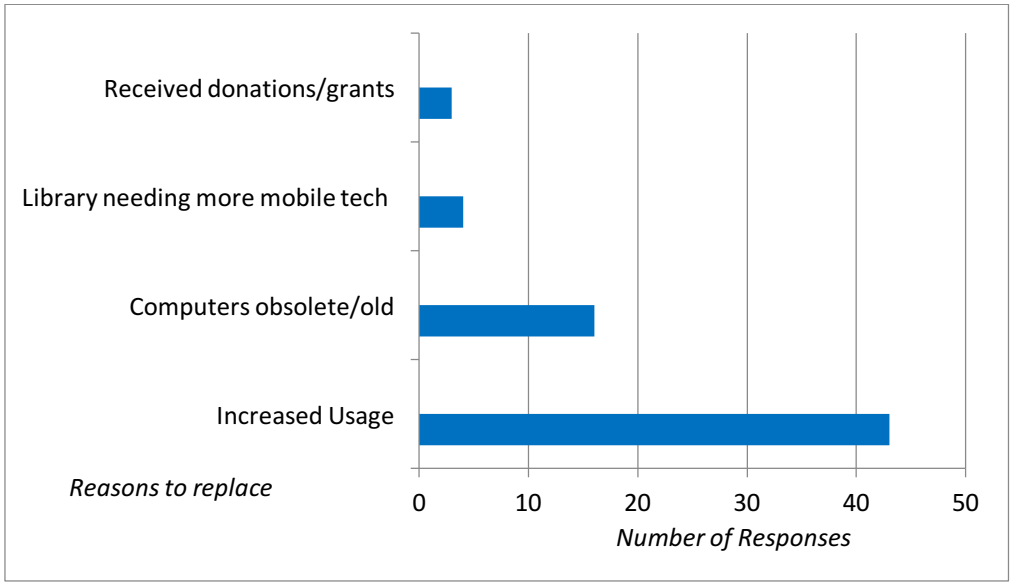


Figure 6. Librarian self-report as to why computers are replaced

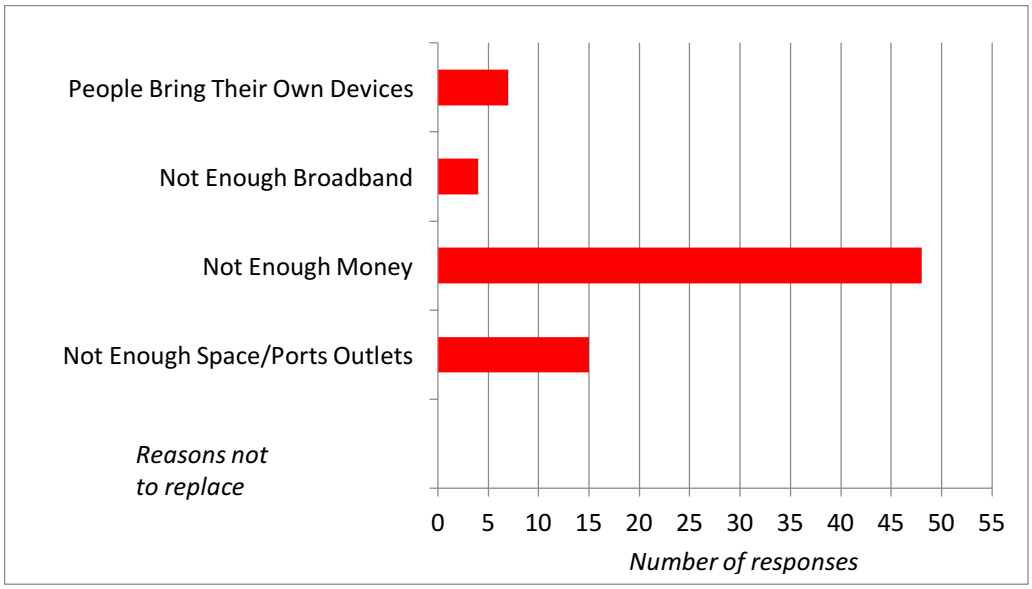


Figure 7. Librarian self-report as to why computers are not replaced

It was clear from both surveys and interviews that space and budget did influence equipment purchases in most of the libraries.

There was an even distribution of the oldest computers still in circulation (5-7 years) across all five states. The dated equipment was not concentrated in one state. The response numbers in this category were not large enough, however, to do a more detailed analysis. When asked a follow-up question about the age of the computers, the responses varied. Many librarians articulated that they had their computers on cycled replacement schedules with the oldest computers replaced every year. These replacement schedules were typically through some type of grant or regular operating budget. Some librarians did mention donations that they received which enhanced their typical technology schedule. However, these donations were not reliable year after year. Librarians also mentioned that they retained computers, but often would repurpose them for other tasks. For example, non-Internet computers could be used for word

processing, or older computers could be imaged to only utilize the library's web catalog, preventing large downloads. These computers then required less bandwidth and processing power. The majority of participants stated that they tried not to retain public Internet computers that were older than 5 years old.

This question led to the issue of budgeted or cyclical replacement plans for the libraries. Many librarians had mentioned this in the open-ended follow-up question regarding the age of their computers. The information from this question supported the large amount of open-ended data indicating that computers were replaced in cycles (Figure 8). A few librarians did articulate in other survey questions that even if a library did have a replacement plan, the money was not always available. One librarian who only filled out a quarter of the survey and did not select her/his state of origin stated: "Just because replacement computers are in the library's budget doesn't necessarily mean we are able to use them as intended. Other large expenses (unexpected) sometimes take precedence."

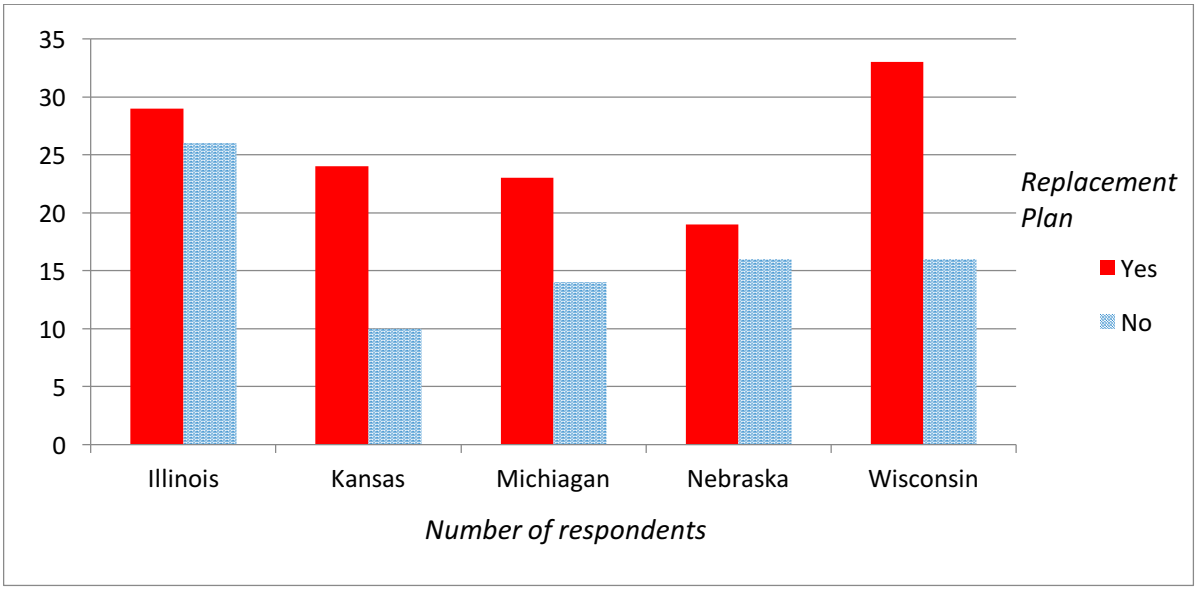


Figure 8. Do you have a replacement plan in your budget for computers?

Some rural libraries that were running out of space for wired computers were increasingly relying on laptops or mobile devices that would run primarily on the Wi-Fi in their buildings. Even for libraries that did have fiber in these scenarios, they were not able to get enough computers online in a wired capacity to utilize this increased speed. This, in combination with the increased number of people bringing in their own devices, slowed down connection speeds. In addition, many rural libraries that used their systems for network management had segmented networks, giving the bandwidth priorities to hard-wired staff and patron computers. While this works effectively for larger libraries that have several wired computers, it causes an access imbalance in rural libraries that do not have the space for wired computers.

One librarian from Michigan mentioned the use of BTOP money for the replacement of computers. She states:

> We were able to receive computers a couple years ago through BTOP grant that helped meet the gap in providing enough computers. With that being said, I'm sure it's just a matter of time before they will need to be replaced. Without Friends funding or another grant opportunity we will only be able to replace one at a time though due to budget issues. In addition, there is no reason to have more computers if it will just make things even slower. Moreover, space is an issue. We don't have the luxury of really adding any more units other than for replacing those that become problematic. (SM2)

4.8 RQ1

RQ1: What is the impact of targeted federal broadband programs in rural public libraries?

For this particular research question, it was important to examine several types of federal programs aimed specifically at public libraries. Two states received proportionally more rural federal funds than others based on federal infrastructure grants alone (Wisconsin via universal service/CAF funding), and in the form of rural anchor institution-focused BIP infrastructure grants (Michigan). Other states like Kansas and Nebraska did not receive as much money, and much of the money was directed at urban areas. This was also the case in Illinois, which did receive federal money for infrastructure. However, this funding was more BTOP than BIP focused. The document analysis addresses more specifics on the distribution of this funding.

Many rural libraries could access another federal program in the form of E-rate rebates on phones and Internet bills. Eighty-five out of 189 of rural libraries surveyed do not file for E-rate reimbursement at all (for either phone or Internet). This was similar to the 45% file rate found from the 2012 PLFTAS data. Of the remainder of the respondents who did file for some form of E-rate, several respondents only filed for phone rebates (Figure 9). This was due to various reasons, ranging from time constraints, their local provider donating Internet to the library, or CIPA guidelines for filtering. One Illinois librarian (SI1) noted: "Percentages of the costs for Internet access are paid by the E-rate program based on reduced school lunch figures. This program is not automatic and requires that several forms be filled out as part of a multi-step process. We then are reimbursed by the Internet service provider for whatever percentage we were to be reimbursed for." Some librarians noted concerns with the recent change to the E-rate reimbursement process in 2015 because E-rate funding could no longer be used to reimburse rural landline phone bills. Instead, that money could be directed to Internet bills only. Libraries that did not file for Internet E-rate were concerned that the lack of the subsidy for their landline phones would create a hardship, as many of them noted their phone bills were expensive. One

Nebraska library director (IN1) noted her phone bill was more than $80 a month just for basic phone service, compared to approximately $30 in a more urban area.

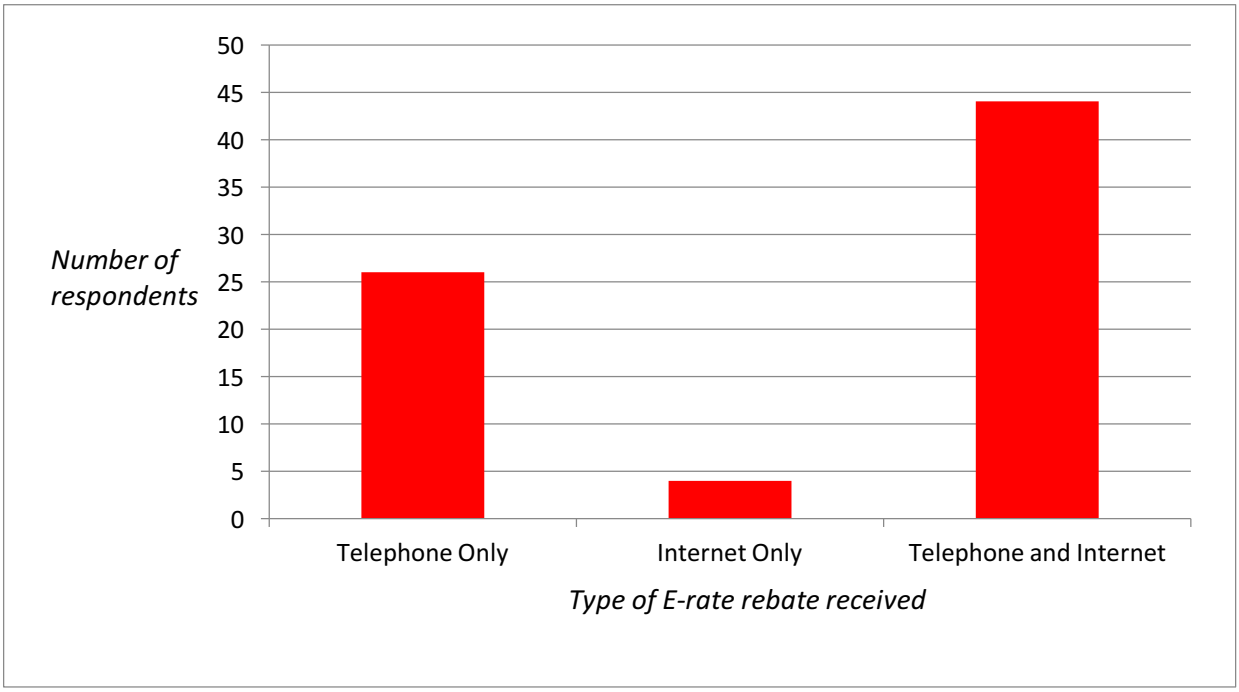


Figure 9. What do you receive E-rate rebates for?

Many librarians mentioned E-rate, when asked how they paid for their Internet connections. However, the primary source of funding was their local budget (Figure 10).

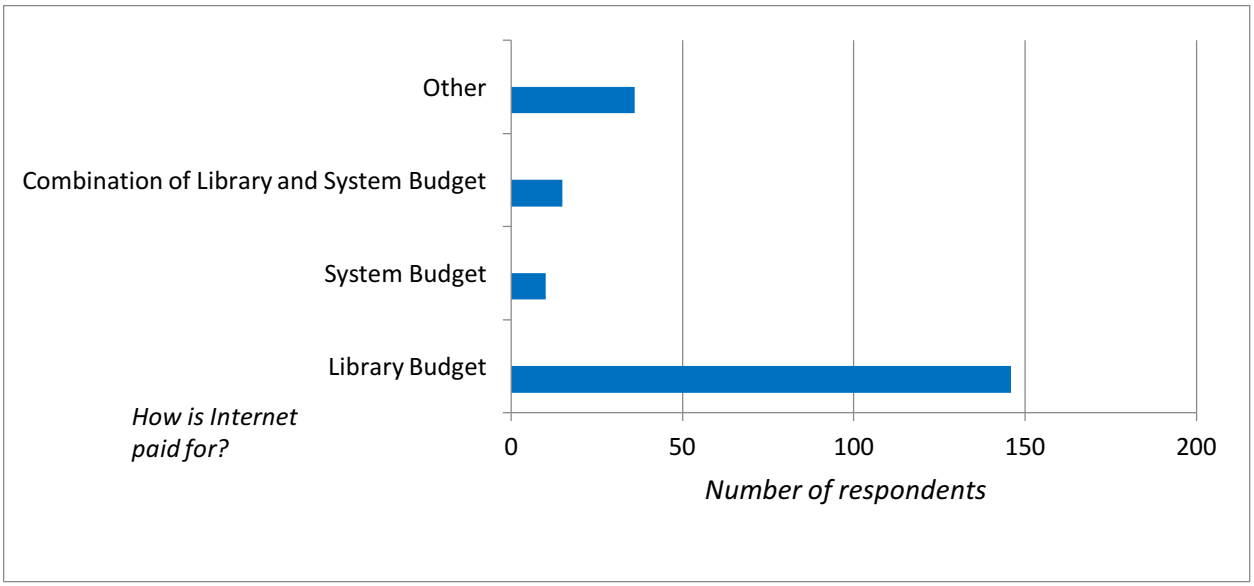


Figure 10. How do you pay for your Internet access in your library?

The "Other" category mentioned E-rate subsidies, local Internet companies donating connectivity to the library, schools and local municipalities. One librarian stated that her library was the Internet hub for the Main Street area in her town, and the Internet was free. When asked about connectivity upgrades, many librarians mentioned E-rate as important in the open-ended questions. A Kansas librarian states:

> They only pay for a percentage based on the amount of children in our school district on free and reduced lunches. We have a rather high percentage of students on free and reduced lunches, so our library qualifies for one of the highest percentages. We do not have fiber optic as an option in our community. AT&T just ran fiber optic into our community, but they won't take that fiber optic out of their building into our homes. The public does not have access to ANY fiber optic service, even though it is here in town. (SK1)

Table 3

E-Rate Applications by State

State	Files E-rate	Does Not File E-rate	Total Response
Illinois	23	32	55
Kansas	23	9	32
Michigan	22	12	34
Nebraska	19	13	32
Wisconsin	17	19	36

It is clear in Table 3 that some states have much higher filing rates for E-rate rebates with Michigan and Kansas having high rates of filing, Illinois with low rates of filing, and Wisconsin and Nebraska with intermediate levels of filing.

When answering this research question, it was important to look at several themes derived from the interviews and the open-ended survey questions. There is some overlap in the answer frequencies due to the fact that there was some crossover. However, several key themes emerged from the combined survey and interview responses. Mention of the E-rate program included subthemes, including filing or not filing for the program, Internet access donated from private ISPs, CIPA regulations, and landline phones. Respondents mentioned the Broadband Stimulus Grant specifically addressing fiber generally with emphasis on BTOP, the Nebraska Library Commission, and Wisconsin Fiber programs. One theme addressed federal shared grants like the Rural Health Network, as well as federal programs and resources such as library systems and LSTA funds. Participants mentioned the role of telecommunications companies and fiber. They

also emphasized speed differences. Finally, one respondent preferred not to answer that particular question.

Four librarians in the survey portion of the research mentioned that there was some funding available for a BTOP grant through the Nebraska Library Commission in 2012, one librarian discussed BTOP without specifying the library commission, and one stated s/he had received BTOP money in 2011. One librarian mentioned a "broadband grant" but did not specify if s/he was referring to BTOP or BIP.

However, these grants were not just focused on rural areas of Nebraska, as this funding was distributed based on three factors: local median income, ethnic population, and local broadband penetration. Many libraries in larger areas of Omaha and Lincoln were recipients of the funds. Southern Nebraska received some federal money that focused on fiber to homes. Nebraska did receive an $11,547,866 award through NebraskaLink LLC. This funding is entire-state focused and did include some middle mile funding for anchor institutions. While this funding was very critical for the libraries that did qualify, there were still issues in rural areas of Nebraska that did not have the fiber infrastructure, according to librarian surveys and interviews. One Nebraska library stated that they do not have fiber, and that unfortunately, it does not run near them. The researcher was able to find advertised available speeds in her area, supporting some of what she stated in the interview. The maximum available speed was 50-100 mbps with only one available provider who offered this. It did not list cost for this type of connectivity (National Telecommunications and Information Association, 2015a).

It was clear that there was extended differentiation when examining data from the NTIA website on the breakdown of funding issued from state to state. Illinois and Michigan received a

great deal of federal infrastructure funding with Michigan receiving over $250 million and Illinois with over $300 million. Kansas received approximately $160 million and Nebraska close to $100 million. Wisconsin had over $225 million of this funding, however one significant shared grant that with Michigan only focused on the Green Bay area, a non-rural area according to criteria used in this research (National Telecommunications and Information Agency, 2015b).

The focus of the money in the states, however, did vary. BIP and BTOP funding was broken down into projects based on what was being addressed—Infrastructure, Sustainable Adoption, and Public Computer Centers. This analysis focuses on infrastructure funding, but it is important to note that there are other specific programs funded. This includes non-infrastructure grants in urban areas and funding for some specific populations like The Communication Service for the Deaf. All of the states in this study were part of the University Corporation for Advanced Internet Development projects that issued approximately $63 million in infrastructure funding per state. This program is important, as it has an anchor institution focus, proposing to connect anchors like universities, libraries and health care. Many of these programs were in urban as well as rural areas (National Telecommunications and Information Agency, 2015b)

Michigan received several grants, with four of these focused on infrastructure development. A few of these projects were county specific including a project with Bloomingdale Communications for $5,646, 473 directed at Van Buren County, Michigan, a county that has a population of just over 75,000. Two major projects through Merit Network were rural focused and recipients of approximately $100 million dollars in BIP money. Approximately $33,289, 221 focused on underserved counties and connected 44 anchor institutions. The second portion was targeted to rural areas specifically in Northern Michigan.

This $69,639,291 infrastructure grant also included some funding to include Wisconsin. Michigan was the only state in the survey to have the majority of the respondents report that they did not have connectivity speed issues in their libraries. Some of these librarians communicated satisfaction in interviews with the new fiber access and accompanying improvement in community connectivity. However, in some areas, Internet connectivity was still problematic. According to a co-op staff member in Michigan:

> In some libraries, their costs are very expensive because they are past that last mile so they're paying for that extra…they don't have choices and so when they print out the RFP, whether they're doing USF or just trying to get service, that could be because maybe their phone company - a couple of the counties actually have their own local phone companies and the phone company has a monopoly or the cable company or whoever it may be and so there's not a lot of competition for their stuff there.

When asked if the BIP money has helped Michigan with this at all, she states:

> I think it helps. I know it has helped but I think there needs to be more. You know, a lot of these communities, the library is the only place they can get connected… and I think there is still a need for more. A lot of the infrastructure is not there, or it's there and it's ancient, that's the other challenge that we're seeing. I was looking at some maps of the various fiber lines that are in this state. You know, there is actual fiber. There is amazing potential for connectivity…there are some vendors that are realizing that if they help and offer discounts, (1) they're going to make money; and (2), they are also going to be providing a community service (ISyM1).

Illinois received infrastructure funding for the University of Illinois, Northern Illinois University and DeKalb County, all located in more populated areas. These areas received approximately $80 million in total. The University of Illinois project, which totaled $22,534,776, focused on low-income populations and community anchor institutions. One hundred and forty-

three of these anchor institutions were included with 4 public library systems and 40 kindergarten through grade twelve schools. Northern Illinois University also addressed anchor institutions within a nine county region. DeKalb County Government received $11,864,164 in infrastructure development funding. A few projects such as The Delta Communications Clearwave Communications infrastructure funding, which amounted to $31,515, 253 was targeted for the middle mile network in 23 counties in southern Illinois. This money focused on anchor institutions, including 23 libraries. Illinois department of central management services focused on rural development in northeast, central and eastern Illinois. The total for this project was $61,895,282 (National Telecommunications and Information Agency, 2015b).

In addition to the University Corporation for Advanced Internet Development project, Kansas received additional infrastructure grant ($998,419). This very large project focuses on all of Kansas, more specifically on access points for underserved areas, and enhancing broadband for 50,000 households, 3,600 businesses and 150 community anchor institutions. It is not rural area-specific, however (National Telecommunications and Information Agency, 2015b).

