University of Texas at Austin

Abstract: *At the Edges of the National Digital Platform: Rural Library Hotspot Lending Programs*

Investigators at the University of Texas at Austin led by Dr. Sharon Strover, in partnership with researchers at the University of Oklahoma and Oklahoma State University, request $496,000 for the 20-month project titled *At the Edges of the National Digital Platform: Rural Library Hotspot Lending Programs*. Our project team includes scholars with backgrounds in communications, library science, economics and community development who have experience examining the relationship between Internet connectivity, community-based efforts to address the digital divide, and the economic and other outcomes associated with Internet use both at the individual and community levels. In this project, we plan to examine how rural libraries address the challenges of Internet connectivity (as well as their role in the digital environment) with new hotspot lending programs. Hotspot lending programs can enhance the ways that rural libraries can participate in the national digital platform.

The project will gather qualitative and quantitative data from 24 rural libraries with hotspot lending program experience, focusing on the librarians involved with the program, the users of the program, local community stakeholders, and non-users. The research will contribute both theoretical and practical knowledge that addresses (1) the role of rural libraries in their information ecosystems; (2) if and how loaned hotspots contribute to users' quality of life, digital literacy and social capital; (3) how such programs interact with other anchor institutions and their services (schools, government, etc.) within their communities, yielding community outcomes and (4) the practical, operational requirements and considerations for offering hotspot lending programs.

The deliverables include a Guidelines document on program implementation as well as a short report on Rural Internet Connectivity and Libraries, in addition to a final research report.   The conduct of the research will be informed by an Advisory Committee, and a community of stakeholders and scholars will help to assess and to circulate the final report findings. Results of the research should be useful to several communities, including policymakers interested in expanding adequate Internet connectivity in rural areas; the broader library community interested in extending digital services and resources to its constituencies; rural economic and community development staff intent on linking Internet-based resources to local needs; and scholars examining the dynamic interplay of space, place, and technologies.

At the Edges of the National Digital Platform: Rural Library Hotspot Lending Programs

Investigators at the University of Texas at Austin, in partnership with researchers at the University of Oklahoma and Oklahoma State University, request $496,000 for the 20-month project titled *At the Edges of the National Digital Platform: Rural Library Hotspot Lending Programs*. Our project team includes scholars with backgrounds in communications, library science, economics and community development who have experience examining the relationship between Internet connectivity, community-based efforts to address the digital divide, and the economic and other outcomes associated with Internet use both at the individual and community levels. In this project, we plan to examine how rural libraries address the challenges of Internet connectivity (as well as their role in the digital environment) with new hotspot lending programs. Hotspot lending programs can enhance the ways that rural libraries can participate in the national digital platform. The project will gather qualitative and quantitative data from 24 rural libraries with hotspot lending program experience, focusing on the librarians involved with the program, the users, local community stakeholders, and non-users. The research will contribute both theoretical and practical knowledge that addresses (1) the role of rural libraries in their information ecosystems; (2) how loaned hotspots contribute to users' quality of life, digital literacy and social capital; (3) how such programs interact with other anchor institutions and their services (schools, government, etc.) within their communities, and (4) the practical, operational requirements and considerations for offering hotspot lending programs.

1. Statement of Need

Providing library services in rural regions often has been a challenge for a wide variety of reasons, including financial resources, fewer qualified personnel, limited availability in terms of hours, and more limited technology services. As public libraries expanded services to include free public Internet access, particularly in the 1990s when federal dollars became more available through the E-rate program, they became central institutions for serving communities that either lacked Internet access altogether or that lacked *affordable* Internet access. Since rural regions historically have had fewer Internet access options (Whitacre et al., 2014; Flamm and Chaudhuri, 2007; Strover, 2014), the library's role has been especially significant, with libraries sometimes offering the only Internet access available for miles. In rural regions with highly dispersed populations, a local town's library therefore could play an outsize role in providing information and services of all sorts through its Internet connection, computers, and knowledgeable personnel to help patrons.

Recently, several libraries in the U.S. have sought to extend their services and ameliorate local digital divides by instituting hotspot lending programs. These programs essentially move Internet connectivity into people's homes by loaning out devices that connect to 3G or 4G cellular networks, and then allow patrons subsidized access to the Internet from anywhere on that network. The largest one, in New York City, has loaned 10,000 hotspot devices, targeting people with no home broadband service.[1] NYPL partnered with rural libraries in Maine and Kansas to develop hotspot lending programs. Other library programs in St. Paul, Chicago, Kansas City, Seattle, and Bellingham, Massachusetts also are experimenting with providing their users loaned devices that use cell phone networks to provide simultaneous, at-home connectivity capable of supporting several devices (such as desktop computers, tablets, or mobile phones). Non-profit Mobile Beacon, a hotspot and connectivity broker working with many hotspot lending programs, cites possible benefits associated with these programs, including providing opportunities for children to do homework at home using the Internet and thus reducing the "homework gap;" searching for job opportunities; staying in touch with distant family; and facilitating seniors as they search for health information.[2]