Wisconsin did have several specific infrastructure programs, with many directed at educational institutions. The University of Wisconsin system infrastructure grant ($5,106, 373) focused on select community anchor institutions in the Madison, Middleton and Monona areas. Many of these areas were not part of this study because they were not rural. One project funded for $29,884,914 was through the University of Wisconsin Extension Service. This middle-mile fiber network enabled connection to a WIMAX/Wi-Fi network, including Wausau and Chippewa Valley. This project expects to improve health care communications in the Eau Claire and Chippewa metropolitan area. (National Telecommunications and Information Agency, 2015b).

When examining broadband maps in the areas where library director interviews took place, it was clear that there were still many differences around the state. While some rural cities enjoyed up to 1GB/s, others where library interviews occurred still had 50-100 mbps maximums listed (National Telecommunications and Information Agency, 2015a).

For those that were not awarded Broadband Infrastructure grants, they utilized other streams of revenue for connectivity. According a system staff member in Michigan, some libraries used Gates Grant money for equipment and Wi-Fi:

> Some libraries used the funding to get Wi-Fi that they didn't have before and that was when a lot of places finally started getting it. They were able to get the infrastructure and, again, it might just be like a router you buy at Best Buy. They were starting to offer those things. We have (a number of) co-op members and I believe all of them are able to offer some sort of Wi-Fi and maybe in partnership with their local community and a lot of them, (use) the local communities' tower and they have a booster for the library. (ISyM1)

Wisconsin received a rural infrastructure fiber grant in 2014 from the Universal Service Fund/CAF that was under development during the course of this research. Some librarians were already articulating the benefit of this fiber. They also mentioned how their library systems were assisting them with this change of connectivity. In one state surveyed, a librarian stated that s/he would prefer not to respond to the question. It is hard to say what the reasons for this might be. Depending on the state, many respondents in the surveys still reported that they did not have any fiber at all, and relied on copper infrastructure (Figure 11). However, the majority of libraries had received broadband increases (Figure 12).

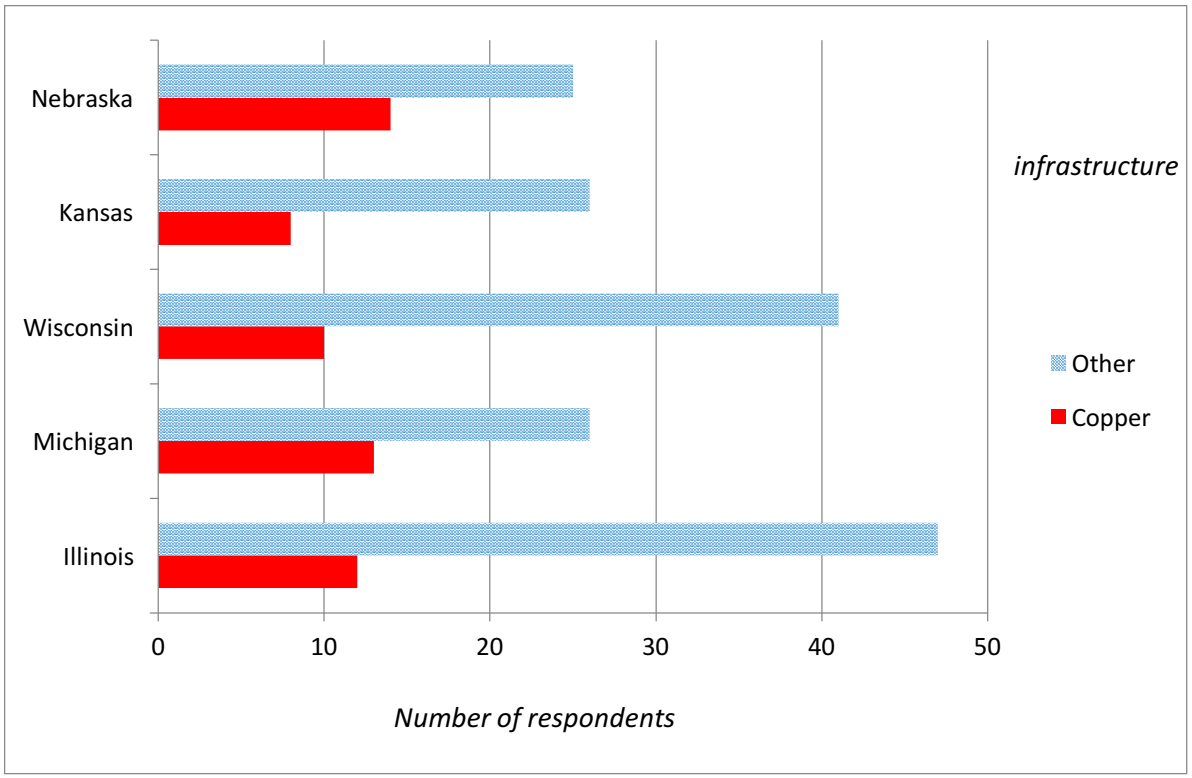


Figure 11. What Kind of Telecommunication Infrastructure Supports Your Library?

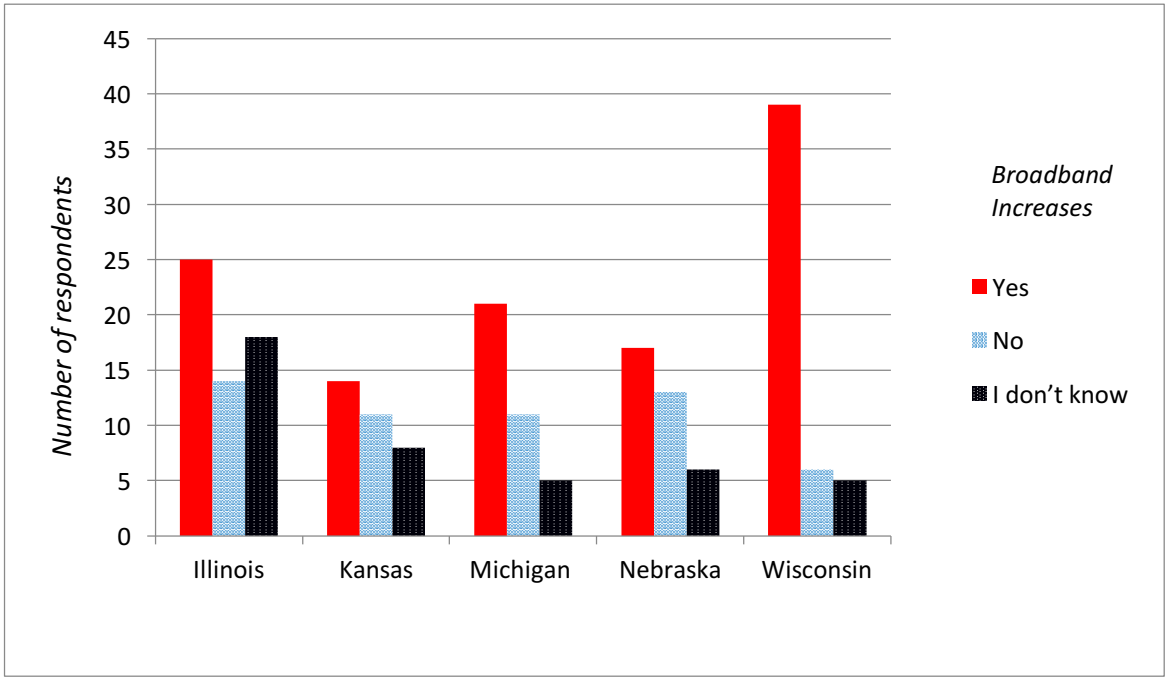


Figure 12. Have you received any broadband speed increases in the past 5 years?

System staff in Wisconsin were in the midst of a fiber upgrade when this research was conducted, which could possibly explain why there is such a high rate of affirmative response to the increase in the broadband question. When the researcher asked about broadband connectivity, one Wisconsin system staff member stated: "Bandwidth continues to be an issue. Is there enough? How do we get more? And that kind of thing, that's always a focus." It is important to note that 100% of the seventeen system respondents answered that there had been broadband speed increases in the last five years for libraries in all of the five states. The document analysis portion of this chapter provides a more detailed analysis of federal infrastructure grants.

The survey responses yielded interesting findings when addressing the issue of offering increased or new Internet-based programming with increased broadband. Only 30 of 87 librarian participants that answered this question provided new or expanded service. When asked what these services were, it was clear that the increased speed was helpful in terms of acquiring databases and offering training. Librarians purchased new databases like Mango Languages, Gale Courses and Ancestry.com that the library was not able to run before. Librarians offered more training courses for patrons on both databases, and general Internet use. Four libraries mentioned test proctoring and partnerships with the schools, some of which were utilizing Chrome Books and needed Wi-Fi or other types of support. One survey participant from Wisconsin noted:

> We've been able to promote our computers as places to take online courses and to do school work for online schools. We have been able to start proctoring more tests because we have more reliable

> and faster Internet speeds. Most importantly, we've been able to relax our "absolutely no streaming or downloading on public computers" policy (which we had in place for years until we got our increase. Now we have the bandwidth to handle some of that). (SW1)

Another individual noted that they could now support services like Skype and newer software because they went from 1.5 MBPS that six machines had to share to a shared five MBPS connection. Speed also influenced the length of time an individual could stay online. One director stated that because of increased speed and more computers they could allow patrons to spend more time on the computers. This was helpful when patrons are filling out job applications, social service forms and unemployment applications.

Two issues have been noted from the qualitative and quantitative data—the first being that some libraries still do not have access to the infrastructure, despite targeted funding initiatives. The second issue is that many libraries are not opting for the targeted programs that do exist, due to a lengthy application process (discussed in the next section), or the perception that the support is not worth the time it takes to apply. This is seen primarily with the E-rate rebate program that public libraries can receive directly. It will be important to look at other research questions to see if there are any associations.

4.9 RQ2

RQ 2: Is there a funding model most effective for access and speed?

4.9.1 Document Analysis: Legislation and Statistical Reporting Related to Funding

It was important to get an idea of the current budget, usage and legislation facing libraries in the different states via annual state reporting, IMLS data and state statutes. Library funding structures are extraordinarily complex, and are best represented visually. The following figures exhibit the dynamics of state, local, federal and private funding.

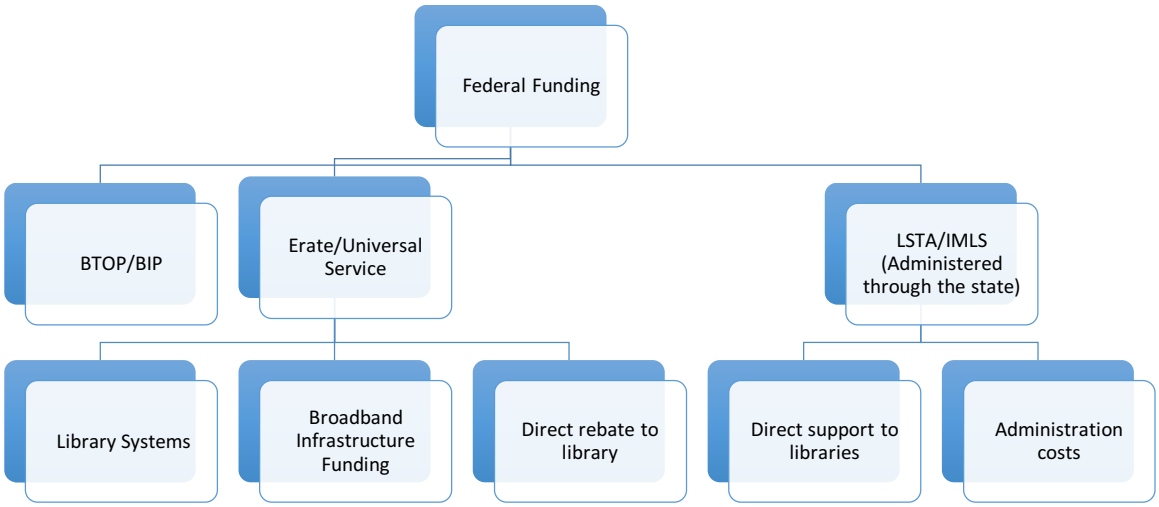


Figure 13. Federal Funding Sources

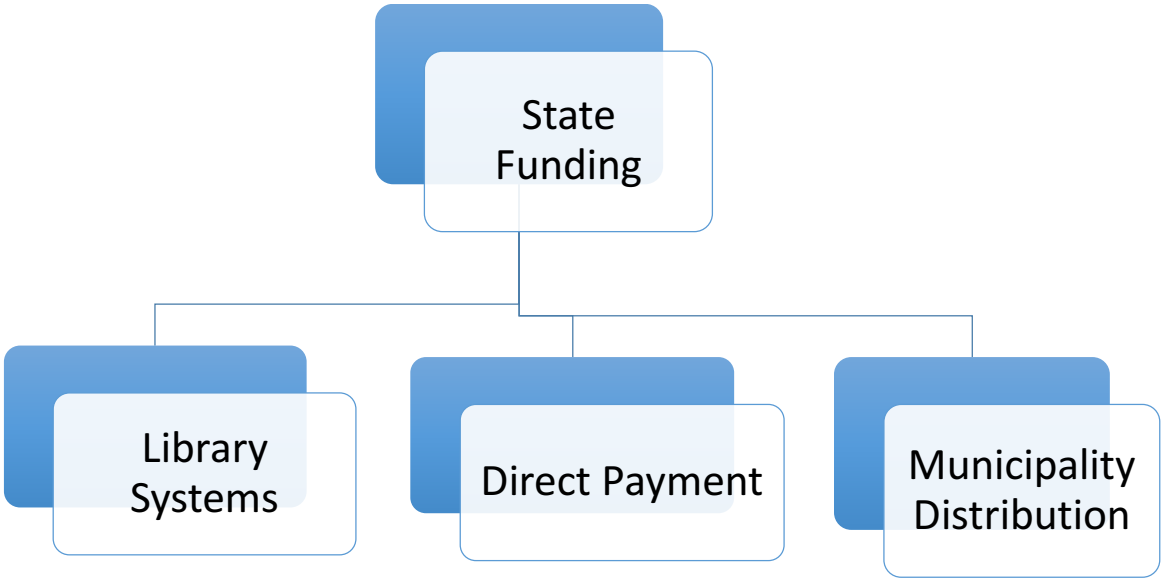


Figure 14. State Funding Sources

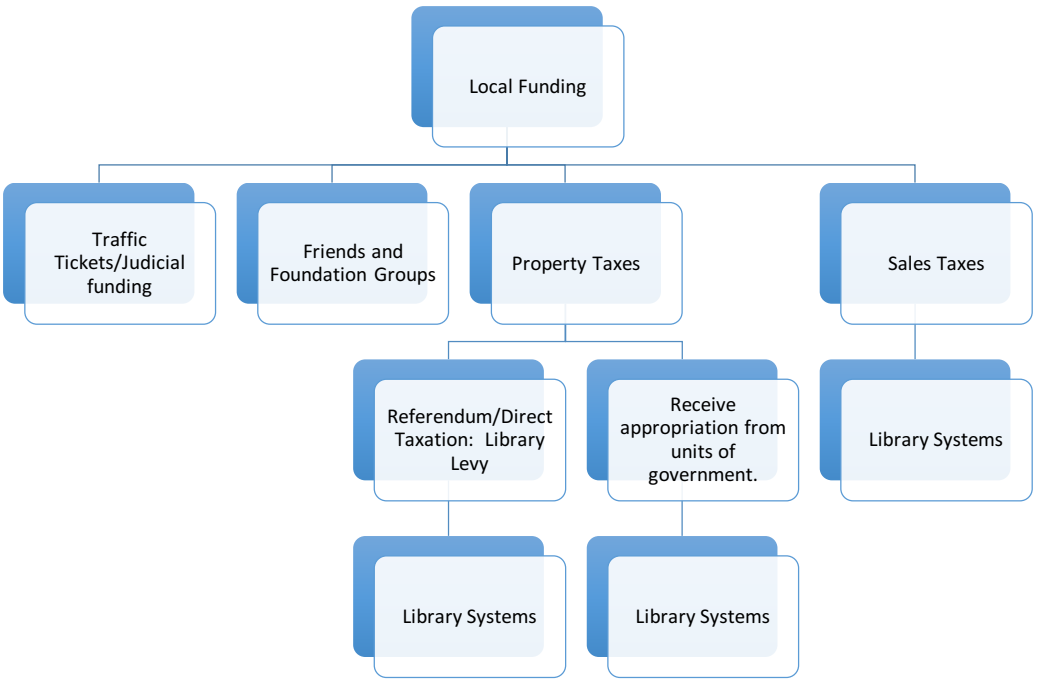


Figure 15. Local Funding Sources

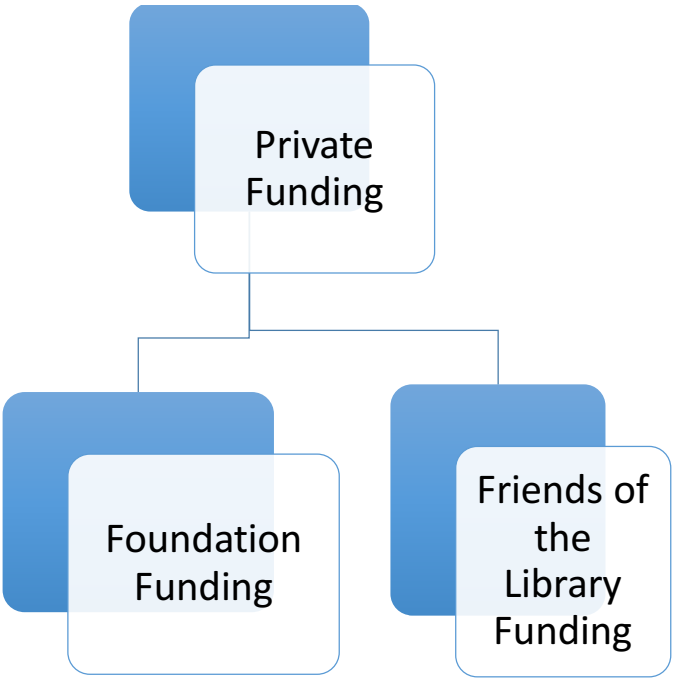


Figure 16. Private funding sources

4.9.1.1 COSLA and IMLS Funding Statistics

According to National Center for Education Statistics (2008), on average, libraries are funded 81.4% locally, 9.6% via the state, and less than a half percent federally (Bertot, Jaeger, & McClure, 2011). This average is down from fiscal year 1972, when state aid to libraries comprised 11.7% of the budget. Public schools, in comparison, received over 40% of their funding from the state in that year, and only 51% locally (Molz, 1973). More recent data in fiscal year 2011 illustrated some individual data—Illinois libraries as a whole received 4% of their funding from state sources, Kansas 3.2%, Michigan 1.9%, and Wisconsin 2.3%. All of these states had less than 1% of their budgets funded federally. Nebraska's state and federal funding

totals were not listed (Institute of Museum and Library Service, 2015). This library funding total, however, only includes direct aid payments, and not funded agencies such as library systems. It also does not include any infrastructure payments via programs such as BTOP and/or BIP.

Due to the fact that IMLS and COSLA funding studies do not factor in other sources of indirect funding, it can create a deceiving picture of the varied funding structures in rural public libraries. In states with large income disparities between urban and rural entities, the means of these numbers do not appropriately reflect the large funding differences that interviewees articulated. For example, according to IMLS data, Illinois has the second highest funding for libraries in the United States. However, upon a closer look of these numbers, much of the funding is exclusively local. A wealthier urban or suburban community, then, could have more local funding available to libraries. The researcher obtained state annual reporting data due to this issue. Two interviewees mentioned large local funding discrepancies in Nebraska and Illinois. Therefore, it was critical to obtain more detailed breakdowns of funding per library within each state. Because these annual reports were either not offered online without an access code (Illinois) or the archived annual report links were dead (Nebraska), state librarians were emailed directly to obtain the information needed. There was a holistic breakdown of funding sources on the Nebraska Library Commission's webpage. In 2013, the state spent $50,978,226 on libraries locally but only $519,844 in state funding. Approximately $249,700 was subsidized federally, and $3,251,541 was funded through private grants and foundations (Nebraska Library Commission, 2014). However, again, a breakdown of individual libraries was critical.

When comparing the federal data to the IMLS data for funding to states, Nebraska had a $1.3 million federal distribution that year (Institute of Museum and Library Service, 2015). The state library systems distributed the remainder of this federal money to other programs, not

directly to the libraries. This ran parallel with the state averages mentioned in the 2008 NECS information. Unfortunately, this information was not broken down further into specific funding divisions within each category. Approximately 50 libraries did not respond to the annual report survey. This is telling, because state funding is contingent on the completion of this document. Nebraska was unique in that the majority of its libraries (250/267) were in service areas with less than 10,000 people, 234/267 were located in communities of under 5,000 people and 159/267 libraries were servicing areas with less than 1,000 people.

When reviewing annual reporting that focused individually on all of the libraries, the data illustrated some large discrepancies in local funding for similar sized libraries. For example, a library director interviewed in Nebraska (IN1) discussed the issue of similar sized libraries around her having budgets that are proportionally higher than her library. There was indeed a large variance when looking through annual report data for libraries that served similar populations (between 2,000 and 3,000 people). The range of local operating revenue for this population in Nebraska ranged from approximately $68,000 per fiscal year to nearly $165,000 per fiscal year (Nebraska state annual report data, 2014). This same trend occurred in the Illinois libraries as well. Interview participants in Illinois had large ranges based on population. One individual interviewed served a population of approximately a thousand people and received nearly $225,000 in local operating revenue; while another with approximately that same, population had a budget of approximately $85,000. One community with over 5,000 population received approximately $75,000 locally, with another community of 2,000 receiving approximately $140,000 per year (Illinois service data, 2014).

The COSLA study focuses heavily on state aid data, discussing the fact that only eight of the 50 states do not have a state aid program for libraries. These states include Colorado, Idaho, Ohio, South Dakota, Tennessee, Vermont, Washington and Wisconsin. Strangely enough, COSLA did not consider Ohio a state that received aid, despite the fact that it has the biggest state aid supplement. This is because the funding is distributed directly to municipalities that distribute the money to libraries. The same is true for states that directly fund library systems. Tennessee has a state aid program distributed through the regional library system. Some of Michigan's state aid goes towards library systems. While this is no longer the case in Wisconsin, a great deal of funding is distributed to library systems via the Universal Service Fund, which is a federal source. However, IMLS does not take into consideration this type of state and federal funding. An examination of these forms of funding would drastically change the state funding picture. Therefore, COSLA and IMLS data are not good stand-alone statistics to look primarily at funding.

Despite the fact that COSLA and IMLS funding studies define state aid to libraries differently, they are able to effectively track funding consistently for each individual state. According to this data, state aid is extraordinarily vulnerable. In the COSLA study, on a year to year basis 1/3 of states have seen their level of state funding increase or decrease by more than 10%, with increases and decreases greater than 50% being common. Kansas currently has experienced nearly 25% in state aid cuts, which has influenced some of the smaller libraries who are much more likely to rely on this funding. Some larger libraries have structured their budgets differently, using state money for special projects as it can often not be relied upon (Shorman, 2015).

One state specifically highlighted in the COSLA funding study was Wisconsin. One of the strategies mentioned that was effective in increasing funding for public libraries was the legislation that required counties to pay at least 70% of the cost of services provided to residents without a local public library under state statute 43.12, 43.15 and 43.16. While viewed as equally distributing the cost of service, this legislation has a challenging impact specifically on rural counties in Wisconsin. This was another issue mentioned in the interviews with a library director in Wisconsin (IW3). Reimbursement to adjacent counties for library services was a hardship for many rural libraries in Wisconsin, when the existing county did not fund a library in a particular city or village. The adjacent county could then bill the community where the patrons needed library service based on their usage of physical item checkout (at the rate of $3 a book, for example). Statutes listed regulations for library systems, as well as resource libraries. This resource library would be given additional funding if it was the library with the largest operating budget within the system. Service contracts are negotiated every year by the library system staff to determine what services the resource library would provide to the other member libraries. This was controversial in rural areas of Wisconsin, where library patrons who lived in the county would go to a larger library in an adjacent county for resources. When this happened, the larger library would track the usage and bill the patron's county back for this usage if the county had smaller local municipalities that used the larger, out of county library. In some cases, the adjacent county was a county that held the resource library for the library system. As mentioned earlier, it was a conflict of interest in that librarians had to discourage their patrons from using a library that was to act as a resource to them. This currently creates confusion for patrons, although the intent of the legislation was to encourage local library development (Wisconsin Statutes, 2015).

Sometimes state aid has strings attached. For example, many local municipalities had to provide a match in order to receive funding. Because state funding levels are fairly low, this does not have a huge impact on local libraries. However, rural libraries in lower tax areas have more challenges for this. In Wisconsin, there are several requirements to receive system services. One requirement, for example, is that a library must annually spend at least $2,500 on library materials. Libraries must also have minimum weekly hours, and required certification for directors for libraries of any size. While the certification forces new librarians to have some background and coursework in library science, it also can be a financial hardship for the rural library with a limited budget.

This legislation is currently under review through a state appointed system study committee formed to examine the statutes and redistribution of funds. Many details from this study have emerged in planning documents. One of the most prominent issues is that state library systems have had the same state-required staffing patterns as they did in the 1970s. Private LEAN studies by committee advisory boards have shown that in many state systems, continuing education staff members are overrepresented in comparison to high demand technology staff members, who are underpaid in comparison to technology staff in the private sector. Recommendations that have resulted from these committees include a complete redistribution of systems, adding more technology staff and combining them not so much geographically, but by the population of the municipalities served. It has been increasingly found that the needs of rural and urban libraries vary so significantly that it no longer makes sense to have them being served by the same library system. However, resource sharing by small and larger libraries was also critical for information access (DPI Lean System Study Work Group, 2014).

4.9.1.2 Direct Taxation, Municipal Levy, Mill Rates and State Library Systems

Michigan sometimes funds libraries with mill rates. The state of Michigan defines mill rates as "The rate at which property taxes are levied on property. A mill is 1/1000 of a dollar. Property taxes are computed by multiplying the taxable value of the property by the number of mills levied." (Michigan Department of Treasury, 2015). Michigan was the only state studied that had statewide mill rates, although the property tax model was the most common method of funding libraries for all states studied. There were several issues unique to communities with mill rates, particularly for the small library. Jim Swan, the director the Central Kansas Library System, articulates the challenge of mill rates:

> I suggested that if they were going to vote to organize a library, that they vote to increase the mill levy for the library at the same time. The townspeople voted in a library without increasing the levy limit for the library. The statutory levy limit at that time for a city of the third class was two mills. Two mills in this town would yield $380 per year—hardly enough to support a library. The clerk that was figuring the mill rate said two mills can't be right and moved the decimal point one place to the right. This made the mill levy 20 mills instead of two—producing $3,800 for the library. In some towns 40 mills would not be enough to fund a public library adequately. So what can towns like this one do? (Swan, 2015).

Libraries in other states had combinations of a direct and specific library levy, and a general municipal levy that is divided among municipal departments. Section 1 of 397.201 in the Michigan state statutes, applied to city, village and township libraries. In these libraries, the council could levy a tax of not more than one mill on the dollar annual on all the taxable property in the city. A city could vote to increase the tax not to exceed one additional mill on the dollar, collected and deposited directly into a library fund (Legislative Council, State of Michigan,

2015). Many of the libraries in Michigan had experienced minimal mill rates for so long that they had to cut hours and staff, according to some of the library directors interviewed. However, in some areas, an increased mill rate just passed for 2015, and it was significant enough that some of the libraries were able to add hours and additional programming. One librarian talked about the fact that she could now afford to have a summer library program for the children, as she was unable to the year before (due to low staffing and reduced building hours).

In Kansas, there were several types of libraries. City libraries are maintained by one city of the first, second or third class (K.S.A. 12-1220). First class cities have 15,000 inhabitants or more, second-class cities have 2,000 to 14,999 inhabitants, and third class cities have fewer than 2,000 inhabitants (Kansas Census, 2015). One city and the surrounding/adjacent township maintain the township libraries. County libraries are maintained by one county, regional libraries maintained by two or more counties or townships (12-1231), and library districts are libraries maintained by one or more cities of the third class joined with one or more townships or portions of one or more townships in one or more counties (12-1236).

Under 12-1236, one or more rural libraries can join with townships or portions of townships or counties to create a district. No less than 10 percent of the electors that live within the city limits must sign a petition o get this to pass. This has numerous challenges according to a testament by Swan. He states:

> The answer for some people is to create a larger area of service. The political realities of this solution are fraught with pitfalls and resistance. Under current Kansas law cities of the third class may join with adjoining townships to create a District Library and a larger tax base for the library. Unfortunately, in many cases the townships that surround the towns with low assessed valuation are just as impoverished as the towns.

> The first hurdle is to overcome the political resistance from rural areas to join with an under-funded library and pay more library tax than they have been paying, and still not have access to quality library service. The second hurdle is to find a political entity with sufficient assessed valuation to produce the increase in tax revenue the library needs (Swan, 2015).

Some of the librarians interviewed and surveyed were from these district libraries (Kansas legislative session, 2014). One library director mentioned the difference between direct taxation of communities via a statutory requirement to fund libraries at certain levels through direct levy. She was of the opinion that this was a far preferable funding source, as there was no "middleman" of sorts via the municipality. From her perspective, this guaranteed library funding, and she did not have to fight for funding with the police or fire department that might be deemed more critical. However, her library had a service area of over 6,000 people with more industry and a higher taxation rate.

This perception of direct levy being more effective caused many libraries to convert to this type of taxation. Some states like Illinois need a petition signed and referendum placed for voting. This process is outlined in Illinois statute 75 ILCS 16/10-25 where a petition must be filed by not less than 10% of the voters. This petition will establish the new maximum tax rate with the voters deciding whether the municipality should be converted to a public library district. The referendum would read: "Shall the public library in (county, or township), Illinois, be converted to a public library district, with a maximum annual public library tax rate established at (rate)% of the value of all taxable property in the district as equalized and assessed by the Department of Revenue?" If the referendum passes, the library will be converted with the annual tax rate from the referendum being applied annually. Many libraries found this method of taxation more effective than obtaining services through a municipal wide levy.

Wisconsin and Illinois both were very specific about the establishment and maintenance of library systems in statute. Illinois focused on the state librarian who was essentially accountable for system effectiveness (Illinois General Assembly, 2015). In Wisconsin, the Department of Public Instruction (or the "division") was responsible for this type of oversight. Wisconsin was the most detailed in articulating statutory requirements for systems. Examples of these requirements included backup reference services and inter-library loan, in-service training for librarians, services to communities and patrons with special needs, and a new requirement that required a technology plan submitted by every public library system in the state every five years. Other states did not have these detailed requirements in their statutes, but the nature of Wisconsin systems was very different from Kansas or Michigan, where membership was not only for public libraries. Kansas, in fact, clarified within their statute 75-2547 that the seven regional library systems could include school, community and junior college libraries. Michigan systems also could be more flexible with services to their members because they did not have these types of statutory requirements. However, this also worked to the disadvantage of the library that might need some unoffered services like interlibrary loan or online reference, for example.. A library may be able to contract for these services elsewhere, but often times at a much higher cost.

Nebraska's statutes addressed local property taxation as a way to fund libraries. According to their 51-201 legislation:

> Any such council, board, or electors may also contract for the use of a public library already established and may levy a tax of not more than ten and five-tenths cents on each one hundred dollars upon the taxable value of all the taxable property in such city, village, county, or township annually to be levied and collected in like manner as other taxes in such city, village, county, or

> township, except that when any county discontinues township organization, the county shall levy and collect a tax of not more than ten and five-tenths cents on each one hundred dollars for such public library (Nebraska Legislature, 2015).

Nebraska is a state much like Wisconsin in that direct taxation does not typically occur for local operating budgets. Instead, funding is doled out from the municipality with the other municipal departments.

Overall, the statutes, annual reports, COSLA and IMLS data, LEAN studies and state reports varied and acted as a groundwork and frame of reference for the funding issues discussed in the surveys and interviews. Many of the librarians were unfamiliar with statutes and funding issues, which were detailed in the last few questions on the survey. There were several differences across states concerning statutes that could influence funding for libraries. Legislation that supported library systems in the states, and the ability to create a tax levy were most critical to rural libraries. Inter-county billing and resource libraries established at the state level affected rural libraries as well.

Two alternate sources of funding not examined in this research are large state aid payments distributed by counties, like in Ohio, and also local sales tax funding as the primary funding source for libraries like in some of the southern states like Georgia, Arkansas, Alabama, and Texas. An examination of additional funding structures would provide interesting comparisons for the funding distributions examined in this dissertation. Overall, the funding picture is complicated for libraries, and the researcher needed data from several different sources to get an appropriate picture of funding for small libraries.

4.9.1.3 LSTA funding

Although federal money is such a small portion of public library budgets, it is important to examine how the existing divisions of funding received through the Library Service and Technology Act (LSTA) are spent within the states. States that receive LSTA grants typically distribute the money in relation to five-year planning documents that state divisions and librarians submit to the Institute of Library and Museum Studies. These documents include detailed and multilayered objectives, creating several individual projects and services. However, there have been situations in the past where public libraries have pooled these resources to fund an agreed upon area of need. One example of this is Maryland's 1994 Project SAILOR, which helped to provide a broadband network for member libraries, government and other community agencies (SAILOR, 2016).

It is critical to frame this discussion in legislation that changed the focus of federal funding for libraries. In 1996, Congress transformed the Library Services and Construction Act (LSCA) to the Library Services and Technology Act (LSTA) as Subchapter II of the Museum and Library Services Act. This legislation ended federal funding for library construction and replaced it with a focus on new information technologies. The researcher analyzed the 2013-2017 planning documents in this section through this lens. Several consistent themes ran through these planning documents including, but not limited to, resource sharing, literacy efforts, and lifelong learning. Not all of these topics were technology specific, although many had components of technology running through them.

Illinois focused on four goals in their five-year planning document submitted to IMLS. One of these goals specifically emphasized reading. Components of this goal included support for guided reading and customized reading programs like the One Book, One Community

program. While technology did not seem to intersect with this area as much, some other goals had integrated technology-related ideals. For example, one goal articulated resource sharing and interlibrary loan maintenance as a priority. Although the emphasis of this objective was on the physical sharing of materials, there were some technology-related components woven through the document. One issue was the sharing of digital archives and an automated catalog. Illinois, Wisconsin, and Michigan all were currently either maintaining a statewide online catalog, or working towards one through strategic planning. All three states mentioned this in planning documents. One unique component of this particular goal in Illinois was the emphasis on special needs users. This goal named rural communities, along with underserved urban areas and *The Talking Books and Braille Program*. The goal of lifelong learning did not necessarily have a technology focus aside from the maintenance of digital continuing education platforms like Web Junction, an Online Computer Library Center (OCLC) sponsored continuing education resource. It was the fourth goal that specifically addresses technology needs. The importance of the Illinois Century Network that provides Internet connectivity, library catalogs and reference databases is mentioned. The goal also emphasizes the importance of developing digital literacy skills for staff and patrons in the library environment (Institute of Museum and Library Services, 2016).

Wisconsin's plan was lengthy, with more than 10 sub-categories of the first goal, which specifically addressed technology. The first portion of this goal emphasized telecommunications access. Unlike the other states, Wisconsin specifically laid out procedures to address bandwidth issues. Section 1.1 notes that 41% of libraries will get some bandwidth increase during the period of this plan. According to the document, 107 libraries would have bandwidth increases from 1.5 Mbps to three Mbps, three libraries would go from 1.5 Mbps to five Mbps, and 89 libraries would remain at 1.5 Mbps. For libraries currently at three Mbps, 139 would stay the same, 36

would move from three Mbps to five Mbps, seven would move from three Mbps to 10 Mbps, and one library would move from three Mbps to 20 Mbps. It did not mention the particular library that had such a significant jump in bandwidth. Finally, the larger libraries that were at 10 Mbps had one library moving up to 15 Mbps and the other to 20 Mbps. The other two libraries would remain at 10 Mbps. Wisconsin was the only state studied that had such detailed bandwidth levels in their plan. Other systems that did not have a state network maintained by library system staff could not as easily influence these totals in a way similar to a statewide network like BadgerNet. (Institute of Museum and Library Services, 2016).

The Wisconsin planning document mentioned several other digital resources under this goal including electronic databases, digitization, digital creation spaces, and the potential for a statewide ILS as mentioned earlier, and statewide interlibrary loan. Although the movement of physical materials does not seem to fit well under a technological goal, the emphasis of ILL was to coordinate software that would help with workflow issues. Wisconsin was one of the few states that specifically mentioned the importance of providing consultant services to assist libraries and systems in preparation and participation in the E-rate program. While this was an important part of the first goal, E-rate filing was not exceptionally high in Wisconsin in comparison to Kansas and other states that did not have this in their plan (Institute of Museum and Library Services, 2016).

In Wisconsin, the second goal focused on traditional literacy and summer reading programs, with the majority of funding directed towards consultant salaries like the Youth and Special Services Consultant. Like other goals, some technological issues were interspersed in this area. There was also grant funding for digital literacy initiatives and databases, as well as grants for adaptive equipment (Institute of Museum and Library Services, 2016).

The final goal in Wisconsin was lifelong learning. The funding in this category went mostly to the salaries of consultants at the state level. One of these positions was for the director of the public library development department and the other for a full time data collection position. There also was funding for a part time support staff person on the LSTA team. This funding also paid for administrative support for meetings with system directors, special services consultants, youth service consultants and continuing education consultants. In comparison to other states, Wisconsin had a very high percentage of LSTA funding tied up in administrative costs that mainly funded salaries and meeting support, although some of the money went to libraries in the form of small grants (Institute of Museum and Library Services, 2016).

In Michigan, the first goal focused on equal access and lifelong learning. Many of the activities to support this included training for staff and modification of the database to be compatible with mobile devices. Librarians pursued discovery software as well as database access to digitized historical materials. Illinois was a state that did focus one of their objectives on underserved rural and urban communities. However, Michigan had a specific program targeted towards the technology needs of rural librarians. The Plinket project provided small communities with modern library websites, a need mentioned by many of the librarians in both surveys and interviews. Also mentioned as a critical part of this goal was E-rate training and support.. Despite this, Michigan's filing rates were not as high as expected from this initiative. One section emphasized statewide partnerships and training to allow more public libraries to have fast and stable Internet access through their participation in broadband initiatives. It is likely that this goal relates to some of the BIP funding that Michigan received in its rural areas (Institute of Museum and Library Services, 2016).

The second goal in Michigan's plan included an economic focus, where libraries would have training on workforce development services. Skill building websites would be available, and there would be a vast array of online training and tips through training tutorials. Respondents also mentioned staff training with programs specifically targeting rural libraries. One example of this was funding for the biennial Rural Libraries Conference. Three of the librarians mentioned this opportunity in the face-to-face interviews, although it was sometimes a struggle for librarians to staff their branches so they could attend. Other literacy projects mentioned included summer reading programs and the One State, One Children Book program (Institute of Museum and Library Services, 2016).

Nebraska had just two goals, the first focused on lifelong learning and library programming. Although there was some technological focus on digitization of historical documents and databases, the majority of these objectives included interlibrary loan, and economy of scale purchasing for summer reading programs. There were talking books and Braille services as well as a mention of unserved and underserved audiences, although it was not clear if these were urban or rural individuals. Some of the focus was on consultant tasks such as assisting libraries with grants and working with the BTOP program to ensure libraries make the best use of the resources. Nebraska's plan was also one of the few to mention e-government and the funding of National Library Commission staff to act as a reference service for state government agencies and employees. The Nebraska Library Commission and Nebraska Center for the Book also supported literacy programs like One Book Nebraska and the Nebraska Book Festival (Institute of Museum and Library Services, 2016).

The second goal in the planning documents related to staff training. While many of these training sessions may have been valuable to rural libraries (eBook/eReader device training,

website design, etc.), not many librarians mentioned this as being widely available to them in the surveys and interviews. Nebraska's five-year plan specifically mentioned E-rate training and broadband Internet, but many of the goals related to broadband were wide ranging. A few examples of these objectives included: "Research on changes at the state and federal levels that effect Internet access for libraries" and "Provision of updated, pertinent information to public libraries on changes affecting Internet access" (p.20). (Institute of Museum and Library Services, 2016).

One of the unique features of the Nebraska plan was the focus on recruiting library professionals. Again, many of the action steps included very broad initiatives like "Investigation and examination of library labor and employment trends" and "Continuation of support to ensure balance between education provision and hiring needs" (p. 20). Like Wisconsin, administrative costs appeared to tie up a good portion of this funding (Institute of Museum and Library Services, 2016).

Kansas had very specific and measurable outcomes, unlike the other four plans examined. Many outcomes were broken down into percentages. One example of this was in regard to librarian survey and statistics. The report noted: "By 2017, 50% of library users from libraries that become automated through sub-grants to regional library systems will "Agree" or "Strongly agree" on surveys that libraries provided access to more materials and provide faster retrieval turn around" (p.10) (Institute of Museum and Library Services, 2016).

The first goal in Kansas's plan focused on interlibrary loan infrastructure. Training and continuing education for the process were included into the plan; however, the fit under this

overarching category was not ideal. For example, one program activity provided to library staff "related to broadband, ILL and KLC" (p. 11). (Institute of Museum and Library Services, 2016).

The second goal did address lifelong learning, focusing on technical support for the library, user and database access. Talking Books was a part of this access goal as well, with specific outcome measures like "Users of the Kansas Talking Books Service will receive prompt service 95% of the time." The third goal addressed technological collaborations with a focus on summer library programs and training opportunities for staff members. There was specific mention made that rural library directors received programs geared for youth service trainings (Institute of Museum and Library Services, 2016).

The question that comes to mind after reading these five year plans could be whether or not this federal money is being spread too thin, despite the fact that Illinois received approximately $5.5 million, Michigan $4.4 million, Wisconsin $2.7 million, Kansas $1.8 million and Nebraska $1.4 million (Institute of Museum and Library Services, 2015). Between administration and salary costs, databases, interlibrary loan and traditional literacy programs, it is very challenging to come up with a targeted and cohesive goal for federal funding, especially for the technology focus mandated in the 1996 legislation. Could the focus of this money somehow include connectivity and telecommunications access for rural libraries that do not currently have it? Is the federal money that currently exists through LSTA of little use to librarians because too much of it is going to fund administration that may not have any real impact on the library directly? Examining different states and models of federal funding use will be valuable, especially when looking at major statewide projects.

4.9.2 Interviews with Library Directors and System Staff

When examining funding questions, several themes with sub-codes emerged from open-ended survey and interview data, including property tax funding and issues such as inequality, competition and comparison for funds, a decline in taxes, lack of industry in certain areas, millage (mill rates) and home rule funding. Several individuals mentioned grants and donations such as the Gates Grant Eliminate the Digital Divide Grant and LSTA. Librarians discussed friends, advisory groups and foundations as support agencies. Their emphasis was on state funding with a focus on annual reporting, statistics, and the comparison inequality of other libraries. Librarians also mentioned other types of funding including federal funding, district libraries with elected library boards, municipal libraries with appointed library boards and shared libraries where schools and libraries are co-located. Many themes included maintenance of effort, inter-county billing and funding for resource libraries.

A number of the initial discussions about funding sources surrounded the property tax model. In rural Nebraska, there are packaging and other industries that hire large populations of transient individuals that may move from job to job, renting and not owning their properties. This creates situations where the revenue from property taxes is low. According to one Nebraska librarian:

> They base budgets for libraries off of property taxes. …we're one of the lower income towns...there are some (libraries) in our county that are more affluent and those libraries have a much better budget than we do per capita…population is about half mine and their budget is still more than mine...(IN1)

This is even more of an issue with the population she serves—a population that relies primarily on public Internet for their information needs. These individuals may not be able to

afford Internet at home, and have a great need to stay connected to friends and family members.. One library director in Kansas talks about the critical role of the library for rural farmers. She states, "It's the farmers and people like that…they don't have connections in the country. The library, especially in the smaller libraries, you'll find they're the only ones that have Internet." (IK1) In these areas, there is very little infrastructure, the cost is high, and satellite Internet is one of the only options, albeit an expensive and often times unreliable one.

Like Nebraska, Illinois adhered to a similar model of property tax funding. According to one librarian:

> The public tax revenue has been going down for the past three or four years...I don't foresee that it's going to increase any time soon and will probably continue to drop because assessed value has gone down in the area and there is no construction right now…. other than (one cooperation) we have no industry. So it's all property taxes in this district. (II1)

She discusses another district library nearby stating, "Their district is essentially the same size as ours, but they have the new plant. They have over a million-dollar budget. There is a huge disparity between really what should be similar libraries…" Complicating the issue in Illinois is that there are municipal libraries and district libraries, as mentioned in the document analysis portion above. Municipal libraries are formed by a municipal entity such as a village, town, city, or county. Traditionally, these libraries receive their funding through an appropriation by the municipality, which shows up as a line item in the village, town, city, or county budget. The local village or town board, the city council, or the county legislature appoints trustees of municipal public libraries (New York State Library, 2015). In a district library, the library boards and budgets are determined through a public vote. Librarians receive the funding directly and they levy their own taxes. This type of funding model was common in Kansas and Illinois.