However, to date there has been no formal, publicly available investigation of the library hotspot programs. The proposed research would address this gap. By examining rural hotspot library programs in Maine and Kansas, augmented with comparative data from the NYPL hotspot lending program, we will investigate four questions associated with supporting the improved home-based Internet connectivity. First, assessing the changing role of the library - from the perspectives of librarians and community members - is core to our mission. Hotspot lending programs can enhance the ways that rural libraries can participate in the national digital platform. Second, assessing what difference free hotspots make to the users will be addressed. To what extent do library-provided hotspots provide something not available elsewhere? How does Internet use change when people have these devices for lengthy periods of time? The third question has to do with broader community outcomes that might occur as Internet connectivity is improved through these programs. Is there evidence of any longer-term outcomes associated with the availability of free, local Internet connectivity? How might we measure those outcomes, or identify relevant indicators? The fourth need is operational data on running such programs, including their costs, the problems that occur, staffing needs, and how libraries work with service vendors.

Rurality and Internet connectivity create unique challenges for extending the national digital platform via rural libraries. While there are many definitions of "rural," a recent IMLS study reports that 43.4% of all libraries are rural and small, and with those locations come more limited technology resources, both physical and human (Swan et al., 2013). Typically, connection rates are both more expensive and slower, paralleling the status of connectivity more generally in rural U.S. regions. Libraries also may be confronted with difficulties obtaining and keeping staff who are comfortable with digital resources; in rural environments where technological expertise is limited, this qualification is especially desirable but difficult (LaRose et al, 2007). In spite of such limitations, the actual use of publicly accessible computers in rural libraries increased over 2008-2011 while comparable numbers in metro libraries actually went down – a 6.7% increase in rural compared to a 9.5% decrease in metro areas (Swan et al., 2013). This may be because Internet access services and options progressed in metro regions, including better rates and speeds associated with mobile phone access to the Internet, while rural regions had no parallel improvement: Real et al. (2014) report that 70.3% of rural libraries constitute the *only* free Internet access in their communities, compared to 46.6% and 60% figures for urban and suburban libraries. It is also worth noting that recent research suggests the presence of a rural library increases local rates of residential broadband adoption (Whitacre and Rhinesmith, 2015). These background features condition the need to understand how hotspot lending redefines the rural library's role and its opportunities in this decade.

This research will investigate how these programs might reconfigure users' information seeking practices. How online behavior (devices used, types of content sought, etc.) more generally is influenced by having temporary home hotspots constitutes our second major research question, one on which currently there is no publicly available data. Given recent data showing that home broadband adoption among rural residents is down to 55% from 60% while smartphone use has increased to 15% among rural households with no home broadband, how smartphones are used for Internet purposes via the hotspots will be one component of our inquiry (Horrigan and Duggan, 2015). The role of smartphones in Internet access is not well researched, but as affordability becomes a more prominent explanation for not having home broadband, mobile phones represent an accommodation: they support many different uses, are mobile, and provide Internet access alongside phone and text connectivity (Strover and Schrubbe, 2015; Smith, 2015). Digital literacy – defined as the complement of skills and

capabilities to navigate Internet-based resources and to use various electronic devices - is a related matter this research will address in the context of hotspot access: easier access encourages greater digital literacy, but does not automatically mean that people acquire the best or most useful skills. Further, for many people who lack digital literacy, the social context in which digital skills are acquired is crucial (Rhinesmith, 2012); libraries and home are trusted environments that may influence Internet use and social capital (ALA 2013). Our project will provide insights into the digital skills and the role of social context for those participating in the hotspot program.

While several researchers have assessed the broader impact of Internet connectivity, there are fewer studies addressing rural community-level outcomes (Whitacre et al., 2014), and fewer still addressing the role of rural libraries' provision of Internet connectivity in the community context. None have examined the role of mobile hotspots. We know rural libraries are highly used by their constituencies and are important local gateways to the types of social and economic development information that cannot be found elsewhere in remote locations. They are important anchors and noncommercial spaces and mediators in digital inclusion (Olderburg, 1999; Allemanne et al., 2011; Griffis and Johnson, 2014), and can be instrumental for educational, job training, small business and civic engagement purposes (Hancks, 2012; Johnson, 2010; Holt, 2009; Allemane et al, 2011). Internet access, wired on-site as well as wireless, now are typical components in libraries' service profile, and some libraries coordinate with local schools. Wireless services and hotspot lending constitute ways to extend the walls of the library beyond the physical structure with its limited hours, and this research will enable us to investigate possible broader community impacts, especially with education institutions and job development, that could be linked to the increased connectivity provided by local hotspots.

The fourth area of investigation will meet the needs of libraries regarding the costs and operational considerations in mounting hotspot lending programs. By gathering data from local vendors on service availabilities and possibilities, our data will shed light on some of the costs, connectivity conditions and organizational demands of these programs.

The audience for this research includes public libraries interested in extending their services as well as policymakers tackling the difficult question of how to push broadband services into regions of the country and into populations that cannot afford it under normal market conditions. Rural telecommunications companies offering connectivity services also will be interested in the findings, as will local community and economic development leaders. As Internet-based educational, medical, and government services become the norm, it is crucial that rural regions not be left behind. Libraries, already anchor institutions in rural regions, have important roles in aiding their communities. Assessing how this relatively low-cost program might ameliorate access and affordability, and how digital literacy issues interact with using the hotspots and using library resources, can help rural libraries tailor their missions and their priorities and redefine the rural information ecosystem.