In Kansas and Michigan, the same issue of general purpose funding based on property taxes occurs. In Michigan, a millage rate determines property taxes. In Kansas, some libraries also experienced "home rule" funding where library boards directly tax their community members much like district libraries do. Home Rule came into existence back in 1974 with statute K.S.A. 19-101 and gave the authority for a county not to comply with the legislation when legislation does not apply in whole or part to all counties. According to the state of Kansas Office of Information and Technology Services: "K.S.A. 19-101a provides limitation on Home Rule powers and K.S.A. 19-101b provides how to charter out from acts of legislation. Before a county uses Home Rule to opt out of legislation, legal counsel should be requested to determine if Home Rule could be applied to the legislation." (Kansas Office of Information and Technology Services, 2008). Some interviewees portrayed Home Rule funding in a positive light, as statute guarantees the funding the library receives. According to one librarian in Kansas:

> The money from ...county...and property taxes from the city goes to the city and that's what supports us. We get a 5% levy. So, when our library was supported, it was mandated that if you were going to have a city library, that the city would support you, you know, so you would have an improved levy. And so we're what we call under home rule...levy of 5% and they can't change that. The only way they can really change it is if they voted to close us (IK1)

She additionally states:

> There's some libraries that are not under the home rule. Their council can take and give them 4 or 3 or 2 percent. Our people in the city voted on it...and so even during a downturn when taxes were down...the city knew we got 5% of whatever it was they got from property taxes...and from sales taxes and things. And then we didn't have to compete with the police or the firemen or anybody else.

She does acknowledge that this type of funding structure can also be controversial, as funding has little deviation to match increased and different needs of libraries. She says, "They really

can't mess around with it. People say well I think that was shortsighted and I'm like, not to me. Not if you are like Denver, who was fighting to keep their funding with the fire and the police, you know and the roads and everything else."

While federal funding supports much of Wisconsin libraries' network connectivity, local funding funds most daily operations. Levies support local funding, with any funding from the state filtered through library systems. Wisconsin is unique in that this funding through the state comes from the universal service fund on phone bills. Universal Service funding comprises the majority of library system's total operating budgets not just for technology assistance, but also for staff, facilities management, and interlibrary loan. However, taxation districts in Wisconsin are complicated. Under statute, 43.12 counties can be billed when residents of that community either do not have a library, or elect to use an adjacent community's library service (Wisconsin Statutes, 2015). This can be especially challenging for rural areas that cannot afford to maintain a public library, or have a public library that does not have a large number of resources.

Several libraries in the state that were statutorily established as resource libraries under 43.12 to act as a resource for smaller libraries with fewer professional staff and smaller collections. However, much of the time, the same libraries who utilize their resource libraries for content and expertise, are the libraries that receive bills due to be being adjacent to their resource library (Wisconsin statute 43.12). It is not unheard of for a larger library branch to bill one of its rural neighbors $100,000 a year. In one rural Wisconsin county, this nearly meant closing rural branches with small operating budgets. The director states:

> Our library system is established as a main library with five smaller branches and a county-wide delivery service set in a rural county. The total annual operating budget has been reduced…. Due to Wisconsin's unique funding structure, the county

> has begun receiving annual bills for adjacent county usage …These bills have a decimating effect on local library service. The bills account for nearly 1/5 of the annual operating budget, which financially equals the closure of all five vital branches. Doing so would even more so limit the valuable resources a library provides to rural residents. In many of the communities, the library is the only place for computer, Internet and wireless access along with print and media resources. The law also contributes to a vicious cycle of charging for usage- as a rural system reduces hours and locations to pay for adjacent county usage, the bill will likely increase as residents have few options for local library service, therefore increasing usage at libraries within adjacent counties (IW3).

This issue works against the rural libraries in terms of access. The vast majority of those surveyed does not currently reimburse other counties for services and offer statewide library card usage.

Another issue that Wisconsin libraries have faced recently is the elimination of state maintenance of effort, the legislation that protects libraries from large targeted budget cuts. Under maintenance of effort (MOE), a municipality could not cut the library's funding significantly, as the payment for library services could not be less than the average of the past three-year's levy. One librarian in Wisconsin discusses his recent budget situation, stating:

> So last year, I got extra money, I got [approximately $2,000] extra from the county. The county gave us an increase so the village was like, we can take away another [$2,000] from our contribution. It's not the way it's supposed to work…because there is no maintenance of effort anymore, which really sucks (IW1).

This elimination of MOE makes it challenging for rural libraries that often times are receiving funding from multiple municipalities (county, village or city).

The librarian surveys included self-reported local funding data. When asked if librarians had any local funding to utilize for technology, there was a very mixed response (Figure 17).

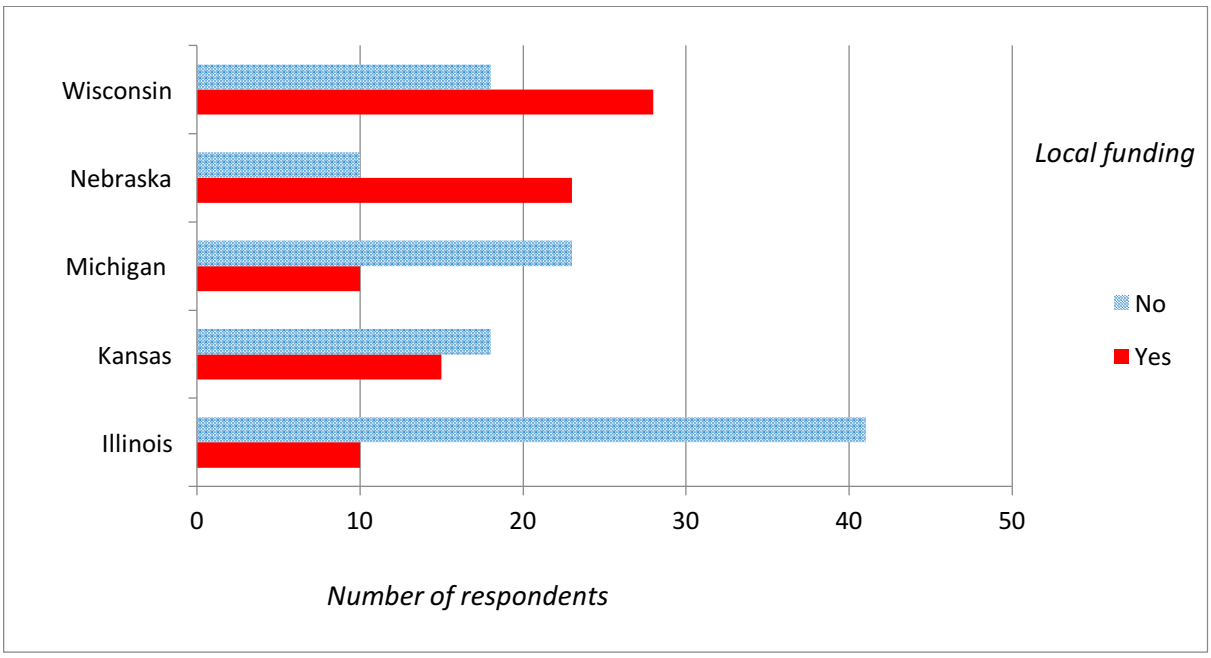


Figure 17. Does your library receive local funding for technology (city, county, local municipality)?

States use funding for technology differently. While Wisconsin and Nebraska had a majority of respondents that stated they did use local funding for technology needs, Michigan, Kansas, and Illinois had the majority of respondents reporting that they did not use any local money for technology. This was especially noteworthy in Illinois that had the largest variance in response to this question.

4.9.3 Supplementary Funding

All library directors interviewed did receive supplementary funding to augment their technology budget. Friends groups would assist in this area, as well as small pots of money distributed by the municipality. A librarian from Kansas states; "They give about $10,000 (a

year) to various programs. If we didn't have that, we would have a huge hole in our library." (IK1) Both Michigan and Kansas take advantage of diversion funds or penal fines from traffic tickets, or seizures. Some libraries did rely heavily on Online Opportunity grants through the Bill and Melinda Gates Foundation to provide public computers for their libraries. One librarian mentioned that she received most of her support through Gates grants, and still used many of the Gates machines from the original grant in the early 2000s. Most of these computers continued to have XP operating systems running. One Illinois librarian interviewed (II2) received a small Eliminate the Digital Divide (EDD) grant through the Illinois Department of Commerce, which provided computers and furnishings for public access PCs (Illinois Department of Commerce, 2015). Illinois also gave small per capita grants. These grants, however, can also be used for books and other materials, so justifying a grant for technology in under-funded areas can sometimes be challenging. This type of piecemeal funding for equipment seemed to be problematic for most states because they did not have a formal replacement plan for their technology.

Rural communities often cannot justify the maintenance cost of having both a public and school library, according to three librarians interviewed in Illinois, Wisconsin and Kansas. It is because of this that many libraries in Kansas and Illinois are share physical locations, as well as networks. One library director in Kansas stated:

> We have fiber. We have always had fiber. Our problem was that we shared resources with the school, the city and the library…the school was needing so much fiber, they came to us and…said: Would you get your own fiber? (IK1)

This was also true in Illinois at a shared school and public library, where a targeted program severely affected connectivity for over a year. The director states: "A year ago, the school district

joined up with… I forget what it's called …the Illinois program for broadband and it was painfully slow for most of the year. Probably all I complained about…it was terrible." (II1)

RQ2a. Do rural public libraries with state funding have increased broadband speed and access to information?

Only some libraries in this study received state funding. Nebraska received state money for their four library systems and a small direct payment yearly to the individual libraries, not including any money through LSTA. Libraries with populations under 8,000 people, for example, received a baseline annual amount of $565 plus ten additional cents per capita. (Nebraska Library Commission, 2014). Illinois used their state funding for three library systems in the state (only two of which were rural), and Kansas did use some state money to fund their library systems. Surveyed and interviewed system staff members in Kansas mentioned that they did not expect system funding to continue as it had been in the past several years. In Michigan, the state formed the systems, but local municipalities funded these systems. Wisconsin received minimal state funding, but received funding through the Universal Service schools and libraries program (E-rate). The state can administer this money, and yet is not a direct source of funding (it is a federal source).

Librarians mentioned different ways that they utilized their system as a resource. One Kansas survey participant stated; "The systems basically help us with EVERY question we can't answer (a program called Log Me In which even allows the tech people to get into my circ (circulation) machine and fix problems)" (SK3) and "Our system staff is AMAZING…our consortium is the first place we look for any kind of library guidance." (SW4) One respondent from Kansas said:

> CE (Continuing education) opportunities, legal advice, and technology assistance. Our consortium also gives us a $7,000 Extended Service Grant for collection development each year, a $1,000 technology grant, a $150 CE grant. The library system also has a Rotating Book Van service that brings many libraries in the system other books that we typically don't have on our shelves in for patrons to check out as well. The library system also helps us get discounts from vendors and ordering books. They also help pay some of the cost for using Zinio (a magazine subscription database). (SK2)

In Illinois, there are only two systems that serve rural libraries. This has caused libraries to form local co-ops much like Michigan, only these are more informal and not sponsored by the state. These co-ops work together on a smaller scale. Historically, Illinois consolidated several library systems in 2010-2011. According to one librarian:

> The number of systems in Illinois had changed dramatically. At one point I think there were 20 plus, and it was eleven, nine, and seven. The Illinois state library said, we just want one system...but that has sort of quieted down now (II1)

One area of Illinois had much upheaval with this consolidation, which led to several libraries pulling out and forming their own systems. At the time of the system reduction, Iowa and Illinois consolidated over state lines to form systems. It was shortly after Illinois began minimizing their systems that the Iowa libraries officially pulled out of the network. It was in response to this that Illinois libraries formed their own local organizations that operate similar to systems. Every library is a delegate, and there is a democratic voting process on membership. These organizations do provide grants for extremely small rural libraries that are not yet automated. Some of these groups have tiered membership with different access levels, but again, if a rural library cannot afford to join, there is not a state funded agency that can streamline that process.

One librarian in Nebraska discusses other state funding models, referencing one state (Ohio) that has funds that distributes state funding based on population equally. She believes it is the most equitable model, and redirects more money to communities that need it the most. A population of 15,000 in a poor town will receive the same amount of library funding from the state as a population of 15,000 in a wealthy town based on a funding formula that gives a certain amount of money for each resident. Therefore, the poorer communities by nature of this model will not have poorer access to libraries because property taxes are not a factor in funding, where areas with similar populations will also have similar library funding.

In Nebraska, the libraries do receive direct state funding, but this is contingent on comparisons with libraries of similar population levels.. Each library director prepares statistics and works towards a strategic plan and other state-assigned tasks. Many rural libraries find this time intensive, and skewed. Some librarians see community comparisons and point systems as ineffective, as many of the comparison libraries do not have comparable budgets. This is especially problematic when you have similar rural sized libraries with huge disparities in budgets due to the property tax model of funding. The state aid payment is based on accumulated points and ends up, according to one Nebraska librarian, not being worth the intensive work. The librarian interviewed in this scenario received less than $1,000 a year in direct funding from the state. Other states, like Kansas, create different compliance regulations that rural libraries adhere to so their communities can receive better access to information. A librarian in rural Kansas noted that without state assistance, she would only have access to her own collection of books, and courier service and interlibrary loan would be impossible.

Overall, it was clear that despite the funding source, if librarians perceived the application process as too labor intensive or too small of an amount, they would not take advantage of programs like E-rate reimbursement or direct state aid payments. This factor complicated the research, as it was common for two libraries in the same state to have different funding levels, as one librarian will apply for the benefit, while another would not. The E-rate application process has a flow chart that can help illustrate the steps involved in obtaining reimbursement (Figure 18). Table 4 documents the feedback of several surveyed librarians about the E-rate program in 2014. The nature of the feedback included concerns about a complicated application process and the recently added program changes that would gradually eliminate POTS (plain old telephone service) funding for rural libraries. According to one librarian: "Eliminating phone services and maintenance are not good ideas. VOIP (Voice Over IP) is well and good, but what happens when the Internet is down? Our organization has no desire to switch to VOIP. We are a small library like many rural libraries in Mississippi, and we have no dedicated IT person to manage our technology. Eliminating funding for this will hurt some of the very libraries you are trying to bring into the 21st century the most." Another librarian states: "I hear they want to drop support for POTS as they want more money for other technology. This will greatly hurt our organization, as we have to have a telephone line to get Internet service. We are a very small library and our funding is only a drop in the bucket but it is important to us. The funding will once again go to the bigger organizations and the small ones will have to fend for themselves again. We don't use the fancy technology. We are just happy to be able to supply the internet for our patrons." (Funds for Learning, 2014)

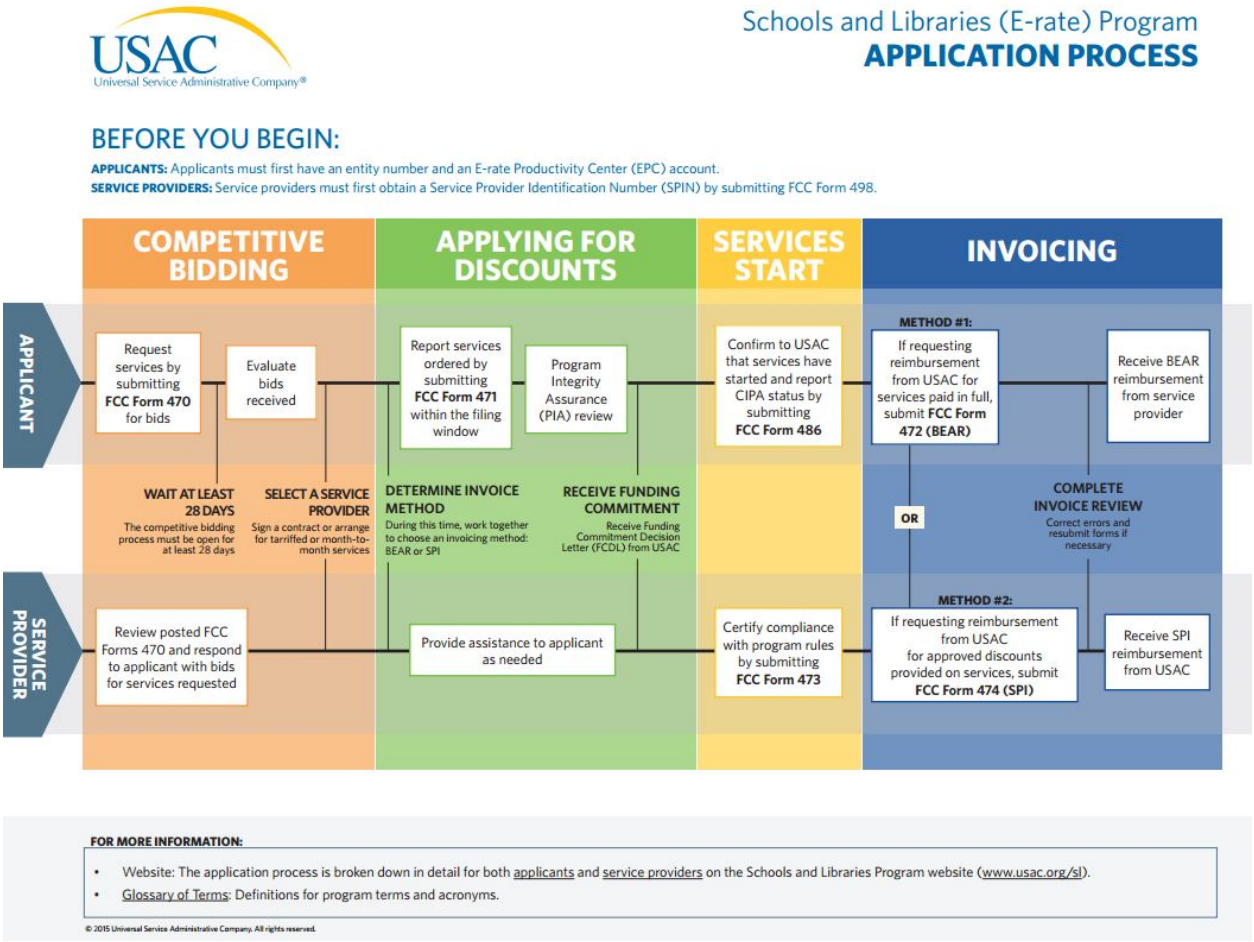


Figure 18. *E-Rate Application Process (Universal Service Administrative Company, 2015)*

Table 4.

"The Road to Hell is Paved with E-Rate Applications":

2014 Survey of E-Rate Applicants from Schools and Libraries

Universal Service Administration Company, 2015

The forms and requirements are barely worth the trouble. We gave up trying to apply for anything other than plain telephone service years ago. This was partly due to our being part of our County network, making it hard to separate out the costs for only the library, but also because it was just too time consuming and difficult to do for a small amount of money.
My main observation of the e-rate program is that it needs simplification in the forms process used to secure reimbursement for eligible expenses. There are four forms involved in getting priority one services reimbursed and three of them take some time to complete. Also I am not in favor of eliminating telecommunications reimbursements as this may be one of the main charges that smaller districts receive back in erate funds. My district has both telecommunications and internet costs and removing the telecommunications would be a significant part of our erate reimbursement.
It is a very confusing process & if you can get through to customer service you get a different answer on the same question depending on who you speak with. I've been told items aren't allowed by one person & that they were by another & I only have basic telephone service. It should not be this confusing! The cutoff dates should be clearer. I had trouble filing my 470 (I was told the prior year had to be completed 1st) & had to get customer service involved & when I went to file the 471 before the due date it wouldn't let me because there were 4 days still on the 470.
Too many forms asking for the same information. Process needs to be streamlined. 126. Please work to simplify the system. The funding is greatly appreciated, but the time spent on the process is cumbersome. Many times we are not notified of deadlines for submitting application components and only find out within days of the deadlines by
Too many steps in application process - the same information is asked for over and over. Universalservice.org sorely needs to update its website. It is inexcusable that, in 2014, they should still be using an IE6- compatible site, instead of one that is compliant with modern browsers. It is indicative of how out-of-touch the e-rate program is with the technology it is attempting to support.
The whole process is very confusing, and difficult to remember what steps you need to take when. I even have a cheat sheet for when to file forms, and I still go crazy trying to figure it out! Also, it was very frustrating last year not knowing if we were going to receive our funding. We have a very limited income and we count on the discounts to help pay our bills.
"The road to Hell is paved with e-rate applications" has been my experience. I have been doing them for 17 years and every year something new comes up to confuse me. The 8888-231.8100 has been an extremely helpful but even they can unknowingly mislead.
My boss died unexpectedly the end of January. He had never taught me erate and now I know why - there is no way to "teach" E-rate - it is too confusing - no way to have a "backup" person - luckily another district allowed their E-rate person who had done it for several years to come help me get started. He spent 8 hours with me showing me how to get ONE 470 filed and an RFP up. I spent countless hours pouring through manuals, tutorials, webinars and many many phone calls and emails to our Tennessee E-rate coordinator. Then after getting all the forms for everything else filed I started getting error emails related to validating the discount percentage for one of my sites - I got it validated for one form and then got the same error back for two others. Unbelievable that the same correction was not populated to all forms. A lot of wasted time had to be spent duplicating the same corrected information for the same error. One of the most frustrating areas is the web site for filing the forms. Multiple times I would have the form completed and then items I had entered would just disappear on the preview screen or would show on the preview screen but not when printed. The site also timed out way to quick - or just locked up. For such an important program, the site is not user

friendly at all. I'm still not sure what I have left to complete as my web-hosting and cell phone filings are not showing funding from my boss's last years filing or this years. We have to have E-rate to continue internet access and moving forward in our technology - so I will continue to search for answers - just struggling to find enough hours in the day to find them

One example of a funding policy that was the most successful was maintenance of effort (MOE) regulation. Many librarians that once had MOE and experienced policy change to remove it, communicated adverse effects from not having it. With MOE, municipalities had to maintain a level of library funding that would not be less than the average of the last three years. This ensured that libraries would not experience deep budget cuts from budget year to budget year. The state removed this legislation in 2011, despite political lobbying by the Wisconsin Library Association and library and system directors throughout the state.

Collaborative structures seem to be extremely valuable to rural libraries, much more so than their urban counterparts. When library systems and co-ops were present, libraries could more frequently take part in passive discounting and shared resources. This was a major benefit in Wisconsin and Kansas with state established systems, Michigan via co-ops, and Illinois, within their independently formed membership consortia. Overall, librarians viewed these factors as making a difference for information access issues.

RQ2b. Are the availability and the particular division of Universal Service Funds related to broadband speed and improved access to electronic information?