2. Impact
The goals of this research are (1) to gather information about operating hotspot programs in order to be able to inform the library community about practical matters regarding costs, working with service vendors, helping users with the devices, and so forth; and (2) to address conceptual and long range issues regarding rural libraries' informational roles in their communities, how users interact with hotspot-based connectivity, and the individual as well as community outcomes that may be associated with these local programs. The research is likely to generate information allowing other libraries to consider whether or not they will adopt similar programs. Understanding the outcomes that occur

when libraries contribute to home-based Internet will be addressed, and may reshape how libraries are perceived within the rural information environment. Our communication plan includes specific efforts to reach out to professionals in both the library field and those working in community development (our project team includes scholars in those areas), as well as to policymakers. Answering whether such programs contribute to improved homework outcomes, for example, or whether the prolonged access at home that such devices facilitate helps tasks such as completing forms (for employment, for various services), or even affects residents' health, cultivates an improved understanding of computer operations and the Internet. The project as a whole will build a greater understanding of the efficacy of home broadband, and how rural libraries might contribute to the underlying value of Internet access.

3. Project Design

Maine and Kansas, two states with significant numbers of small and rural libraries (73.4% and 74.9% of their libraries fit those categories respectively, according to IMLS), will be the field sites to investigate rural library hotspot programs. These two states also have been early experimenters with hotspot lending programs when in 2014 they crafted an agreement to work with the New York Public Library program. They received some of the early grant money to implement their programs. The Kansas program ended at the close of 2015, but a subset of the 18 participating libraries have opted to continue to loan hotspots in 2016. The Maine program with six rural libraries continues through 2016. All have gathered some data from users based on the short questionnaire developed by the New York Public Library, but no additional assessment is planned. Dr. Strover has access to their early data as part of her work with New York Public Libraries, and Maine and Kansas State Library partners are partnering with us on this research (see Partnerdoc 1 and 2, and SupportingDoc1).

The core research questions here reflect our concerns with impacts on users and communities, as well as operational issues and the broader library role in rural environments. As such, they specifically relate to the overarching goals outlined above.

  (1) What are the primary purposes and outcomes reported by users behind checking out hotspot devices?
      a. What drives use of the program? Affordability? Ease of use?
      b. How does digital literacy interact with use?
      c. Which types of devices are used to access the Internet, and how do users think about the affordances of different devices (especially smartphones)?
      d. How does social capital figure into purposes and outcomes?
      e. What types of data could illustrate long term outcomes? Based on qualitative data, can we expect to see alterations in school grades, employment numbers, or health outcomes (all domains where secondary data are routinely gathered), as a result of hotspot connectivity? Alternatively, are there other "soft" outcomes that we should examine in the long term?
  (2) How do hotspot adoption and use affect these small communities? Can such programs constitute meaningful routes toward digital inclusion?
      a. How do local community institutions (local economic development leaders, schools, medical facilities, etc.) perceive advantages/disadvantages associated with these means of accessing the Internet?
      b. What is the local environment for Internet connectivity in the target regions? How do alternative sources of Internet connectivity, if they exist, figure in remediating the local digital divide?

      c.   What role do/might community partners (e.g., schools, healthcare providers, local businesses and governments, etc.), if any, play in helping to promote these programs?

(3) How might such programs reflect libraries' roles in the local information ecosystem of their communities? How do digital platforms function in rural regions? As libraries extend their walls with these programs and possibly create new user demand as well as new opportunities, how do their local roles change? This will be examined from the perspectives of both the librarians as well as from the perspective of their user groups. What are the tools, data, relationships with schools, and new applications that might contribute to new Internet use-related outcomes?

      a.   How do these programs affect the role of the library in the community from the perspective of creating social capital?

      b.   To what extent do such programs address the "homework gap?"

      c.   Is there evidence of improved use of instrumental information related to education, health and government services as a by product of the connectivity provided through the hotspots?

(4) What are the operational processes, including costs, funding and vendor or Internet Service Provider relationships that enter into offering a hotspot lending program?
What are the "best practices" and "lessons learned" for these endeavors?

<u>Sample</u>: The research plan will assess the hotspot lending program at the libraries in Maine and Kansas that participated in the first phase of the program. The State Librarians partnering with us have agreed to assist in many ways, and NYPL is enthusiastic about opportunities to share data (See PartnerDoc 1 and 2, and SupportingDoc1). We plan to visit all the libraries (6 in Maine, 18 in Kansas) to gather data from librarians but are aware that across 24 library sites and communities there may be unevenness in the data we are able to gather from users and nonusers and from local community institutions. In-depth site visits (including focus groups, discussions with local leaders and librarians, and detailed review of lending procedures) are planned in at least 15 total communities. Most of the rural libraries in KS are "remote," and most of the rural libraries in ME in are "distant" or "remote" categories as defined by IMLS. Most of the small populations in their collective service areas are ethnically homogeneous, with a few exceptions in some western Kansas locations. Maine's community sizes are all under 3000, while Kansas community populations range from 368 to 11,201 (See SupportingDoc6).