There was a direct association between state funding and states that had federated systems. Many of the states that did not have many federated systems also did not have much

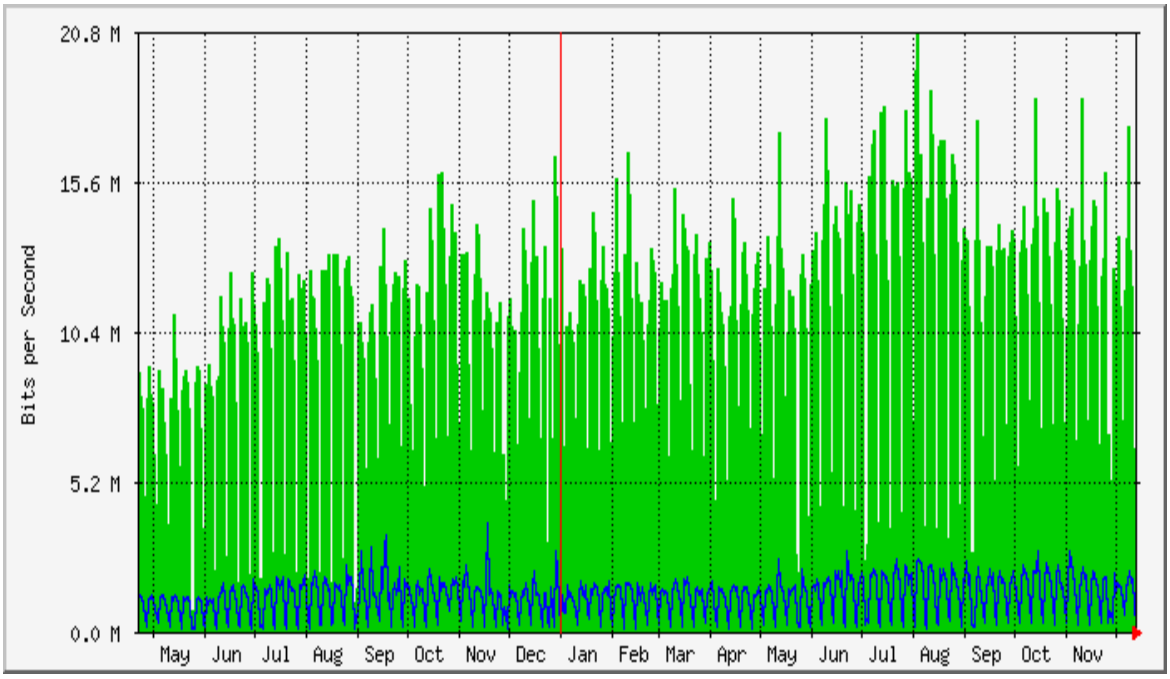
state funding. A few states, Wisconsin for example, have preserved their library systems by tapping into E-rate money. The functions and funding of library systems were different in each of the five states. However, it did seem as if rural libraries were in the most need of system support for technology. According to one Kansas director in a larger rural area:

> ...We'd definitely like to cut them (systems) but if we didn't have those, the smaller libraries…some of the little tiny libraries would not exist. They just wouldn't. And some of them only have wireless around those places but that's the only place that people have Internet (IK1).

Historically, USF did not fund library systems, but states directly funded the systems, making them vulnerable to budget cuts. It was clear from the research that the states that had the schools and library (E-rate) program funding systems often were the states that could retain more systems due to fluctuating state funding cuts.

As it pertains to perceived speed, Wisconsin was on the lower end of the spectrum in the survey portion of the research. The researcher obtained some speed data from a system of fifty libraries that shared a network. Over 90% of these libraries had populations of 10,000 people or less. A yearly graph of these libraries combined illustrates the averages of bandwidth use to ceiling levels. Of particular note are the summer months, when library use increases. The months of July and August have bandwidth levels maxed out at the ceiling point (Figure 19).

`Yearly' Graph (1 Day Average)



	Max	Average	Current
In	20.8 Mb/s (20.8%)	9644.7 kb/s (9.6%)	2007.5 kb/s (2.0%)
Out	3687.7 kb/s (3.7%)	1215.2 kb/s (1.2%)	272.8 kb/s (0.3%)

GREEN ### Incoming Traffic in Bits per Second

BLUE ### Outgoing Traffic in Bits per Second

MRTG MULTI ROUTER TRAFFIC GRAPHER

2.14.5

Figure 19. *Broadband ceiling charts for a library system in Wisconsin*

Wisconsin was one of the few states that did not hire out privately for their technology needs with librarians reporting high satisfaction with their systems. When surveyed about what librarians used their systems for, there were varied responses. In states where library system penetration was high, the use of library system staff for technology support was also high. This was true in Wisconsin and Kansas where more than three quarters of respondents mentioned

utilizing their systems for these tasks. Wisconsin had a higher utilization rate of relying on their systems for legal advice, and few librarians used their systems for genealogy and local history reference assistance. Few respondents did not use their systems for those tasks. These librarians were primarily in Nebraska and Illinois, two states with few systems. Only one respondent in Michigan noted that s/he used the system for something other than what was mentioned (Figure 20).

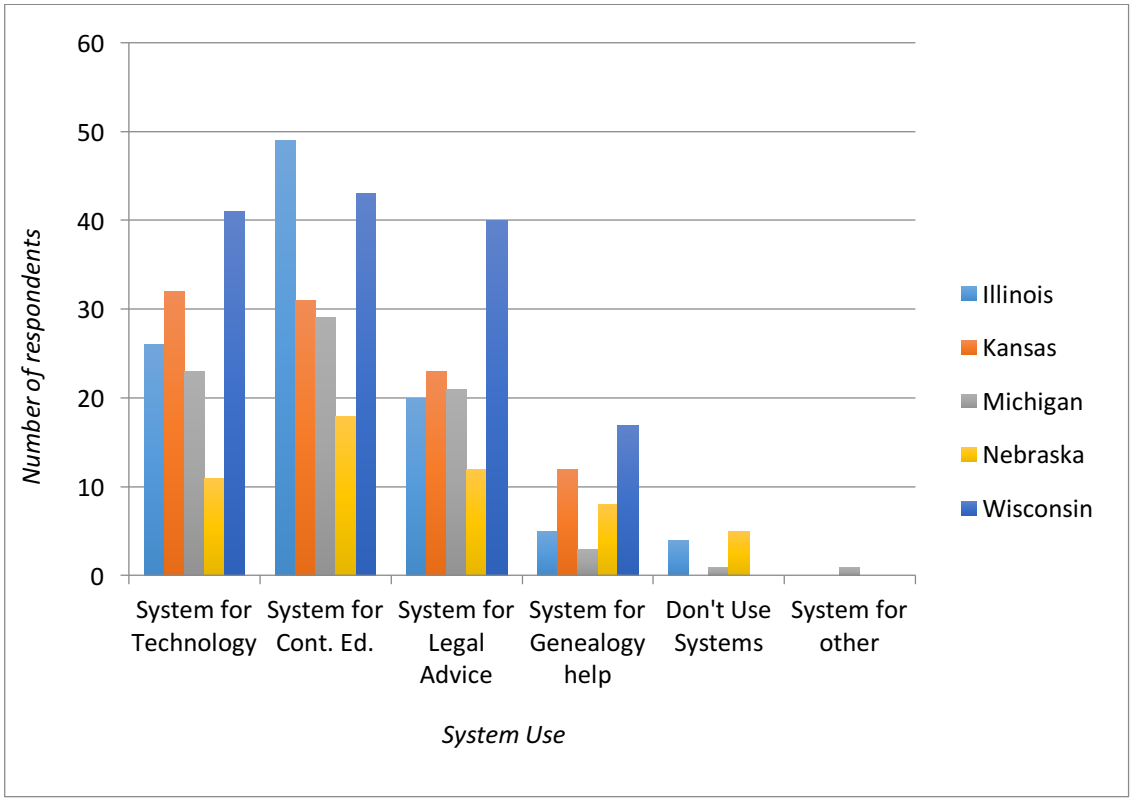


Figure 20. How do you use your library system or consortium as a resource?

Chi-Square analysis was not appropriate for much of the quantitative data, mainly because the nature of funding was so complex that a single-variable association would not appropriately capture other issues that could potentially complicate the analysis. However, in the case of systems, it was clear to see the differences between the number of systems in each state,

even though they do have differing degrees of involvement. Due to the fact that many libraries were using their systems for technology support, it is important to assess whether or not an active system presence in technology tasks led to increased perceived computer broadband speed measures by the directors. A hypothesis was formed (H1), stating that the perceived connectivity speed of public computers in states that have received substantial technology assistance through systems is higher than in states that have received less substantial technology assistance through systems. The researcher divided technology assistance into categories of involvement. Illinois, Nebraska and Michigan were categorized into low system technology involvement. This was because the sheer number of systems could not meet all the daily technology needs of their geographically isolated members in Nebraska and Illinois. For Michigan, it was also clear in surveys and interviews that very few of the systems assisted with technology-related tasks. Many co-ops did help with shared discounts, continuing education, and issues related to interlibrary loan, but this was based on geographic location and the needs of their individual libraries.

Wisconsin, on the other hand, reported high system utilization for technology. This was not just for technology support, but also for their connectivity infrastructure/hardware, which the library system staff monitored and maintained. Many systems in Wisconsin had shared servers and ILS's monitored and maintained by system staff. It is because of this that Wisconsin rated high for system technology involvement. Although Kansas library directors reported extremely high technology support utilization rates for their systems, they did not rely on their library systems to maintain the infrastructure of the network. Libraries in Kansas hired independent ISPs for their physical connectivity, but did receive some system support with questions that related to their networks. Kansas rated intermediately due to that issue.

In order to test the hypothesis, a Chi-square analysis was conducted. A cross tabulation appears in Table 5 with the Chi-square analysis in Table 6. While the analysis is significant at the .05 level, it is clear from the cross tabulation data that states with heavy and intermediate level technology assistance were reporting perceived slower speeds than those with lower level technology assistance. It is also clear here that there is a relationship between the factors of system technology assistance and perceived broadband speed. However, the data illustrates that substantial technology assistance by system staff is associated with lower reported speeds. This is an unexpected result that will be addressed in the discussion section of this dissertation due to the potential impact of state networks as well.

Table 5

Cross Tabulation of System Technology Assistance and Librarian Perceived Speed

		Slowdowns		Total
		Yes	No	
System Tech Assistance	Heavy	34	13	47
	Intermediate	21	13	34
	Light	64	65	129
Total		119	91	210

Table 6

Chi Square of System Technology Assistance and Librarian Perceived Speed

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.676[a]	2	.022
Likelihood Ratio	7.887	2	.019
Linear-by-Linear Association	7.633	1	.006
N of Valid Cases	210		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.73.

4.9.4 Conclusion

There was evidence of state-supported library systems in meeting the needs of rural libraries as it pertained to technical and troubleshooting assistance. This was true whether local and state money, or federal money, like universal service funds, supported a system.. It is important to note, however, that systems serve different functions in various states, and librarian satisfaction levels with systems could relate to the ability to connect to a state network. The data from the surveys did not show a large perceived speed difference across states that had many systems (regardless of funding) versus states that had a few. In fact, the states that had systems heavily involved in their member's technology needs had more reported perceived speed issues than those states that did not. Possible reasons for this include network segmentation and fewer options for connectivity, according to some interview data. Wisconsin also had shared servers,

and a highly controlled division of bandwidth. Overall, though, systems were very important to the rural libraries with the smallest populations for information access across the board. This included technology assistance, but also being part of a network of shared resources to supplement what they could afford to provide.

4.10 RQ 3

RQ3: Are librarians opting out of government systems to pursue private assistance with connectivity when available?

A majority of the surveyed libraries hired private companies for technology support. Michigan and Nebraska are states that have a high rate of contracting or hiring outside individuals to assist with technology. Kansas and Wisconsin, both states with heavy system penetration, do not use these solutions as often. In Wisconsin the incentive would be even lower due to BadgerNet membership.

The high incidences of private contracts were in states that did not have an option for state system connectivity and technology assistance. However, again, some states that did have this potential elected to go with a private agency to serve either connectivity or technology support needs. These large differences between states illustrate the fact that libraries in system-heavy states are utilizing their systems for technology needs the majority of the time. When asked if they use their systems for technology needs, librarians in Kansas and Wisconsin answered affirmatively most often, with Kansas at a 94% utilization rate and Wisconsin at an 80% rate. Illinois and Michigan were mid-range in this area, at 44% and 47% while Nebraska had the lowest rate of affirmative answer, at 28%. Several of the librarians who affirmatively

answered to hiring private technology companies for support, also affirmatively answered that librarians independently address technology issues. Very few libraries selected "Other" for their technology assistance. Those who did mentioned volunteers, relatives, and school staff members that assisted them with this process (Figure 21).

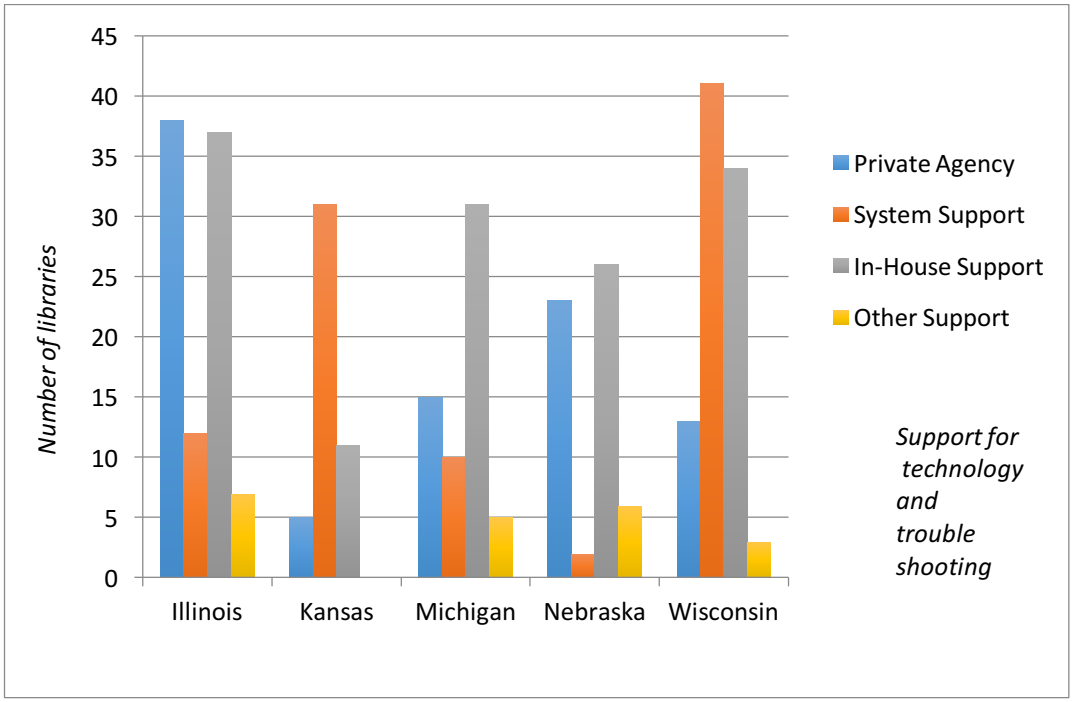


Figure 21. How do you address computer technology issues and troubleshooting?

From this quantitative portion, it appeared as if many libraries in states that did not have systems were hiring private agencies for their technology needs. However, after the survey results came back, there were several additional questions raised as to why this was occurring. The qualitative interviews did provide supplemental information on this topic, with several derived codes. These included issues such as high cost technology consultants without

significant output levels, and directors consulting with other directors for technology assistance. Topics discussed included infrastructure upgrades with issues such as telephone companies unwilling to update current infrastructure, unused fiber, and telecommunications companies not having compatible equipment. Respondents also mentioned connectivity was cost prohibitive for the library. They also discussed opting out of library systems due to substandard service, as well as free Internet as a donation becoming substandard. Participants referenced peer networking and discounts, as well as filtering and shared networks.

There were two scenarios when private technology companies were hired: for connectivity to the Internet, and for technology and troubleshooting assistance. All libraries in Kansas, Nebraska, Illinois and Michigan hired private ISPs for their connectivity needs. Michigan, Illinois, and Nebraska systems were not involved with any network management. In Kansas, however, system staff would work with ISPs to modify connections for library-specific use (assisting with router settings, segmenting networks with private and staff computers, etc.). Most libraries in Illinois, Michigan, and Nebraska independently hired private consultants for their library's technology and troubleshooting needs. In the majority of cases, this was not because they did not want to use their systems for these things. It was because their systems did not offer these services, and they did not have any other option. Only Kansas and Wisconsin systems assisted their libraries with technology and troubleshooting issues. Some Michigan co-ops did do this as well, but this was inconsistent statewide.

There was, however, a small group of rural libraries with slightly larger populations and budgets that would opt out of system connectivity and/or system technology assistance altogether

in the two states that offered it. When asked why a Kansas librarian hired a private company to assist with technology versus her library system, she stated:

> Because…there are so many libraries. We have a lot of technology needs and a lot more computers online than most people… our technology was not moving forward. We were not in the 21st century…I'm not going to (be) …limping along and asking: Oh please? Can you come today? We really need you, something broke. We need somebody that's in town (IK1).

A librarian in Wisconsin echoed this sentiment, but the issue was speed and not as much troubleshooting. When asked why he elected to go with a private company versus the system broadband connectivity, he stated, "…the speed wasn't there…and you couldn't increase it." (IW2) When asked if everyone in the system had done that as well, he noted that the only libraries that did were those who could afford it. The systems did try to increase the speed for those remaining libraries by looking at router replacement. According to this director, this helped a great deal as libraries that were pulling in three mbps could now increase to 20 mbps with the new hardware.

RQ3a.**How do these private telecommunication interests impact connectivity in rural areas?**

Contracting with a private agency can be problematic as it pertains to Internet connectivity as well. According to one library director in Michigan: "The phone company techs tell me that their equipment across the street is old. The current parent company can't even confirm there is a problem because their equipment will not read the equipment across the street." (SM1). One Wisconsin librarian stated:

> We live in broadband/Internet poor area of the county. It's rural and no large providers want to compete here. However, we have a communications co-operative that has been instrumental in working with the county to make improvements when possible. (SW3)

A different Kansas librarian supports this stating:

> Being rural, getting ISP's willing to service our small communities is hard to find! They don't see it as profitable. If they do come here, we end up paying almost double or more (than) what gets charged in a much larger city 35 miles south of us! (SK1)

Another issue is infrastructure. One librarian from Kansas says:

> The Internet provider will not upgrade their system (ex. optic lines have been put down but not used). The telephone company is over its head—doesn't know how to deal and refuses with the demand, need for quality services and need for system updating. (SK4)

Most libraries do not even have the option to get system assistance with technology. In Illinois and Nebraska, state funded systems do not assist with network management or direct technology assistance. Michigan often uses a peer network to exchange ideas and leverage discounts on technology-related contracts. Kansas systems assist libraries with private companies and technology needs. One system representative was concerned, though, that state money in Kansas would completely disappear in the next few years, which would create some challenges.

Many Wisconsin libraries utilized their library system technology staff in connecting to BadgerNet. Wisconsin's 17 regional library systems are statutorily obligated to provide technology assistance and support to their members as a condition of receiving funding, and therefore allocate bandwidth for each library on the network (American Library Association Office of Technology and Policy, 2009). System staff would work directly with telecommunications companies to maintain the network, assist staff members with network

traffic issues, and directly work with hardware and software in local libraries. One challenge in Wisconsin was how to divide the bandwidth on an interconnected system that could create a bottleneck. Library system IT staff members have authorization to increase library facility bandwidth up to 10 mbps at this point. However, anything beyond that requires special authorization through Technology for Educational Achievement (TEACH), a program of the Wisconsin Department of Administration (DOA), Division of Enterprise Technology. The TEACH website addresses its mission and goals, stating:

TEACH subsidizes the cost to provide telecommunications access to eligible educational agencies. TEACH services began in 1997, funded by the state universal service fund. The $22 million it distributes annually are applied toward the cost of connectivity. The DOA works with school districts, libraries, private colleges, and the board of regents of the University of Wisconsin System to promote the cost-effective installation and maintenance of educational technology. According to the website, TEACH significantly lowers the cost of connectivity to BCN as seen in Table 7 (TEACH, 2016).

Table 7
Monthly Service Rates for the TEACH program
(TEACH, 2015)

Sum of ITp, WAN and Video	Monthly Cost for TEACH	Monthly Cost for Customer	Monthly Savings for Customer
256 Kbps	$299.20	$100.00	$199.20
384 to 512 Kbps	$345.40	$100.00	$245.40
768 Kbps	$414.70	$100.00	$314.70
1.5 Mbps	$460.90	$100.00	$360.90
3 Mbps	$829.40	$100.00	$729.40
5 Mbps	$1,105.50	$100.00	$1,005.50
10 Mbps	$1,600.50	$100.00	$1,500.50
15 Mbps	$1,831.50	$250.00	$1,581.50
20 Mbps	$2,073.50	$250.00	$1,823.50
30 Mbps	$2,134.00	$250.00	$1,884.00
40 Mbps	$2,227.50	$250.00	$1.977.50
50 Mbps	$2,321.00	$250.00	$2,071.00
60 Mbps	$2,352.90	$250.00	$2,102.90
70 Mbps	$2,384.80	$250.00	$2,134.80
80 Mbps	$2,416.70	$250.00	$2,166.70
90 Mbps	$2,448.60	$250.00	$2,198.60
100 Mbps	$2,480.50	$250.00	$2,230.50

Some libraries receive their Internet free from a local provider. However, there are issues with this as well. A library director in an area of Nebraska states:

> They (the ISP) gave us special accommodations knowing that we were a library...then they changed their plans and they updated the home users to have more bandwidth. And what we saw here is our free little substandard service went way lower ...and all the bandwidth requirements are going way up. (IN1)

High phone service costs plague rural areas of Nebraska. This director states: “Regular service is $80 a month. Yeah, are you kidding me? It’s exceptionally high and that is just landlines and that is why everybody got rid of them.”

As more public libraries and school libraries partner up to take advantage of programs, there have also been other challenges beyond speed concerns. Contracting with private telecommunications companies may affect privacy, as they have no obligation to protect patron records. Many school/public library hybrids had some conflicts when it came to filtering computer access and would need to separate computers. While the school had strict filtering software, the public librarians many times did not want this software to impede access on the public side of the library. Some public libraries combined with their schools would isolate their wireless connectivity, and pay for that independently with the intent of not filtering the wireless. However, if an individual does not have a device to use at the library, it will affect access on the wired public computers. These are a few issues that became problematic for many libraries that had combined in this way. However, the advantage of combining with a school library, according to library directors interviewed, was that technology support is typically provided through the schools where normally a rural library would have to manage or contract out (for their own).

It is clear from the data that when technology support and network connectivity for rural public libraries are available, the libraries were relying on their systems to provide it. Very few libraries opted out of system support or a shared network. On the few occasions that this did occur, it was because the library staff members were dissatisfied with the Internet speed or quality of service and could afford to approach a private provider who could better meet these needs. However, this was only when another provider could assist in this way. Some librarians interviewed did not have a good local infrastructure, or any system support. This made it challenging to provide the level of support that their communities needed. This issue was prevalent in the following research question as well.

4.11 RQ 4

RQ 4: What is the role of the librarian in digital literacy in rural libraries?

Several codes were derived from open-ended survey questions and interview questions that addressed E-government, troubleshooting, and technology access. To answer this question, themes included the variability and set up of mobile devices, e-government and librarian assistance levels, the closing of local agencies, unemployment filing, elderly patrons, tax filing and Medicare. Troubleshooting tasks with patrons included printing-related issues and human resource tasks (printing out check stubs, etc.). Additional comments included assisting individuals with social media such as Facebook and utilization of experienced staff and volunteers for digital literacy. Continuing education for existing staff had several themes including webinars, face-to-face workshops and librarians not having MLS/reference librarians, low wages of staff members and technology fears.