<u>Implementation</u>: Our data includes gathering both qualitative and quantitative data to answer these four questions. On the quantitative side, we plan to (1) gather and analyze data from initial surveys that users have completed when they returned their hotspot device to the lending libraries; and (2) develop a survey to gather additional, post-check-in data from the participating users as well as some nonusers in the communities approximately 12 months they returned their hotspot device. Both methods contribute to **Question 1.**

Our qualitative data will include (1) conducting focus groups in targeted communities with small groups of hotspot users, contributing to **Question 1** and **Question 3**; and (2) interviews with library staff in order to assess training needs, their perceptions of community needs, and the tools and services they are most useful to them in extending Internet access and expertise to their constituencies. The latter interviews will allow us to gather the operational data needed to answer **Question 4** and will also contribute to **Question 3**. To respond to **Question 2**, we will interview local stakeholders regarding their assessment of the role of hotspot devices and mobile Internet connectivity. We also will gather

cost data and assess connectivity alternatives in the targeted regions; we anticipate turning to local vendors for some of this information. Finally, we will incorporate available secondary data (such as from the IMLS, the National Broadband Map, the Current Population Survey, or business-related data from the Bureau of Economic Analysis) pertinent to our research settings in order to generate more detailed pictures of these ecosystems.

We will convene an advisory panel for four meetings (conference calls or skype meetings) as a method of evaluating our progress and sharing interim findings. Members of this panel will include people from pertinent organizations such as those represented by our letters of support as well as researchers from around the country.

Analysis: Quantitative data will be analyzed using standard statistical techniques available through SPSS or Stata. NVivo data will be used to help analyze qualitative data. In our analyses, we will be cognizant of the contextual features in the library settings that affect individual use and community outcomes associated with broadband, including availability of library personnel to assist with questions, local school involvement alongside libraries, other community stakeholders' endorsement of the program and effects on use of the hotspots and the lending program.

Having at least two time points - one shortly after using the hotspot (when returning the device) and another some months later - for data gathering will strengthen our understanding of the dynamics of Internet access and use in rural regions, and provide an opportunity to examine connectivity and digital literacy as a *process* for the users. This is particularly important since one potential outcome is increased home broadband adoption (and effective use) *after* participating in the lending program; evaluating this metric would not be possible using only the project data currently available (one-time only surveys completed immediately upon returning the device).

Overall, our research seeks to probe the new institutional roles rural libraries may assume by providing in-home connectivity, and to learn something about the tools, data, relationships to schools and the new applications used in education and services and how staff expertise might contribute to successful outcomes. At the same time, technologies and broadband providers - as the Pew results on smartphone use suggest - are changing, and our research will investigate the connectivity options available in rural regions and profile relevant local and regional broadband options appropriate for library needs. Deliverables include (1) an initial report that will be circulated to partners, an Advisory Committee, and various organizations; (2) a summary report on Internet options for rural libraries; (3) a dataset that will be publicly shared; and (4) guidelines for successful implementation and (5) public presentations and such as webinars and shorter articles such as White Papers developed with interested organizations, as detailed under "Communications Plan."

4. Diversity Plan
Because the target sites are rural, they constitute a relatively understudied set of locations and meet the criterion of diversity. Within our intended sample libraries, we plan to include at least one library in Kansas (Stanton or Hamilton counties) that includes a significant Hispanic population and a greater than average Black population (Segwick county). Quinter, in Gove County, KS, also is an attractive site because its population has a high proportion of residents over 65, and seniors often are identified as a target constituency within the digital divide. (See SupportingDoc5 and 6 for site maps and demographic information.)

5. Project Resources: Personnel, Time, Budget
Our team has deep expertise in the structures of rural communities, the role of rural libraries, and the impact of broadband connectivity programs. The Technology and Information Policy Institute (TIPI) directed by Dr. Strover has a part time accountant and a full time Senior Project Coordinator who will assist with administrative aspects of the research, while the University of Texas Office of Accounting will be responsible for routine aspects of the billing and overall accounting. TIPI has a suite of offices and computers where data will be analyzed and housed. All data gathering activities will be approved by University Institutional Review Board processes, and centralized through TIPI for ease of aggregating once all focus groups / interviews have taken place.

Sharon Strover, Ph.D., Principal Investigator, Philip G. Warner Regents Professor of Communication: will direct the overall research effort. Dr. Strover is the current evaluator for the New York Public Library's hotspot lending program, the largest of its kind, with 10,000 devices loaned out across three of the city's boroughs, and has access to current data from the programs in Maine and Kansas, as well as pretest and emerging data from New York. She has managed research projects totaling over $7 million, and written numerous articles examining broadband policies and rural and community-based broadband efforts. She has researched broadband impacts in rural communities for USDA, State of Texas, and various non-profit organizations, and recently evaluated one large Broadband Technology Opportunities Program funded by NTIA that included both urban and rural sites. **Project role**: She will manage the overall program and work with Drs. Rhinesmith and Whitacre planning and executing field work in both Maine and Kansas, liaise with the research sites, and develop, gather and analyze the qualitative and quantitative data.

Brian E. Whitacre, Ph.D. Co-Principal Investigator, Associate Professor of Agricultural Economics: As an economist specializing in the role of technology in rural areas, Dr. Whitacre has both academic and real-world experience in this field. He has published over 20 journal articles dealing with the impact of broadband in rural communities, and has held over 100 workshops on e-commerce opportunities for small businesses in these communities. He has also led rural communities through a strategic planning process that emphasizes cooperation between rural and urban neighbors. Dr. Whitacre has won regional and national awards for his research, teaching, and outreach programs. **Project Role**: Dr. Whitacre will lead research efforts (including compiling survey data from hotspot lenders, focus groups with both users and nonusers, and interviews with library staff) in at least three of the Kansas libraries that participated in the program. Dr. Whitacre will also be the primary analyst for assessing potential data sources that could be used as part of an outcome-based evaluation for the hotspot lending programs.

Colin Rhinesmith, Ph.D. Co-Principal Investigator, Assistant Professor of Library and Information Studies: Dr. Rhinesmith's research is focused on digital inclusion and broadband adoption in low-income communities. His research looks at the role of public libraries, and other community-based organizations, in going beyond their physical walls to provide access to technology resources and digital literacy training. His work has been published in several LIS journals, including *Government Information Quarterly*, *Journal of Research on Libraries and Young Adults*, and the *Journal of Education in Library and Information Science*. Dr. Rhinesmith has experience as a public computing center professional, where he led digital literacy classes and provided one-on-one support to users. **Project Role**: Dr. Rhinesmith will spearhead qualitative research efforts (observations, interviews, focus groups) and collecting pertinent documents with librarians, hot spot users, and other key stakeholders.

Timeline: (**Deliverables in bold**)

May 15-December 2016: Design project materials, initial field visits, data gathering
- Finalize site information for libraries in KS and ME
- Analyze existing data collected by the libraries (based on questionnaires administered upon returning devices to the library)
- Develop protocols for focus groups
- Develop survey instruments for user and nonuser surveys [online versions, hard copy versions]
- Schedule initial research visits to participating libraries
- Planning meetings with State Library personnel in ME and KS
- Select Advisory Committee members; initial phone conference
- Establish protocol for recruiting users and nonusers for surveys
- Contact service vendors for Maine and Kansas to gather operational information
- Conduct first round of interviews with librarians
- Interview local stakeholders
- Conduct focus groups with users
- Transcribe and analyze qualitative data
- Continue to explore local connectivity options; complete interviews with hotspot service providers and develop **report on *Rural Internet Options* for libraries**
- Contact vendors providing hotspot connectivity and set up meetings (several visits over time)
- Assess local connectivity options

January 2017-August 15, 2017: Data gathering, analyzing qualitative data
- Continue focus groups with users
- Implement post-return surveys with users (on a rolling basis in both states)
- Continue interviews with community institutions/stakeholders
- Transcribe and analyze qualitative data (ongoing)
- Visit library sites for final data collection from libraries
- **Develop *Guidelines on Successful Implementation* report**
- Analyze qualitative data to identify extant datasets that might be related to findings
- Analyze quantitative data
- Additional Advisory Committee consultations
- Assemble dissemination plan, in consultation with partners, the Advisory Committee, others

August 16-December-2017 Finalize data analysis, reporting and dissemination
- Complete analysis of qualitative and quantitative data; investigate quantitative datasets
- Draft **preliminary findings and circulate to partners, other stakeholders, Advisory Committee**
- Obtain feedback on final report and fact sheets from stakeholders and from Advisory Committee; incorporate suggested changes and develop **final report**
- **Anonymize data and deposit** in appropriate repositories
- Conduct **webinars**; draft **conference and other papers**, press releases, etc.

Budget: The budget will cover graduate assistants salaries (1 at each of the 3 institutions), fringe and tuition; partial summer salary for each of the three principal investigators; travel to 24 library sites in

Maine and Kansas sites; materials and supplies including analysis software, samples, and materials associated with a mailed survey; possible incentive payments for focus group participants. Indirect costs at the University of Texas are calculated at 55%, U of OK at 52% and OK State at 45.8%.

6. Communications Plan

We plan to collaborate with several organizations that will help to share the research results (specifically, the final report and guidelines for successful program implementation). First, we will share the initial results with the participating libraries and will include their feedback in the final report. The final report will be shared with all participating libraries. To reach small and rural libraries more broadly, The Association of Rural and Small Libraries (see SupportingDoc2) can provide opportunities for communicating our findings online and at their annual conference. The American Library Association (SupportingDoc4) also could publish a White Paper online that reports the research results and would collaborate with disseminating the results in several other ways. They are especially interested in the practical aspects of operating a hotspot lending program. Our *Guidelines* for successful program implementation will be peer-reviewed by those in the library profession to ensure that they are transparent and adaptable by others with an interest in establishing such a program.