After surveying and interviewing library directors in each state, it was clear that digital literacy was a primary task in their every day schedule, with nearly 91% of librarians doing one-on-one technology assistance. According to one Wisconsin library director, the reason for this was not just that it was the only place in town to ask, it actually was a place in town that most people sought out for community relationships and guidance. He states, “We are definitely a community center here. People will call and say; what do you know about (community member’s name)? How is he doing? I talk to some of them, that’s just the way it is. It’s a small place.” (IW1) It is that comfort level, according to one library director, that allows people to feel free to ask questions in a safe space.

Librarians did experience some anxiety about technology and e-government. According to one rural librarian in Kansas:

> From my understanding, if library staff goes too far in offering assistance, the library can be held liable. Technically, I try not to help with anything that contains personal information beyond the information the patron provided on their library card application. Occasionally there are patrons who know next to nothing about computers and I might have to go a little farther, or I have on occasion allowed a patron to stay after the library closed to complete their unemployment application. I had to stay on my own time to make this happen. (SK1)

Only two of the library directors interviewed in the rural libraries had graduate school education, or access to reference librarians (only 5% of libraries employed one). Being isolated from library schools and continuing education opportunities was definitely a challenge. Libraries took advantage of system-wide continuing education (CE) when possible. This was different in each state surveyed, where Kansas had 28 out of 31 participants answer affirmatively to the question as to whether or not they use their system for CE. Nebraska, however, was at the low range, having only 21 out of 39 librarians utilize their system for continuing education. Kansas however, did have quite a few library systems in comparison to Nebraska that had only four. Rural libraries did often find themselves struggling to attend face-to-face meetings that were several hours away. Figure 22 shows that there was some variance of webinar utilization across the states. While Kansas and Wisconsin had a lower range of webinar use when looking at webinar versus face-to-face attendance, states without state or federally funded library systems like Illinois, Nebraska and Michigan had a much higher incidence of relying on webinars when looking at only these two categories.

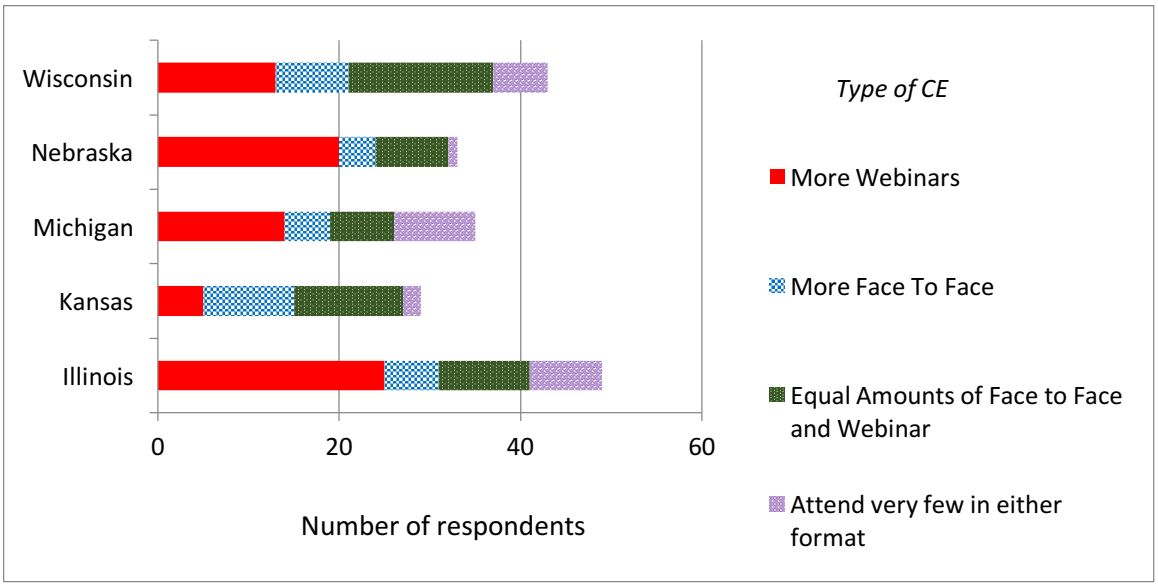


Figure 22. Do your staff members attend continuing education (CE) opportunities? For those who attend what type of CE do they utilize?

When possible, many librarians utilized webinars. One librarian in Michigan stated:

> Now that they're doing more of them (workshops) online and doing webinars, I don't have to leave here when we're short staffed. I used to not be able to go to lots of things and now it's like, ok, webinar, somebody cover the desk for this hour while I'm listening...I truly love webinars (IM1).

For the most part, survey participants felt their speed for webinars was adequate. For those that did respond to this question and did not provide an "other" or "I don't know" answer, 94% (166 out of 176) stated there was not a problem with speed most or all of the time. Only 5% found that their speed rarely was able to keep up with webinar requirements. For that 5%, the majority would give up and not attend. A few tried other solutions, like dialing in. One Nebraska librarian could only listen to webinars in the mornings because "Afternoon sessions are rarely feasible." (SN2) A few other directors said that they attended webinars from home due to not having time to do them during their shifts. Most of these librarians did this without pay. The responses of these library directors mirrored the responses of system survey participants, where

88% (14/16 respondents) stated that speed was not a problem for their member libraries when participating in online CE most or all of the time (Figure 23).

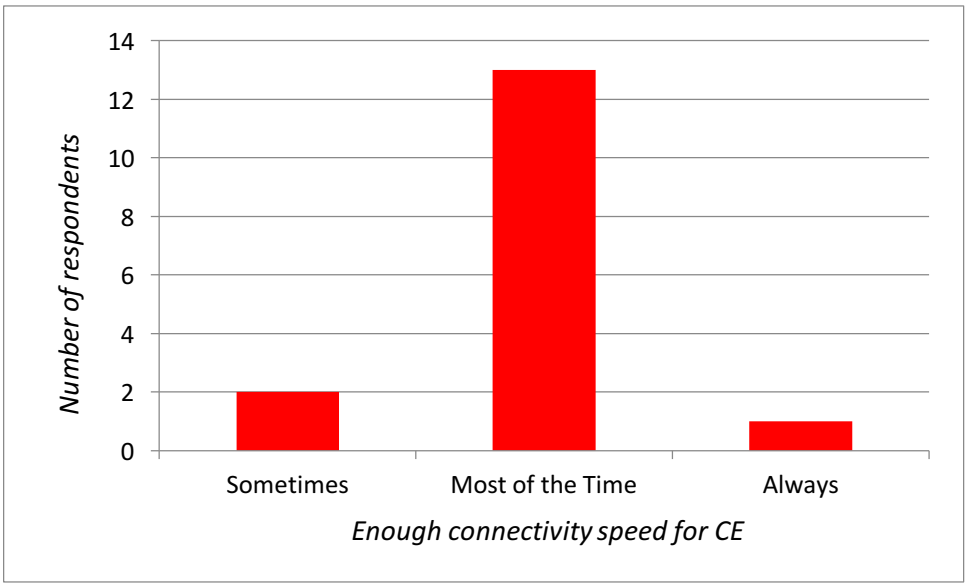


Figure 23. Are your member libraries' connection speeds adequate to meet the requirements of most online continuing education for staff (Webinars, etc.?)

One significant problem is the staffing needed to address technology questions from patrons. Many of these (staff) people are either relatives of library staff or volunteers. Paid staff members are typically paid minimum wage and do not have extensive technology experience. The low wages and lack of benefits also affects employee retention and attracting candidates with technology backgrounds. According to one Wisconsin library director: "This year we got a little increase…. When I got here my staff was so underpaid…. they were making $7.50 (an hour) and this year I finally got (them to) $8.25." (IW1) These low wages affect staff retention as well as hiring a skilled workforce.

Often, librarians with little technology experience have to address issues and make major decisions regarding connectivity, according to many of the librarians interviewed. Most of these librarians do not have formal education in library science or technology, but are expected to make budget decisions to address these needs. One librarian in Nebraska talks about this issue, detailing the negative impact of contracting for service. She states, "I mean, a lot of the librarians around here, they're stuck in these contracts with repair guys and they spend hundreds of dollars for hiring somebody to do all of this when you can do it for free." (IN1) Other rural librarians in the county often approach this same library director for her expertise and knowledge. She goes on to say:

> They all come to me in this county anyway when it comes to computer questions depending on how satisfied they are with their service provider. There is one (director) who is content with their service provider and their $1,000 contract and whatever but the rest of them aren't and tend to have more questions.

In several interviews, rural librarians discussed at length how their small towns could sometimes work to their advantage. Many librarians utilized the assistance of relatives or friends for technology support on a volunteer basis. There are, however, some issues with this as well, as temporary staff would leave and the libraries would often have to scramble to find someone with network management knowledge. One librarian from Wisconsin states:

> The former director relied on a volunteer for the bulk of the technology based work in the library, including all of our networking. If the issue is more advanced, we often have to call the volunteer in. This is problematic because you shouldn't rely on a volunteer to keep your network running. (SW2)

Other librarians mentioned the fact that patrons will help them in a bind, as well as Friends groups who help in an emergency. Some librarians have a fear of computers, and mask this fear with other excuses. According to one Wisconsin respondent:

> From what I have been told, there was a perceived budget shortage but upon further investigation that was not true. The former director preferred working without computers and admitted to not really trusting them. Anything computer (work) related was done by support staff. I have a feeling this is part of why our computers are in such terrible shape. Technology was not a priority for her. (SW2)

One librarian in Nebraska says rural librarians are expected to answer questions that are often not related to the library at all. She says:

> The main questions that I really typically get and encounter are outside of…some of those ...library specific questions. The main ones that I get are, you know, my device isn't working, how do I reset it? How do I get onto this website? Can you help me get my paystubs? Can you help me print? We have some older people that, you know, now things aren't available. They used to mail things and now they have to use the Internet to get those things and so I have a lot of questions and concerns and help that I offer that way. So yeah, again with that older generation...they have to do their Medicare enrollment online, etc. (IN1)

This issue was significant on the survey responses as 197 of 205 library directors (96%) reported that patrons were coming in for e-government tasks and 152 of these librarians were assisting with these tasks.

Rural areas have a tendency to have fewer services, and a few areas had libraries that took over these jobs to fill in the gap. One librarian from Nebraska states:

> The local DHHS office closed. People must now apply for benefits online rather than through the office and a caseworker. This is difficult for many people who have no computer skills, so

> we have the sites to help them and enough computers to allow them time to fill out the forms. (SN1)

In hard economic times, one librarian discusses patron computer use, stating that unemployment was high and people were cancelling their home Internet, using the library's instead.

The older generation of Internet users was a group mentioned by a librarian in Illinois, especially as it pertains to social media. She states:

> We do get a lot of social media questions from older patrons, so we have a lot of patrons now who are joining Facebook…somebody wants to be my friend…So I would say we get repetitive questions about that, so we've had Facebook programs. But we do get a lot of social media from older patrons, not younger ones at all. A lot of things like, I want to upload pictures. How do I connect my camera to the computer? More hardware than software issues. (II1)

This came across in the survey data as well, where few libraries offered formal technology classes. Several librarians expressed that patrons preferred one on one technology training, as there was so much diversity in technologies and websites. Ninety-one percent of librarians noted helping with all technology tasks, regardless of what they were, on a one on one basis (Figure 24).

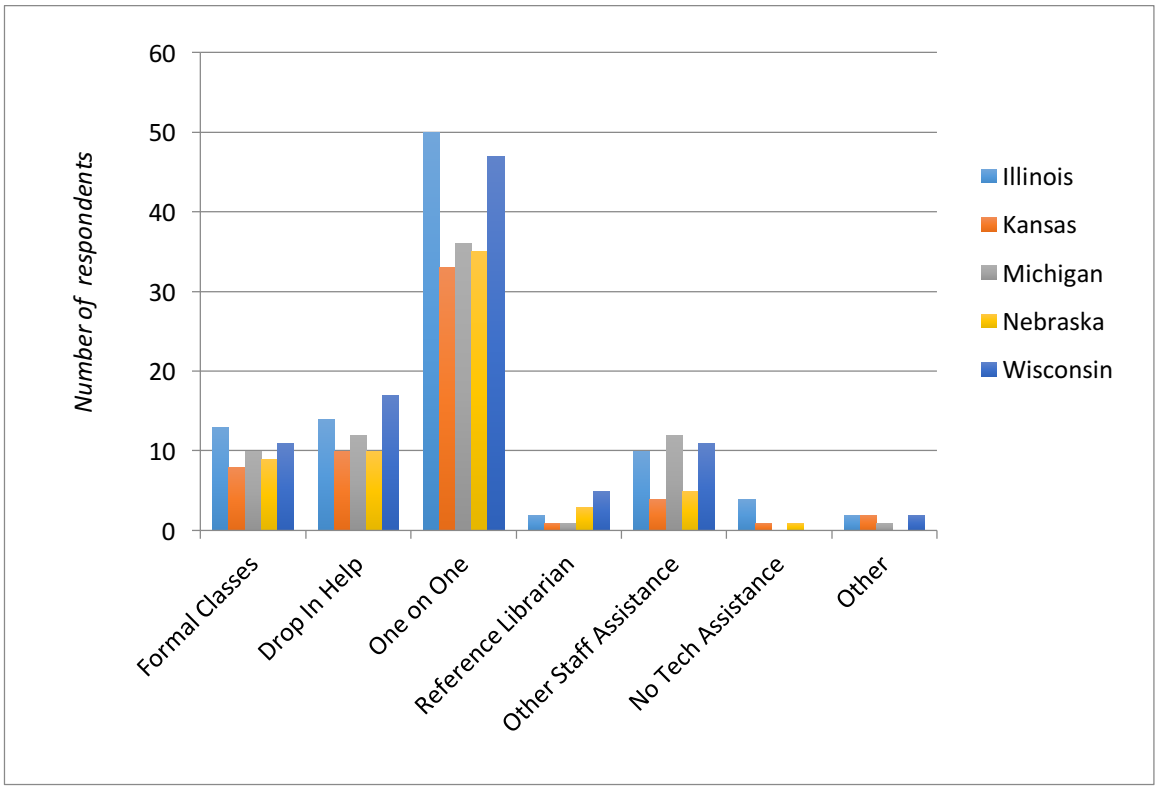


Figure 24. How do you assist patrons with information technology?

This same thing holds true in many libraries, where the staff are getting questions related to new technologies. One director in Kansas states:

> Everybody has a different piece of technology…How do I use this tablet? …And they might have an ASUS...an iPad…. a Kindle…a Toshiba…Panasonic…I mean all those little Androids…work differently. And we, our staff, didn't have access to all of the iPads and everything ourselves unless we have them personally because we just didn't have the money to buy them...they cost thousands of dollars..(IK1)

This same library director stresses how set up is vital, when many of the patrons come to the library for assistance with a new device. Not only is it important to know the device, but also the

steps of preparing it for use out of the box. This same library was exploring issues related to circulating some of these technologies, the director wanting to see the items checked out. She states:

> We're going to have to work out how we're going to check them out...and who is going to get them…. you need to be careful how you check things out to people so you aren't discriminating...but on the other hand you don't want them just to walk away or just sit here.

Another librarian in Illinois mentioned this same issue. This majority of the technology questions in this library were troubleshooting. She says:

> Everything from how do I turn the computer on to more advanced questions. A lot of Internet browser issues, that sort of thing, accessibility issues. Then more recently because of eBooks and downloadable audio books that's become more of an issue. Different devices have different instructions and so I would say that's probably the big thing right now, that's probably most of our questions. (II1)

Technology continues to be a huge expense for libraries, with some directors discussing how it is one of the main expenses. E-books continue to be a challenge. One Kansas director states: "It is a challenge to pay $55 to $80 for a book...when your patrons can get it for $14. That's ridiculous! …If libraries, didn't exist, publishers wouldn't. There would be a lot fewer of them!" (IK1)

This data supports a clear role for the rural librarian in digital literacy. In all five states, librarians were addressing challenges concerning information access. The majority of assistance occurred on a one to one basis. Despite the fact that libraries were struggling to meet this need with lack of training and access to reference librarians, they were attempting to learn what they could to assist.

4.12 Conclusion: Research Questions

Qualitative and quantitative data in both surveys and interviews supported funding sources that had the most positive implications for connectivity. Through detailed interviews with library system staff and directors in the five states, there were elements of funding structures that were positive for libraries. The most frequently mentioned ones are in Figure 25 below:

Figure 25. Funding best practices articulated by library directors

Librarians mentioned these issues in surveys and interviews as the elements that most effectively impacted their budgets in a positive way. When looking at a model for best practice, these elements were found in various states, and contributed to successful funding and consequently improved ability to provide the Internet connectivity their communities needed.

Overall, the quantitative and qualitative findings in combination provide a bigger picture perspective of the myriad factors at play when determining the impact of funding structures on

connectivity, access and digital literacy. The discussion portion of this dissertation will address the interpretation of these findings and any implication they may have for current and further research in the area.

Chapter 5: Discussion

Some of the initial findings of the research illustrated the fact that rural libraries had generalized funding challenges that were, in fact, associated with connectivity. The researcher saw this with both the connectivity infrastructure as well as the hardware and software necessary for access. Most libraries have computers in the range of 3-5 years old, with the majority of libraries having budgeted replacement plans (Figure 8). Figure 7 shows that the two biggest issues that interfere with computer replacement and additions for all states were not having enough money or not having enough space in small rural branches. The implication of this is that libraries are operating with fewer computers to meet the needs of their communities and these computers may be obsolete, impacting speed of connection or vulnerability to viruses. It is clear that for those able to replace computers that they were attempting to address obsolescence and increased technology usage by patrons in their branches (Figure 6). This increased usage also had an impact on the most common articulated reason for computer slowdowns, peak hours and streaming content (Figure 3). Part of this issue could have something to do with the fact that some libraries still were utilizing a copper infrastructure shown in Figure 11. However, many library and system staff did not believe connectivity speeds have gotten worse over the past few years, but instead stayed the same or improved (Figure 4), and that librarians felt that they generally had enough computers to meet the needs of their communities (Figure 5). It appeared that connectivity speeds did not have as much impact on equipment purchase as other factors. This was addressed by one system technology staff member in Kansas who stated:

> First, library decisions to increase (or reduce) the number of computers are primarily the function of how many computers the library staff need to effectively do their work and how many computing devices are needed to meet patron demand taking into

> account acceptable wait times. Second: Amount of physical space available in the library impacts the number of computers more than available Internet bandwidth. Third: The amount of electrical and Local LAN (Ethernet cabling) have more impact than available Internet bandwidth *(network cable used on wired networks. Ethernet cables connect devices on local area networks such as PCs, routers and switches)*. Fourth: Available Bandwidth from the ISP comes in behind the above three impacts when deciding to increase or decrease computer numbers. Most ISPs in our area of Kansas have, over time, increased the bandwidth available to public libraries such that staff and patrons are able to function fairly well. None of the 40 locations have 100MB connections. Less than 6 have connections of 50MB. Less than 6 have less than 3MB connections. Most of the remainder have from 10 to 20 MB connections. Even with those limitations, the libraries are functioning at acceptable levels, though double or triple currently available speeds would allow more flexibility and options. (SSyK1)

While this creates a picture of what impacts speed and hardware generally, more specific findings can be summarized with themes derived within each research question. The discussion of these research questions will be divided into categories. The quantitative and qualitative data will be presented within each discussion portion to get a combined perspective on the interpreted data.

5.1 RQ1 Federal Funding

It was clear that, overall, federal funding programs were having some impact on rural public libraries according to the qualitative data. While they were certainly helping supplement some services, rural libraries were continuing to have major issues to best utilize the infrastructure. System staff and library directors indicated that the federal funding was so sporadic and in such small amounts that it just was not enough to cover the needs of rural libraries. This occurred with several federally sponsored programs, including BTOP, BIP, or E-

rate. However, 100% of the seventeen system respondents did answer that there have been broadband speed increases in the last five years for libraries all of the five states.

5.1.2 BTOP and BIP

Due to applications, federal broadband money is distributed unevenly in states, as programs are targeted differently, whether that money be federal infrastructure grants for rural and urban areas combined (BTOP), exclusively rural (BIP) with a focus on certain populations or community anchor institutions. Many states reported broadband increases in the past year (Figure 12) with libraries in Wisconsin primarily answering affirmatively to that question. This was likely due to the fact that during the timeframe of this dissertation in the winter of 2015, Wisconsin received a large Universal Service Fund grant through the Connect America Fund for broadband infrastructure development. This program subsidized telecommunications services in rural and remote areas and began being distributed to states in several phases. Wisconsin was included in phase 2 and began development around the time of this dissertation.

Illinois and Nebraska both received BIP/BTOP grants: Illinois having access to BTOP funding and Nebraska concentrated BIP funding in specific counties. However, many of the librarians did not have access to the infrastructure. Even if libraries were included in the funding, the proportion of funding to them was often very minimal. It was also difficult to isolate the proportionality of public library data from the existing dataset from the FCC, which did not differentiate between public, school and special libraries in many circumstances (Grimes, Bertot & Lincoln, 2012). This made the impact of these programs difficult to analyze as it was challenging to determine how many actual *public* libraries received support through this

program. When more detailed information on the project emerges, it would be beneficial to break down this data on a smaller scale.

It was clear from National Broadband Plan maps that vendors in areas that received infrastructure funding were advertising greater possible connectivity speeds. When searching for the communities the interviews took place in, there were some larger discrepancies in advertised available speeds. Michigan, Wisconsin, and Illinois had vendors advertising up to 1 GB per second, while Kansas ranged 25-50 mbps and Nebraska 50-100 Mbps according to broadband maps on the NTIA website.

Michigan did report a high amount of positive speed reporting, both by the librarian reported patron conversations and by staff members in the survey questions directly addressing this issue. Many of the librarians in the survey noted that they believed the reason for these positive conversations was the fiber to which their libraries had access. Michigan initially received the most targeted rural library anchor institutional funding to nearly 70 library systems, giving it quite a large penetration of federal funding for fiber. There were still some problematic areas in Northern Michigan that had noteworthy reports of infrastructure problems in the survey. Again, anchor institutions struggling with equipment needs and ongoing operating budget funding did not expect BTOP and BIP to be a complete fix for anchor institutions struggling with equipment needs and ongoing operating budget funding. Real, Bertot and Jaeger (2014) state, without investment in libraries in a strategic way, innovative and critical services could not be implemented with any type of permanence.