The Center for Rural Strategies (SupportingDoc3) convenes an annual conference called the National Rural Assembly, and they too can provide a venue in their conference where we can share results with community leaders and local officials who would be interested in such a program. They also sponsor an online newspaper, The Daily Yonder, which reaches people across the U.S. and beyond. The PIs have published in the Yonder before, and we can produce a series of articles reporting our results. The Yonder reaches a diverse constituency of people interested in rural issues, and it can link our findings to issues of broader concern to rural communities. We also may release our results through the Benton Foundation, which produces a daily news digest that reaches thousands of readers interested in communication technology; broadband-related issues are historically a priority topic for them.

We also have led in webinars the past, and plan to offer one or more on this research. We will work with the Regional Rural Development Centers, which have a series of webinars routinely for community development specialists (http://srdc.msstate.edu/trainings/crdwebinars.html) and http://ncrcrd.msu.edu/ncrcrd/chronological_archive.) We will also make use of our ties to Cooperative Extension, given their presence (and importance) in many rural communities across the nation. The National Association of Community Development Extension Professionals (NACDEP), the professional organization for extension personnel focused on community development, also would be interested in practices or programs that practitioners can implement or support in their communities. We will share our results at their annual conference.

We will submit results in scholarly journals, to conferences such as the Telecommunication Policy Research Conference held in Washington DC annually, and communicate with policy constituencies where we have contacts (FCC, federal agencies FCC, the National Telecommunications and Information Administration, USDA as well as pertinent industry associations and think tanks such as the New America Foundation and the Benton Foundation).

References

Allemanne, N., Mandel, L. and McClure, C. (2011 August/September). The Rural public library as leader in community broadband services. Library Technology Reports, 19-29.

American Library Association (2013). Digital literacy, libraries and public policy. http://www.districtdispatch.org/wp-content/uploads/2013/01/2012_OITP_digilitreport_1_22_13.pdf.

Flamm, K. & Chaudhuri, A. (2007). An analysis of the determinants of broadband access. Telecommunications Policy, 31(6/7), 312-326.

Griffis, M. and Johnson, C. (2014). Social capital and inclusion in rural public libraries: A qualitative approach. Journal of librarianship and information Science, 46 (2), 96-109.

Johnson, C. (2010). Do public libraries contribute to social capital? A preliminary investigation into the relationship. Library and Information Science Research, 32: 147–55.

Hancks, J. (2012) Rural Public Libraries' Role in Community Economic Development. Public Library Quarterly. 31(3).

Holt, G. (2009). A Viable future for small and rural libraries. Public library Quarterly, 28, 287-294.

Horrigan, J. and Duggan, M. (2015). Home broadband 2015. Pew Internet and American Life, 2015. Available at: http://www.pewinternet.org/2015/12/21/home-broadband-2015.

Johnson, C. (2010). Do public libraries contribute to social capital? A preliminary investigation into the relationship. Library and Information Science Research, 32: 147–55.

LaRose, R., Gregg, J., Strover, S., Straubhaar, J., & Carpenter, S. (2007). Closing the rural broadband gap: Promoting adoption of the internet in rural America. Telecommunications Policy, 31, 359−373.

Olderburg, R. (1999). The Great good place: cafes, coffeeshops, bookstores, bars, hair salons and other hangouts in the heart of a community. New York: Marlowe and Company.

Real, B., Bertot, J., Jaeger, P. (March 2014). Rural public libraries and digital inclusion: Issues and challenges. Information Technology and Libraries, 6-24.

Rhinesmith, C. (2012) Free library hot spots: Supporting broadband adoption in Philadelphia's low-income communities. International Journal of Communication, 6, 2529-2554.

Smith, A. (2015). US smartphone use in 2015. Pew Research Center, available at: http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015/

Strover, S. (2014). The U.S. Digital Divide: A Call for a new philosophy. Critical Studies in Media Communication, 114-122. DOI: 10.1080/15295036.2014.922207.

Strover, S. and Schrubbe, A. (2015) Mobile inequality. Paper presented at the International Communication Association. San Juan, PR.

Swan, D., Grimes, J. Owens, T. (2013). The State of small and rural libraries in the United States. Institute of Museum and Library Services. Available at: https://www.imls.gov/assets/1/AssetManager/Brief2013_05.pdf.

Whitacre, B., Gallardo, R., and Strover, S. (2014). Broadband's contribution to economic growth in rural areas: Moving towards a causal relationship. Telecommunications Policy 38 (11), 1011-1023. doi:10.1016/j.telpol.2014.05.005.

Whitacre, B., Rhinesmith, R (2015). Public libraries and residential broadband adoption: Do more computers lead to higher rates? Government Information Quarterly 32(2): 164-171.

---

[1] This effort was funded through a $1 million donation from Google, $500,000 grant from the Knight Foundation and the Open Society Foundation, as well as some local support from the Robin Hood Foundation.

[2] See Mobile Beacon's website at http://www.mobilebeacon.org/wifi-to-go/.