5.1.3 E-Rate Funding

A rural library could expect E-rate funding ranging from $300-$1500 a year for landline phone rebates. However, even when these small portions of federal money were available, many rural libraries did not apply for them. One example of this is the failure of many libraries to apply for E-rate rebates. This was consistent with a 2000 Urban Institute study that found that the application rates of the most rural and impoverished districts were the lowest in comparison to other entities that qualified. States that provided assistance to individual applicants had greater success rates for obtaining support (Oden & Strover, 2002). Many rural libraries in this research had low incidences of applications to these programs created for them, because they did not have the off-desk time to navigate a complicated application system. These libraries primarily focused on the day-to-day service of their libraries, and were so geographically isolated that they did not have much assistance in learning these processes. This isolation is getting worse with the downsizing of federated library systems in many states like Nebraska and Illinois, as systems have historically filed on behalf of these libraries, or at least provided continuing education on programs like E-rate. Some evidence for this is provided in the survey, where Illinois, a state that has only two systems that serve rural areas had a much lower incidence of E-rate filing at 42% in comparison to Kansas, that had an extremely high rate of filing at 72%. (Table 3) The 2012 PLFTAS data for all rural libraries in comparison showed that only about half of rural libraries were filing. It is interesting to see how this data can vary across the states, but Real, Bertot and Jaeger do acknowledge that some rural libraries have the advantage of state library systems applying on their behalf. This does not seem to be associated with the number of systems alone, though, as shown in this data. Wisconsin and Kansas, two states with heavy system penetration had very different E-rate application rates, with Kansas

having an extremely high rate of filing in comparison with Wisconsin that hovered around the averages found in the PFLTAS surveys. This provides evidence that the prevalence of systems is not presently associated with higher E-rate filing totals.

Another complicating factor is that this program that once supported telecommunications for libraries both with Internet and phone bill rebates in high cost rural areas, is now, in 2015, evolving into an Internet-only rebate program. New E-rate modernization policies are viewed positively, particularly by the American Library Association. However, just because the portion of money for connectivity is bigger, does not mean that rural libraries will take advantage of it. If individual libraries are not opting in to this targeted federal program, this could be a real issue for connectivity in future. It will be important to examine whether or not systems are assisting rural libraries with this process, and if so, if the diversion of some of the USF funds to these systems might be an avenue to increase the application rates. If systems are not feasible, funding could also be diverted to continuing education initiatives to assist in the process, as well as making the application process less complicated. At the time of this writing, there are opt-outs for one particular E-rate form, however, form waiver requirements include vendor cost and speed restrictions that are just not available in rural areas.

5.1.4 Federated Library Systems

Having federal funding supporting systems was often key to system survival, as the majority of states in the U.S. continue to cut drastically state aid for library systems. Rural libraries viewed systems as important in Kansas and Wisconsin as librarians used systems for technology assistance and network maintenance. The perceived importance of systems could also be linked to statewide networks, as network connectivity was a large element of the services

some libraries received through systems. Some believe that librarians with universal service funded systems were able to "fly under the radar" so to speak when state legislators were addressing general-purpose budgets. Therefore, states like Wisconsin that had this type of funding for their systems were able to keep more of them for longer periods of time (Wisconsin with USF funds had 17 systems, vs. Illinois with state funds having just 2 systems). System support was different across the individual states researched. There are formal systems that provide a framework for the libraries to operate under and to cooperate, and looser confederations of libraries that try to replicate some of these features on a smaller scale when the system level support is unavailable. However, the more informal systems are more flexible and do not have the element of required services, and their assistance may not always include technology-related tasks. There were clear differences in statutory requirements for federally funded systems like in Wisconsin, versus systems with some state funding, like in Kansas. While the statutory requirements made these systems less flexible to the needs of libraries, they also were held accountable for services that libraries needed the most. The discussion of federated systems is also important in the data derived that addressed the second research question examining state and local funding. The involvement of systems will be discussed in more detail below.

5.2 RQ2 State and Local Level Funding and Legislation Issues

The main issue with state funding mirrored that of federal funding—there was not enough of it to make a difference for the rural public library in these particular states, information communicated both in the qualitative portions of the survey and the face to face interviews in states that received this type of funding. This was supported by IMLS and COSLA

funding surveys that showed that federal funding comprised less than one percent of libraries' operating budgets in all states. Direct state aid payments to libraries did not have much impact simply because the money was such a small amount. States that only supported a few large library systems were also not as beneficial to the rural public library, as these systems could not provide the library with reliable technology assistance. Without active system support, these libraries were essentially on their own, with isolated technology and collections. It is important to keep in mind, though, similar to federal funds, state funding can be filtered into other services that do not appear in COSLA or IMLS statistics. One example of this is the statewide database in Michigan, where all libraries have the option to be a part of a materials sharing consortium. Several librarians mentioned this as being beneficial to their communities. State monies funded this resource.

Local support agencies, like Friends and Foundation groups, as well as private donors such as the Gates Foundation were very important to libraries. Librarians discussed the support groups that would donate money for technology purposes, or purchase hardware outright. Interviewed librarians indicated that private foundations such as the Gates Foundation funded several programs. One librarian expressed concern that if the Gates program did not continue, the library would have a difficult time purchasing the hardware they would need. The Gates Foundation recently announced that they would no longer be funding direct grants to libraries for hardware, as their goals have been largely accomplished (Chant, 2014). According to Chant (2014): "Many of the goals that led the foundation to focus on libraries in the first place, such as getting computer resources into libraries around the country and making sure patrons can use them to access the Internet, have been largely accomplished." Deborah Jacobs, who is the director of the Gates Foundation library initiative, compares this withdrawal of support to the

discontinuation of Carnegie support for libraries, stating: "While new investments may end, the resources the foundation helped to build will remain useful to the industry for years to come."(Chant, 2014)

5.2.1 Property Tax Funding

Another issue is the differentiation of funding sources within states themselves. The nature of most library funding is local, provided by property taxes in municipalities. According to Sin (2011), on average the local government provided nearly 77% of all funding for libraries. It was clear that municipalities with less of a property tax base and few local businesses had more poorly funded libraries in comparison to other libraries with stronger property tax support. Library directors in Illinois and Nebraska who noticed great budget contrasts with their wealthier neighboring communities articulated this observation. Glen Holt, former library director and scholar, discusses this issue in his 2009 paper on rural libraries, and their reliance on the minimal tax funding collected from agricultural property (Holt, 2009). Holt believes this has an extremely negative impact on rural libraries that do not have any other resources at their disposal.

5.2.2 State Library Legislation and Consolidated Library Systems

There were funding issues within states that librarians in surveys and interviews discussed, with complimentary data derived from a document analysis of statutes that were most critical for rural libraries. None of the statutes studied had any specific emphasis on rural public libraries, and it was clear in some cases that the statutes favored larger, more politically active libraries, which had more staffing resources to represent themselves. Some of the legislation

actually had an adverse effect on rural libraries, particularly in Wisconsin where resource library/inter-county billing legislation and the discontinuation of state maintenance of effort had a large impact. Several interviewees across the state articulated these issues.

Again, there is some evidence to suggest that it is not direct funding, but funds supporting federated library systems and some targeted programs that are working towards the advantage of the rural library. Federal and state data through both COSLA and IMLS do not include the financial figures that comprise system funding; they only consider direct federal payments to libraries. There is no tracking or inclusion of state and federal funding in these budget numbers to get a more realistic assessment of how much funding is actually directed to state and local federated systems. Wisconsin, for example, in the IMLS data has similar federal funding percentages as Nebraska, despite the fact that millions of dollars of Universal Service federal funding support 17 library systems in Wisconsin. The data shows that the majority of rural libraries with a large number of federated systems relied on their systems for their technology needs, which was valuable for access. Whether funded by the schools and libraries division of the Universal Service Fund, or funded directly by the state. These federated library systems were critical for technology assistance and troubleshooting for rural branches in Wisconsin and Kansas. Figure 20 shows the most critical services systems provided for libraries, with primary importance placed on technology and continuing education particularly in states like Wisconsin and Kansas. Nebraska, which has very few systems, did not report using them as much for these things. In states that did not have state or USF funding for systems, the libraries filled this gap by devising their own smaller networks to take advantage of shared services. Unfortunately, these systems only provided limited support. The prevalence of systems and the stability of the

funding source was one of the most critical factors for information access and technology support.

This is not to say that these systems do not need to be evaluated on a regular basis, especially with the changing technological needs of libraries. Many systems had the same types of staffing patterns as they did in the 1970s, before libraries had computers. There was also an issue with large administrative and overhead costs, redirecting money away from the public libraries being served. Another issue was that a greater number of libraries in states with heavy system penetration reported slowdowns (Figure 1). There was a significant relationship between library director reported broadband speeds and the level of system involvement in the library's technology needs. However, this relationship showed that systems with more involvement had lower speed reports from their member libraries (Table 4 and 5). One analysis could be that the shared nature of a highly controlled division of bandwidth, like in Wisconsin via their state library systems, might actually inhibit growth as some librarians suggested in interviews, although many system reports stated that regulating a distinct network such as BadgerNet could influence speed. It is possible that speed could be increased more quickly by the private sector if there was broadband availability.

It is possible the current environment of diminishing support by state and federal sources has library systems unwilling to call attention to themselves or advocate changing existing policy. Wisconsin has only recently formed committees to address these new challenges as few policy changes have been made since the formation of federated library systems. The disproportionally louder voices of the urban libraries that have higher staffing levels and more political representation often times overshadow the needs of these isolated rural libraries, even though many times, they outnumber their urban counterparts in system governance. Tailoring

these state and USF-funded systems to better meet the needs of the rural libraries may be a positive in the long term.

5.3 RQ3 Private Telecommunication Use and Interest

This funding and library system data was also utilized for the third research question. It is important to note, that when available, very few libraries opted out of system technology support for contracts with private agencies. This was the case whether state funding or universal service funding supported the system. One of the proposed solutions to some of the specific issues rural libraries are facing occurred in Georgia where they use state funds to pay the salaries of experienced MLS degreed librarians. These librarians work with rural librarians across the state where the municipality cannot afford to hire a librarian full time. One could argue that this strategy is not that much different than employing MLS level system librarians to assist with some of the same issues. These same systems are the target of budget cuts within states (Real, Bertot, & Jaeger, 2014).

Rural areas still were challenged with outdated infrastructure and access issues when hiring local private companies for their Internet needs. Most libraries in the survey reported experiencing connectivity slowdowns during certain hours and even unexplained lack of connectivity for several hours. Much of the qualitative research showed that rural librarians anticipated these disruptions as a part of living in a rural community, and expectations were often low. However, many librarians expressed concern over connectivity speed and access because it was increasingly important for their communities who were using the Internet for tasks such as job searching, filing taxes and Medicare applications or taking online classes for school or work. This led to the final research question on digital literacy.

5.4 RQ4 Digital Literacy

Rural librarians were key in assisting their communities with technology. However, it was clear that in all states, there was a continued expectation of computer and digital literacy assistance that was of an advanced nature. According to Real, Bertot and Jaeger (2014), 48.3% of PLFTAS rural respondents agreed that the lack of staff technology expertise was a challenge. The present study, with data from 2015 found that only 5% of rural librarians hired reference librarians. Librarians were utilizing their library systems for continuing education, but this was very different across the states. Less than half of the libraries in Nebraska used their systems for continuing education, in comparison to a large majority of librarians in Kansas, a state with heavy library system penetration. When breaking this down further, Nebraska had the highest rate of webinar attendance for those librarians who used their systems for CE. This makes sense because with so few library systems, the distance to attend a face-to-face meeting would be extremely challenging. Not surprisingly, Kansas had the lowest rate of webinar attendance (Figure 22).

This research supports the need for an increased level of targeted resources overall for public libraries in rural areas. Libraries should not be funded based on a local community's ability to pay. However, Molz's critical dissertation on federal funding for libraries discusses the fact that policy needs to be specific. She states:

> The present library legislation is rather loosely clustered around a central context of extending and improving library services in general. Because of the great administrative difficulties involved in the actual disbursement of funds, the legislation addresses itself to specific types of libraries, and as a result, the library programs are focused on the requirements of an institutional constituency comprising school, public, and academic libraries and not on a clientele of individuals having highly differentiated learning needs. In contrast to the federal public

> school legislation, which emphasizes students of exceptional financial need, the library legislation actually provides some federal funds for almost any type of library serving in effect almost any type of clientele...As a first step, then, in a reconsideration of the federal role, the library profession would do well to wrestle with a more precise identification of federal-aid beneficiaries, rather than federal aid benefits. At present, under the state plan provision of both the federal public library and the public school library programs, any or all such libraries in a given state can partake of the program funds, regardless of any indexes of economic, social or educational need on the part of the recipients of the service (p. 105).

Molz discusses the fact that many states that had retained large portions of LSCA Title 1 funds at the state level for administration, which prevented libraries from utilizing the funds at the local level. Targeting federal funds to high need communities would be a way to evaluate and distribute federal funding in the most effective way (Molz, 1973).

Chapter 6: Conclusion

The issue of underfunding and compromised information access in rural areas is not new. Research in the mid-nineties examined the differences between urban and rural libraries, with rural areas greatly lacking the resources and services taken for granted by their urban counterparts. Challenges included limited budgets, populations distributed over large geographic areas, lack of education and training, and sometimes, even, lack of automation for cataloging collections (Senkevitch & Wolfram, 1995). Recent studies have addressed broadband infrastructure issues that affect the rural public library. Kozak's (2010) interviews with rural residents while researching the Supernet in Alberta, Canada have laid the groundwork for some of the infrastructure development research in this dissertation. One librarian in Kozak's (2010) study noted the prohibitive expense to connect to the existing infrastructure, as well as the cost of hardware and software updates. This was a challenge very similar to what librarians articulated in the surveys and interviews in this dissertation. Many librarians had such small operating budgets that they did not have the additional funding to update their equipment, or modify wiring to their buildings.

Rural communities, according to Vavrek (1995), have been neglected units of study, and small libraries in particular have been ignored as models of service. This continues to be true. The PLFTAS surveys, while not specifically aimed at rural libraries, were able to provide some information about small libraries with populations under 25,000 people. This quantitative data, when isolated, has been very important. Real, Bertot and Jaeger (2013) discuss the recent challenges that these rural libraries face, including having the oldest computer equipment, the slowest access speeds and the lowest amount of federal support.

The contribution of this research is unique in that it pulls several best funding practices from each state to propose a more effective model. It also examines some federal funding initiatives specifically aimed at rural libraries, making recommendations for potentially improving these processes. Rural communities that rely on their libraries as critical access point feel the impact of funding practices more than other areas when there are state and federal library funding cuts, stagnation, or disproportionate allocation of funds to administrative costs. Rural libraries continue to experience several challenges including but not limited to: expensive telecommunications costs, buildings that have not changed since the age of Carnegie, lack of educational and continuing education opportunities and unpaid and underpaid librarians and technology staff. The most challenging part of all is that rural librarians are so geographically isolated from their peers they do not have their own space to discuss and brainstorm policy change in their own states. Even if they did have this space, they have little to no funding for travel and low staffing levels.

The findings of the first two research questions and sub-questions made it clear that local funding was the most critical indicator of information access. It is important to realize, though, that some federal initiatives that support infrastructure are just beginning to be accessible to many of the librarians surveyed in this study. Librarians did articulate the positive speed impact some federal programs were making. It was very challenging to determine if the impact would be more significant with updated equipment or software.

One issue with federal programs was the opt in by librarians and systems in various areas. E-rate applications were inconsistent across states, but overall had an application rate of under 50%. When examining USAC surveys, librarians' and administrators' concern seemed to be the challenge of the application process as a whole. Based on the controversial nature of Universal

Service to neoliberal advocates, it could be argued that this process is kept intentionally complicated to distribute less funding to high need areas. This program should be more effective for users. Kozak (2010) discusses the importance of comprehensive universal service aims, emphasizing the importance of sustained public deliberation. This deliberation is what will be key to maximize the effectiveness of these federal programs that currently exist. Information from users is a critical type of deliberation that can improve this program, if it is put to use when re-designing the process. While these programs were beneficial to build and improve infrastructure, there were still other library-specific issues that needed to be addressed. Although Michigan, Illinois and Wisconsin had begun to utilize their new high-speed fiber through federal broadband programs, they still were faced with other issues that affected their connectivity, like hardware and hookup costs. This echoes the findings in Kozak's (2010) research.

As far as state support, the data suggests that it was not the small direct state aid payments that were critical for the rural libraries. The most critical state support funding was for federated systems, when there were enough of them to meet the needs of the rural library. However, even these systems funded with state and federal support had large amounts of this funding tied up in administration. As far as libraries opting out of federated systems for either technical assistance or connectivity, it was clear that this circumstance for rural libraries was rare. Finally, there was significant support from surveys and interviews that librarians in all states were meeting critical digital literacy needs in their communities. While this might not have been as apparent through formal classes, librarians were meeting this need with one on one spontaneous assistance when necessary.

One limitation of this research is that the findings of this study are based largely on self-report, and subjectivity can occur. It was very challenging to be able to do speed reports specific

to each library, as the surveys were anonymized. Network management data was not accessible via private ISPs, and only one state, Wisconsin, collected broadband speed data on the system level. Wisconsin was a state that had the most striking negative speed reporting, and therefore had some speed assessments included to illustrate this fact. More quantitative speed measurements would be a good compliment to this research for a more detailed case study in future. Another issue is that although the selected states represented different funding and system approaches, they are still only five states of fifty. The findings may not be generalizable to the rest of the country. Further research on the effectiveness of current federal programs should be examined. It might be valuable to analyze the application process for E-rate and other federal programs. This research would be even more critical with the E-rate modernization legislation, shifting from reimbursing phone service to Internet service only. An understanding of the challenges experienced in the current environment of federal programs is needed before initiating advocacy for increasing federal programs directed at these same rural libraries. Additional questions stemming from this research include some inquiries about states that have a greater incidence of applications to federal programs. Is there anyone who assists these libraries in this process? What are the factors that led to an increased application rate?

It was clear from the data, that directors used library systems for a myriad of things, primarily technology assistance, continuing education, and interlibrary loan. What has been the impact of system consolidation on the rural library? Are there ways to most effectively meet the technology needs of the public library, while minimizing administration costs? Finally, it will be important to investigate patron needs in rural areas and how patrons use their local libraries. Are they satisfied with the services that the library provides? Where are areas of need in rural communities?

According to Senkevitch and Wolfram's 1995 research, it is not simply about the infrastructure itself, it is also critical to look at a large-scale effort to train librarians in using information services offered online. Polly (1995) states: "What should policymakers do? The policymaker should define the federal role to support public librarians in a networked environment. What gets left out is the hard part of going over the threshold into the library." (p. 67). Publicly funded rural libraries offer cost-effective means to extend access because they are mandated to provide community information services (Senkevitch & Wolfram, 1995). Many (if not most) of these rural libraries have not received any significant funding additions since LSA in the 1950s. According to some librarians, many of these libraries still exist only because they have a Carnegie building.

Holt (2009) articulates his belief that state governments need to step in and use their size and scale to perform as an equity agency, much like they did in education. Schools currently receive 40% of their funds locally, with 60% subsidized by state and federal funding. Serrano versus. Priest (FindLaw, 2008), and other state court cases have addressed the issue of local funding for education. According to Wellisch (1974):

> Serrano vs. Priest in California and similar cases in New Jersey, Minnesota and Texas have raised questions as to the constitutionality of using local taxable wealth as the basis for fiscal support of public education. In Serrano vs. Priest the California Supreme Court in overruling the lower court held that support of education cannot be allowed to depend on the fiscal capability of the communities within the state. The court's decision was based upon the belief that education is a major determinant of a person's chances for economic and social success and a unique influence on the development of political attitudes that are essential for a democratic society. Under the courts ruling of Serrano Vs. Priest the state now has the responsibility to demonstrate that it has a compelling interest that justified financing public schools through property taxes with the resulting inequities. (p. 61).

These court cases were only precursors to various forms of controversial educational legislation, and discussion about how schools should be funded still occurs. Baker, Sciaira and Farrie (2010) outline their fairness principles for public education, including the importance of varying levels of funding based on geographic location. One critical element of the fairness principle is that the level of funding should increase in relation to student poverty. A different model of public library funding should take this into consideration as well. In areas with low property tax income, supplementary and diversified funding is important to bolster these communities that do not have the resources to provide as much access as their communities may need.

There needs to be a coordinated effort, facilitating the movement of rural librarians through policy change. The ALA that has been so instrumental in rural library support and funding has focused most of their rural advocacy on expanding the E-rate program, despite the problems with the program as it exists now. E-rate may not be the answer to the connectivity issues that rural libraries are facing at this time because of the low application rates in the highest need areas. However, this does not mean there is not potential utilization in future with some modifications to the process. This funding has increased and is specifically directed at rural areas. The natural next step would be to look at the application process and find ways to make it accessible for rural librarians that may not be well supported, or to create programs to work on behalf of several libraries to apply for infrastructure funding in large areas.

Federal funding that directly supports the individual public library is not often a legislative focus. Those at the system level, like one co-op member in Michigan who advocated personally in Washington D.C., are declining in number due to state budget cuts. Since historically there has not been a strong public demand for federal money supporting libraries

directly, there has not been as much of an issue with cutting it this funding. Only 44% of individuals in 1980 even knew that most direct funding for public libraries came from local governments, and there is not much evidence to suggest that this number would change that significantly more than 35 years later (Advisory Commission on Intergovernmental Relations, 1980). The voices that support greater federal involvement in education just are not as vocal or present for public libraries, an institution that supports lifelong learning. This is likely due to educators and librarians experiencing a disconnect and not realizing their common interests. This was not always the case, as coalitions for federal support did exist, and successfully secured library funding in the past. Legislative discussions highlighting larger American values proved successful when advocating for programs such as LSCA. However, federal support programs have had an increasing negative impact on rural public libraries. The LSA program developed in the mid-1950s targeted rural public libraries. The Civil Rights environment in the 1960s had an impact on LSCA, and although not specifically rural library focused, did still have a mission of funding underserved and disadvantaged communities. LSTA, on the other hand, has eliminated the common good values of access to everyone, shifting the focus to technology across the board. This shift in focus has hurt the rural public library.

As the Internet is becoming vital for daily functioning in society, democratic values need to be examined on a federal level. What is the basic level of access that a citizen needs to be functional in a society? Digital literacy is critical in order to locate, evaluate and use digital information. Without access, people cannot develop digital literacy, and without digital literacy, they cannot gain maximum benefit from online resources. When information, services and resources are increasingly only available online, people without access are at a significant disadvantage. The lack of ability to use resources will have a negative impact on an individual's

success due to the limited access to E-government, employment, and informational resources. Public libraries play an important role in providing access and instruction in the use of these such resources (Information Policy and Access Center, 2013). It is becoming increasingly obvious that Internet access is critical for the freedom of speech and assembly. This has been illustrated by several scholars who study the role of social media in disconnected and isolated areas that were able to coordinate political protests and overthrow of repressive governments. Social service programs such as Medicare, Social Security and Unemployment have moved their application process from paper to online formats. The same is true for those applying for jobs. The IRS now only sends paper forms to homes, libraries or the post offices by request, with limitations imposed on the order size and distribution. The broader values emphasis on equity of access that exemplifies the concept of primary goods or "the barest essentials for the poorest citizen to function in society" that are being minimized by the neoliberal values manifested in the delivery of technology. The public library is constrained by these values, and rural libraries in particular have the challenge of advancing a public good in a neoliberal culture that does not support it.

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Appendix A: Surveys; System Module and Director Module

PLEASE ANSWER ALL QUESTIONS ABOUT YOUR PUBLIC LIBRARIES. IF YOU ARE A SYSTEM OR CO-OP THAT ALSO SERVES ACADEMIC, SCHOOL OR SPECIAL LIBRARIES, PLEASE CONSIDER ONLY THE PUBLIC LIBRARIES AS "MEMBER LIBRARIES".

1. What state is your system/consortium/co-op in?

- ❍ Illinois
- ❍ Kansas
- ❍ Michigan
- ❍ Nebraska
- ❍ Wisconsin

2. How many years have you been employed with the library system/co-op? (If a portion of a year, please round up)

3. Do you primarily meet the service needs of rural or midsized libraries? (Population information can be found at http://www.census.gov/popfinder/)

- ❍ Rural (less than 10,000 people)
- ❍ Midsized (with libraries that serve populations between 10,000 and 40,000 people)
- ❍ A mix of libraries in communities--some with less than 10,000 people, some between 10,000 and 40,000 people
- ❍ I don't know
- ❍ Other (PLEASE ELABORATE)

4. Have any of your member libraries received broadband increases in the past five years?

- ❍ Yes
- ❍ No
- ❍ I don't know
- ❍ Not applicable

4a. If “yes” is selected, in your opinion, have increased broadband speeds impacted the library director’s decision to purchase more computers for the library?

- ❍ Yes
- ❍ No
- ❍ I don't know
- ❍ Not applicable

4b. If yes is selected, please elaborate on the impact of broadband speeds and purchasing decisions for public library directors.

5. In your opinion, have some member libraries experienced slow broadband speeds?

- ❍ Yes
- ❍ No
- ❍ I don't know
- ❍ Not applicable

5a. If yes is selected, in your opinion, have slow broadband speeds influenced library director decisions in purchasing more computers for the library?

- ❍ Yes
- ❍ No
- ❍ I don't know
- ❍ Not applicable

6. Do system/co-op staff make recommendations to member libraries for computer purchases?

- ❍ Yes
- ❍ No
- ❍ I don't know
- ❍ Not applicable

6a. If Yes, have increased broadband speeds increased system staff recommendations for the purchase of computers for the libraries served?

- ❍ Yes
- ❍ No
- ❍ I don't know
- ❍ Not applicable

6b. If yes, have slow broadband speeds influenced system staff/co-op member recommendations for purchasing computers for member libraries?

- ❍ Yes
- ❍ No
- ❍ I don't know
- ❍ Not applicable

6c. If yes, please elaborate on how broadband speeds impact computer recommendations for member libraries.

7. Have any of your libraries ever experienced staff computer slowdowns due to heavy use of the public computers?

- ❍ Yes
- ❍ No
- ❍ I don't know
- ❍ Not applicable

7a. If yes, what do you do when this happens?

8. Have you implemented any procedures to combat issues due to broadband limitations?

- ❍ Yes
- ❍ No
- ❍ I don't know
- ❍ Not applicable

8a. If yes, how do you assist member libraries in these procedures?

9. In your opinion, have member libraries' transmission speeds gotten better, gotten worse or stayed the same over the past 2-3 years?

- Gotten better
- Gotten worse
- Stayed the same
- I don't know
- Other (Please elaborate)
- Not applicable

9a. If transmission speeds have gotten better or worse, why do you believe transmission speeds have gotten better or worse?

10. Do you have a technology replacement plan that member libraries must adhere to?

- Yes
- No
- I don't know
- Not applicable

11. Are your member libraries' connection speeds adequate to meet the requirements of most online continuing education for staff (Webinars, etc.?)

- Never
- Rarely
- Sometimes
- Most of the Time
- Always
- I don't know
- Other (Please elaborate).
- Not applicable

11a. If never, rarely, or sometimes, how do you address these issues?

12. Have you found at certain times that certain computer Internet protocol (IP) addresses are utilizing large portions of the bandwidth for a certain library?

- ❍ Yes
- ❍ No
- ❍ I don't know
- ❍ Other (Please elaborate)
- ❍ Not applicable

12a. If yes is selected, for most libraries how frequently is this disruptive to online activities?

- ❍ Never
- ❍ A few times a day
- ❍ A few times a week
- ❍ A few times a month
- ❍ Other (Please elaborate)
- ❍ Not applicable

12b. If a few times a day or week is selected, do you offer assistance with online functionality? (e.g. offering options to segment the network, temporarily increasing bandwidth, temporarily blocking heavy bandwidth-using websites)

- ❍ Yes
- ❍ No
- ❍ Not applicable

12c. If yes, how do you assist in these situations as they come up?

13. Who is the Internet service provider (ISP) for your member libraries? If you don't know, or if they vary, please notate here.

14. Have your member libraries received any grants or federal government assistance for fiber or any other connectivity method outside of their normal operating budget in the past five years?

- ❍ Yes
- ❍ No
- ❍ I don't know
- ❍ Not applicable

14a. If yes, did the funding cover the entire cost of the connectivity upgrade?

- ❍ Yes
- ❍ No
- ❍ I don't know

14b. If the funding did not cover the entire cost, please elaborate.

15. Who pays for member libraries' Internet connectivity? Please elaborate if there is more than one source. If you don't know this information, or if it varies, please indicate that.

16. Are there any other agencies that assist member libraries with technology resources?

- ❍ Yes
- ❍ No
- ❍ I don't know
- ❍ Not applicable

16a. If yes, what are these agencies that assist with technology resources?

1. What state is your library located in?

- ❍ Illinois
- ❍ Kansas
- ❍ Michigan
- ❍ Nebraska
- ❍ Wisconsin

2. How many years have you been employed in the library field? (If a partial year, round to the next year) _____

3. What geographic location would you consider your library to be in? (Population information can be found at http://www.census.gov/popfinder/)

- ❍ A rural area (population of under 10,000 people)
- ❍ A midsized area (population between 10,000 and 40,000 people)
- ❍ A rural area in close proximity to urban or midsized community
- ❍ Unsure

4. What kind of telecommunication infrastructure currently supports your library? (Can check more than one box here).

- ❑ Copper (example: Coaxial cable or twisted pair wiring)
- ❑ Optical Fiber
- ❑ Wireless
- ❑ Satellite
- ❑ Unsure
- ❑ Other (Please elaborate)

5. Do you ever experience public computer responsiveness slowdowns when patrons access the Internet?

- ❍ Yes
- ❍ No ***Skip to 6***
- ❍ I don't know ***Skip to 6***

5a. If yes, under what circumstances do the slowdowns take place?

6. Do you modify your procedures or routines during these slow times?

- ❍ Yes
- ❍ No ***Skip to 6***

6a. If yes, how do you modify your procedures?

7. Do you have enough computers to meet your current demand for patrons?

- ❍ Yes
- ❍ No
- ❍ I don't know

8. In general, have you been purchasing more or less computers for your libraries?

- ❍ More Computers ***Skip to 8***
- ❍ Less Computers

8a. If you are purchasing less computers, why is this the case?

9. How old are your current computers?

- ❍ Less than 1 year
- ❍ 1-3 years
- ❍ 3-5 years
- ❍ 5-7 years
- ❍ Over 7 years
- ❍ I don't know
- ❍ They are of varying ages (Please elaborate)

10. Do you have a replacement plan in your budget for computers?

- ❍ Yes
- ❍ No
- ❍ I don't know

11. Have you received any broadband speed increases in the past 5 years? (Broadband defined as bandwidth levels over 256kbps).

- ❍ Yes
- ❍ No ***Skip to 11***
- ❍ I don't know ***Skip to 11***
- ❍ Other (Please elaborate)

12. If you received increased broadband; did this increase influence your decision to purchase more computers for the library? (Check all that apply)

- ❑ Yes, as replacements
- ❑ Yes, as additions
- ❑ No. Speed has not impacted my decision to add new computers.
- ❑ No. There are other factors impacting replacement (Please elaborate)

12a. Has the increase in broadband speed caused the library to promote or offer new Internet-based services?

- ❍ Yes
- ❍ No ***Skip to 11***

12b. If Yes, please elaborate on these services

13. Have there been factors that impacted your decision to purchase more computers for the library?

- ❍ Yes
- ❍ No ***Skip to 12***

13a. If yes, what have been the factors that have impacted your decision to purchase more computers for the library?

14. Have you ever experienced staff computer slowdowns due to heavy use of the public computers?

- ❍ Yes
- ❍ No ***Skip to 13***

14a. If yes, what do you do when this happens?

15. If you manage several different branches, do you find that broadband speeds differ across these branches?

- ❍ Yes
- ❍ No ***Skip to 14***
- ❍ I don't know ***Skip to 14***
- ❍ Not applicable ***Skip to 14***

15a. If yes, why do you believe this is so?

16. How do you address computer technology issues and troubleshooting? (Check all that apply)

- ❑ They are handled in house
- ❑ Our library system assists us
- ❑ A private agency assists us
- ❑ Other (Please elaborate)

17. In your opinion, has your computer transmission speed gotten better, gotten worse or stayed the same over the past 2-3 years?

- ❍ Better
- ❍ Worse
- ❍ About the Same ***Skip to 16***
- ❍ I don't know ***Skip to 16***

17a. If it is better or worse, why do you believe this has occurred?

18. How do you pay for your Internet access in your library?

- ❍ Pay from library budget
- ❍ Consortia or system pays for it

- Both the library budget and the system/consortia pays for it
- I don't know
- Other (Please elaborate)

19. Do your staff members attend continuing education (CE) opportunities, for example, webinars and/or face-to-face workshops?

- Yes
- No ***Skip to 18***
- Some staff members attend, some do not

19a. For those that attend do they:

- Attend more webinars than face to face CE opportunities
- Attend more face to face than webinar or online opportunities
- Attend an equal amount of webinar/online and face to face CE opportunities
- Attend very few CE events in both webinar and face to face formats
- Other (Please elaborate)

20. Is your Internet connectivity speed adequate to meet the requirements of most online continuing education for staff (Webinars, etc.?)?

- Never
- Rarely
- Sometimes ***Skip to 18***
- Most of the time ***Skip to 18***
- Always ***Skip to 18***
- I don't know ***Skip to 18***
- Other (Please elaborate)

20a. If rarely or never is selected, how do you address connectivity issues for continuing education?

21. Do patrons ever discuss the library's broadband speed with the staff?

- ❍ Yes
- ❍ No ***Skip to 19***
- ❍ I don't know ***Skip to 19***

21a. If yes, are these conversations:

- ❍ Mostly Positive
- ❍ Mostly Negative
- ❍ A combination of negative and positive
- ❍ I don't know
- ❍ Other (Please elaborate)

22. Are you a part of a library system or consortium? (A group of libraries that partner to coordinate activities, share resources, and combine expertise)

- ❍ Yes
- ❍ No ***Skip to 20***
- ❍ I don't know ***Skip to 20***

22a. If Yes, please explain the type of consortia or system you belong to (state system, regional consortia, etc.). If more than one, please describe each.

23. How do you use your library system or consortium as a resource? (Check all that apply)

- ❑ For technology assistance
- ❑ For continuing education
- ❑ For guidance on legal issues that come up
- ❑ For genealogy, preservation or metadata assistance
- ❑ We do not use our library system for any of these things
- ❑ Other (Please elaborate)

24. Do patrons use your library for e-government services for example; doing taxes online, filing for Medicare/social security, unemployment benefits, etc.?

- ❍ Yes
- ❍ No ***Skip to 21***
- ❍ I don't know ***Skip to 21***

24a. If yes, do library staff members assist them with these processes?

- ❍ Yes
- ❍ No

25. How do you assist patrons with information technology? (Check all that apply)

- ❑ Formal Classes
- ❑ One on one Assistance
- ❑ Scheduled drop in times
- ❑ Reference librarian appointment
- ❑ Appointment with other staff
- ❑ None of the above
- ❑ Other (Please elaborate)

26. Who is your Internet service provider (ISP)?

27. Have you received any grants or federal government assistance in addition to your general operating budget for optical fiber or any other connectivity method in the past five years?

- ❍ Yes
- ❍ No ***Skip to 24***
- ❍ I don't know ***Skip to 24***

27a. If Yes, please state the source and date of the funding.

27b. Did they cover the entire cost of the connectivity upgrade?

- Yes, ***Skip to 24***
- No
- I don't know ***Skip to 24***

27c. If you stated the entire cost of the connectivity upgrade was not covered, please elaborate.

28. Do you make payments to other libraries (not systems) for services?

- Yes
- No ***Skip to 25***
- I don't know ***Skip to 25***

28a. If you selected that you make payments to other libraries for services. Please elaborate on what these services are, and why payments are made.

29. Does your library receive funding from the state (not only for technology)?

- Yes
- No ***Skip to 26***
- Our state funding is filtered through other agencies
- I don't know ***Skip to 26***

29a. If yes, or filtered through other agencies, what is the funding used for?

30. Does your library receive local funding for technology (city, county, local municipality)?

- Yes
- No ***Skip to 27***
- I don't know ***Skip to 27***

30a. If Yes, what is the funding used for?

31. Does your library (or someone on behalf of your library) file for E-rate funding (rebates on library telephone bills)?

- Yes
- No
- I don't know
- Other (Please elaborate)

31a. If yes, what do you receive E-rate rebates from?

- Telephone bills
- Internet bills
- Telephone and Internet bills
- I don't know

Thank you very much for taking this survey! As part of this research, I am looking for volunteers to participate in short interviews to follow up on the findings of the survey. If you would be interested in participating, please contact Jennifer Thiele at jhaase@uwm.edu.

Appendix B: Interview Questions (Directors)

1. How many years have you been in the library field?
2. Walk me through a typical day for you at the library (or libraries if they have several branches).
3. Tell me about some typical patron inquiries that you get on a given day.
4. How have these questions changed since you began work as a library director (if at all)?
5. Tell me about the technology needs of your patrons.
6. Tell me about your personal technology needs as a director.
7. Tell me more about the budgetary needs of the library.
8. Do you currently offer programming at the library? What are the programs you offer?
9. How do you assist patrons with information technology?
10. Do you experience any challenges in assisting patrons with their information technology needs? If so, how?
11. How does your funding model help or hinder IT/Internet access for you and/or your patrons? (This question may be different depending on the state…universal service vs. state funding vs. BTOP etc.)
12. How do you use your system/consortium as a resource for technology? (If they are a part of one)

The investigator will end the interview by asking the librarian if it would be possible to have a physical/virtual tour of the library.

Appendix C: Interview Questions (Systems)

1. How many years have you been in the information technology/library field?
2. Walk me through a typical day for you at your job
3. Tell me about some typical inquiries you get from member library staff on any given day.
4. How have these questions changed since you began employment with your system/co-op? (if at all)
5. Tell me about the technology needs of your members.
6. Do you directly assist your library directors with information technology? If so, how?
7. Do you face any challenges with the information technology needs of your members? If so, what are they? If not, please elaborate.
8. Do you face any challenges with staffing/budget for technology-related issues? If so, what are they? If not, please elaborate
9. Is there anything that you do behind the scenes with technology/connectivity to assist member library operations? If yes, what are those things?

Appendix D: Glossary of Acronyms and Definitions

ALA: American Library Association

BIP: Broadband Initiatives Program

BTOP: Broadband Technology Opportunities Program

DOA: Department of Administration

I & R: Information and Referral

ILS: Integrated Library System

IMLS: Institute of Museum and Library Service

IPAC: Information Policy and Access Center

LIS: Library and Information Studies

LSA: Library Services Act

LSTA: Library Services and Technology Act

Merit Good: A commodity which is judged that an individual or society should have on the basis of some concept of need, rather than ability and willingness to pay

MOE: Maintenance of Effort

NTIA: National Telecommunications and Information Administration

PLFTAS: Public Library Funding and Technology Access

POTS: Plain Old Telephone Service

Private Good: is excludable and rivalrous, preventing those who have not paid for it from using the good or consuming its benefits

Public Sphere: According to Buschman (2003), the public sphere is the space in between the state (public) and private life. It is where "unfettered and quality available information is gathered and argumentation and critique takes place among people as the basis of rational public will formation: The genesis of legitimacy in laws, decisions, and ethical norms in democracy." (p.42)

USF: Universal Service Fund

Universal Access: Access to telecommunications through a community center point, when home connectivity is not possible

Universal Service: The Telecommunications of 1996 set up specific guidelines for universal service criteria, something not included in the 1934 act. Section 254 outlines several principles of universal service, including quality services being available at just, reasonable and affordable rates, access to advanced telecommunication and information services in all regions, access in rural and high cost areas, equitable and nondiscriminatory contributions across all providers, specific and predictable support mechanisms in the federal government and the states and access to advanced telecommunications services for schools, health care and libraries.

Curriculum Vitae

Jennifer Thiele

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Education

PhD, Information Studies/Information Policy (In Progress) University of Wisconsin, Milwaukee, 2011-present.

Masters of Information Science, University of Wisconsin Milwaukee, 2005.

Bachelor of Science, University of Wisconsin, Green Bay 1998.

Teaching Experience

Teaching Assistant, Multimedia Application Development, online. D2L platform.

Discussion of online technology in application form, including web development, social media, GIFs, photo and video-editing, animations, and digital literacy/design. Supervised by Kendrick Gardner. University of Wisconsin, Milwaukee 2015.

Teaching Assistant, Foundations of Library and Information Sciences, onsite and online. D2L Platform. Foundation course for beginning graduate students in library and information studies. Supervised by Dr. Joyce Latham and Dr. Jessica Moyer. University of Wisconsin Milwaukee, 2014.

Teaching Assistant, Introduction to Information Science and Technology. Onsite. Foundation course for computer science and technology undergraduates. Supervised by Dr. Michael Zimmer University of Wisconsin, Milwaukee, 2014.

Instructor, Young Adult Readers' Advisory eCourse, ALA Editions, July-August 2012

Taught an online professional development course using Moodle, based on materials from The Readers' Advisory Handbook, Moyer and Stover, eds. (2010)

Invited Speaker

Thiele, J. *Equity of Access in Rural Libraries: A Case Study of Low Broadband Speed and its Impact on Practice.* University of Wisconsin, Milwaukee. March 5, 2013.

Thiele, J. *Programming and Outreach. Public and Community Library Services*. University of Wisconsin, Madison. October, 2012.

Thiele, J. *E-Content Reading Trends. Webinar*. Nicolet Federated Library System. August, 2012.

Kapusniak, R. & Thiele, J. *Overdrive Navigation and E-books.* WLA Support Staff Conference. Appleton, Wisconsin. Wisconsin Public Library Consortium. May, 2012.

Peer-Reviewed Articles, Posters, and Presentations

Wolfram, D., Bennett-Kapusniak, R. Glover, J., McCleer, A. Thiele, J. *Planning LIS Doctoral Education Around a Focused Theme: The B2A approach*. ALISE. Chicago, IL. January 27-29, 2015.

Moyer, J., Thiele, J., et al.. *Suspense, Adventure and Thrillers.* Crossover Readers Advisory. ALA editions. In press.

Thiele, J. *Broadband Infrastructure in Rural Areas of the United States.* ETTLIS conference. Noida, India. January 6-8, 2015.

Davies, K. and Thiele, J. Library Research: A Domain Comparison of Two Library Journals. *Community & Junior College Libraries* 19.1-2 (2013): 1-9.

Barniskis, S., Bennett-Kapusniak, R., McCleer, A. & Thiele, J. *Converging Knowledge: Networking the Gap between Public Librarians and Researcher*. Poster Presentation, ALISE, Philadelphia, PA. January, 2014.

Thiele, J. *Equity of Access in Rural Libraries: A Case Study of Low Broadband Speed and Its Impact on Practice*. Poster Presentation. LITA Forum, ALA. Louisville, Kentucky, November, 2013.

Barniskis, S., Bennett-Kapusniak, R., McCleer, A. and Thiele, J. The Traditional, the Digital and You. Discussing the PEW Report. Wisconsin Library Association Conference. LaCrosse, Wisconsin. October, 2013.

Thiele, J. 2nd International Symposium on Information Management in the Changing World. *The Digital Divide: A Case Study of the Impact of Low (or No) Broadband in Rural areas*. Limerick, Ireland. September, 2013.

Thiele, J., Kapusniak, R. & Zimmer, M. *Ebooks and Cross Generational Perceived Privacy Issues.* I-conference. Fort Worth, Texas. February 2013.

Moyer, J.E., Kaspusniak, R. and Thiele, J. *Have We Gotten Better? Evaluating Readers' Advisory Services Using a Secret Shopper Course Assignment*. Works in Progress Poster session, Association of Library and Information Science Education Conference. Seattle, WA. January, 2013.

Wolfram, D., Glover, J., Kapusniak, R., McCleer, A. & Thiele, J. *Overcoming Barriers to Information Access*. Joint Conference of Librarians of Color. Kansas City, MO. September, 2012.

Thiele, J., Kaspusniak, R. and Moyer, J.E. *Browsing for Leisure Reading in the Digital Environment: A Case Study.* Poster Presentation, IFLA. Helsinki, Finland. August 2012.

Thiele, J. and Moyer, J.E. BOBCATSSS 2012 Conference Report *New Library World*, Spring 2012 Vol. 133, no. 5/6

Moyer, J.E. and Thiele, J. Ebooks in Public Libraries: A Literature Review and Case Study. *New Library World*, Spring 2012, Vol. 133, no. 5/6

Moyer, J.E. and Thiele, J. *Four Case Studies of Ebook Readers.* Paper, 2012 BOBCATSSS Symposium Proceedings. Amsterdam, Netherlands, January 2012.

Moyer, J.E. and Thiele, J. *Four Case Studies of Ebook Readers*. Presentation, 2012 BOBCATSSS Symposium. Amsterdam, Netherlands, January 2012.

Work Experience

Library Director, Marinette County Consolidated Library System 2008-current. Direct a system of seven county libraries, overseeing a staff of 30 employees and a one-million-dollar budget.

Honors

Doctoral Student to ALISE award (2015). Conference funding to present dissertation poster in Boston, MA.

Selected Participant, Summer Doctoral Programme, Oxford Internet Institute, Oxford, UK (2014). Competitive summer program at an academic centre for the study of the societal implications of the Internet.

B2A Fellowship (2011-2015) Awarded by the Institute of Museum and Library Services (IMLS). Supportive Programs that enhance library and information science education and that help develop library leaders. This includes four years of funding for research and travel as well as tuition and scholarship.

Professional Organizations/Boards

Board Member, Marinette and Oconto County Literacy Council, 2011-present

Board Member, Past President/VP, Northeast Wisconsin Intertype Libraries 2009-present

Editorial Board, PhD Newsletter, University of Wisconsin Milwaukee, 2012.

Member, Wisconsin Library Association

Member, American Library Association