Schedule of Major Research Activities

Task	Phase 1 2016								Phase 2 2017								Phase 3 2017			
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Task 1: Finalize site information for libraries		○																		
Task 2: Analyze existing data collected by the libraries		�	░																	
Task 3: Focus group protocol development	░	░																		
Task 4: Survey instruments development for user and nonuser surveys					░	░	░	○												
Task 5: Planning meetings with State Library personnel		○																		
Task 6: Establish protocol for recruiting users and nonusers for surveys		░	░																	
Task 7: Contact service vendors to gather operational information		░	░																	
Task 8: Research visits (qualitative data) librarians, stakeholders		░	░								▓	▓	▓	▓	▓	○				
Task 9: Conduct focus groups with users		░	░								▓	▓	▓	▓	▓					
Task 10: Transcription/analysis of qualitative data						░	░	░	▓	▓										
Task 11: Field work: Assess local connectivity options & summarize in report				░	░	☆														
Task 12: Implement post-return surveys with users											▓	▓	▓	▓	▓					
Task 13: Analyze qualitative data to identify extant datasets											▓	▓								
Task 14: Assemble dissemination plan						░	░								○					
Task 15: Analysis of qualitative data & quantitative datasets												▓	▓	▓	▓	○				
Task 16: Draft report for review and circulate																░	░	●		
Task 17: Complete revised final report and circulate																				☆
Task 18: Anonymize data and ensure deposit																				☆
Task 19: Develop *Guidelines for Successful Implementation*																☆				
Task 20: Conduct webinars; draft conference and other papers, press releases													▓	▓	▓	▓	▓	▓	▓	☆
Task 21: Develop dissemination plan with various organizations													▓	▓	▓	▓				
Task 22: Advisory board conference calls		○			○					○							○			

○ | milestone   ☆ deliverable

DIGITAL STEWARDSHIP SUPPLEMENTARY INFORMATION FORM

Introduction
The Institute of Museum and Library Services (IMLS) is committed to expanding public access to federally funded research, data, software, and other digital products. The assets you create with IMLS funding require careful stewardship to protect and enhance their value, and they should be freely and readily available for use and re-use by libraries, archives, museums, and the public. However, applying these principles to the development and management of digital products is not always straightforward. Because technology is dynamic and because we do not want to inhibit innovation, we do not want to prescribe set standards and best practices that could become quickly outdated. Instead, we ask that you answer a series of questions that address specific aspects of creating and managing digital assets. Your answers will be used by IMLS staff and by expert peer reviewers to evaluate your application, and they will be important in determining whether your project will be funded.

Instructions
If you propose to create any type of digital product as part of your project, complete this form. We define digital products very broadly. If you are developing anything through the use of information technology (e.g., digital collections, web resources, metadata, software, or data), you should complete this form.

Please indicate which of the following digital products you will create or collect during your project (Check all that apply):

	Every proposal creating a digital product should complete …	Part I
	If your project will create or collect …	**Then you should complete …**
☐	Digital content	Part II
☐	Software (systems, tools, apps, etc.)	Part III
☑	Dataset	Part IV

PART I.

A. Intellectual Property Rights and Permissions

We expect applicants to make federally funded work products widely available and usable through strategies such as publishing in open-access journals, depositing works in institutional or discipline-based repositories, and using non-restrictive licenses such as a Creative Commons license.

A.1 What will be the intellectual property status of the content, software, or datasets you intend to create? Who will hold the copyright? Will you assign a Creative Commons license (http://us.creativecommons.org) to the content? If so, which license will it be? If it is software, what open source license will you use (e.g., BSD, GNU, MIT)? Explain and justify your licensing selections.

We would like to share the dataset but have not yet identified the appropriate repository.   We would like attribution for the funder, IMLS, and for our work in generating the data. We have not yet chosen a license.

A.2 What ownership rights will your organization assert over the new digital content, software, or datasets and what conditions will you impose on access and use? Explain any terms of access and conditions of use, why they are justifiable, and how you will notify potential users about relevant terms or conditions.

We support open access and will ask only for attribution in terms of IMLS support and in terms of our work to gather the data.

A.3 Will you create any content or products which may involve privacy concerns, require obtaining permissions or rights, or raise any cultural sensitivities? If so, please describe the issues and how you plan to address them.

No.

Part II: Projects Creating or Collecting Digital Content

A. **Creating New Digital Content**

A.1 Describe the digital content you will create and/or collect, the quantities of each type, and format you will use.

A.2 List the equipment, software, and supplies that you will use to create the content or the name of the service provider who will perform the work.

A.3 List all the digital file formats (e.g., XML, TIFF, MPEG) you plan to create, along with the relevant information on the appropriate quality standards (e.g., resolution, sampling rate, or pixel dimensions).

B. **Digital Workflow and Asset Maintenance/Preservation**

B.1 Describe your quality control plan (i.e., how you will monitor and evaluate your workflow and products).

B.2 Describe your plan for preserving and maintaining digital assets during and after the award period of performance (e.g., storage systems, shared repositories, technical documentation, migration planning, commitment of organizational funding for these purposes). Please note: You may charge the Federal award before closeout for the costs of publication or sharing of research results if the costs are not incurred during the period of performance of the Federal award. (See 2 CFR 200.461).

C. **Metadata**

C.1 Describe how you will produce metadata (e.g., technical, descriptive, administrative, or preservation). Specify which standards you will use for the metadata structure (e.g., MARC, Dublin Core, Encoded Archival Description, PBCore, or PREMIS) and metadata content (e.g., thesauri).

C.2 Explain your strategy for preserving and maintaining metadata created and/or collected during and after the award period of performance.

C.3 Explain what metadata sharing and/or other strategies you will use to facilitate widespread discovery and use of digital content created during your project (e.g., an API (Application Programming Interface), contributions to the Digital Public Library of America (DPLA) or other digital platform, or other support to allow batch queries and retrieval of metadata).

D.**Access and Use**

D.1 Describe how you will make the digital content available to the public. Include details such as the delivery strategy (e.g., openly available online, available to specified audiences) and underlying hardware/software platforms and infrastructure (e.g., specific digital repository software or leased services, accessibility via standard web browsers, requirements for special software tools in order to use the content).

D.2 Provide the name and URL(s) (Uniform Resource Locator) for any examples of previous digital collections or content your organization has created.

Part III. Projects Creating Software (systems, tools, apps, etc.)

A.**General Information**

A.1 Describe the software you intend to create, including a summary of the major functions it will perform and the intended primary audience(s) this software will serve.

A.2 List other existing software that wholly or partially perform the same functions, and explain how the tool or system you will create is different.

B. **Technical Information**

B.1 List the programming languages, platforms, software, or other applications you will use to create your software (systems, tools, apps, etc.) and explain why you chose them.

B.2 Describe how the intended software will extend or interoperate with other existing software.

B.3 Describe any underlying additional software or system dependencies necessary to run the new software you will create.

B.4 Describe the processes you will use for development documentation and for maintaining and updating technical documentation for users of the software.

B.5 Provide the name and URL(s) for examples of any previous software tools or systems your organization has created.

C. **Access** an**d** Us**e**

C.1 We expect applicants seeking federal funds for software to develop and release these products under an open-source license to maximize access and promote reuse. What ownership rights will your organization assert over the software created, and what conditions will you impose on the access and use of this product? Identify and explain the license under which you will release source code for the software you develop (e.g., BSD, GNU, or MIT software licenses). Explain any prohibitive terms or conditions of use or access, explain why these terms or conditions are justifiable, and explain how you will notify potential users of the software or system.

C.2 Describe how you will make the software and source code available to the public and/or its intended users.

C.3 Identify where you will be publicly depositing source code for the software developed:

Name of publicly accessible source code repository:
URL:

Part IV. Projects Creating a Dataset

1. Summarize the intended purpose of this data, the type of data to be collected or generated, the method for collection or generation, the approximate dates or frequency when the data will be generated or collected, and the intended use of the data collected.

This is survey data from rural residents addressing issues of their information practices, including their use of library resources, types of broadband connectivity and Internet use. It will be collected througha mailed and an online survey.

2. Does the proposed data collection or research activity require approval by any internal review panel or institutional review board (IRB)? If so, has the proposed research activity been approved? If not, what is your plan for securing approval?

3. All data collection will be reviewed by UT-Austin's IRB.

4. Will you collect any personally identifiable information (PII), confidential information (e.g., trade secrets), or proprietary information? If so, detail the specific steps you will take to protect such information while you prepare the data files for public release (e.g., data anonymization, data suppression PII, or synthetic data).

We do not plan to collect personally identifiable information.

5. If you will collect additional documentation such as consent agreements along with the data, describe plans for preserving the documentation and ensuring that its relationship to the collected data is maintained.

We can include these documents alongside the datasets.

6. What will you use to collect or generate the data? Provide details about any technical requirements or dependencies that would be necessary for understanding, retrieving, displaying, or processing the dataset(s).

The data will be shared as a cvs file with an accompanying instrument and codebook.

7. What documentation (e.g., data documentation, codebooks, etc.) will you capture or create along with the dataset(s)? Where will the documentation be stored, and in what format(s)? How will you permanently associate and manage the documentation with the dataset(s) it describes?

The codebook will be stored as a MSWord document and the data as a cvs file.

8. What is the plan for archiving, managing, and disseminating data after the completion of the award-funded project?

We will use our time assembling the data to also develop the archiving plan. We address dissemination in our narrative section.

9. Identify where you will be publicly depositing dataset(s):

Name of repository: We have not yet determined the site.
URL:

10. When and how frequently will you review this data management plan? How will the implementation be monitored?

We will review the data management plan twice during the grant period. Our advisory committee can help to monitor our implementation.

Original Preliminary Proposal

At the Edges of the National Digital Platform: Rural Library Hotspot Lending Programs

Statement of Need: New digital content and services available through the national platform are only useful to people when they have access to the Internet. This research targets rural libraries implementing hotspot lending programs as they endeavor to extend services beyond their walls. The hotspots typically enable fast, multi-device, Internet access to populations who cannot otherwise access the Internet, often for reasons of expense. This is a critical need in rural communities, where incomes and employment are typically lower, compounded by the frequent absence or unaffordability of landline-based broadband. Rural libraries are anchor institutions in their communities and provide an expanding array of services. With deep ties to their regions, they often function as important sites for local Internet access and digital literacy expertise. According to IMLS, 47% of all public libraries are rural, and they typically are small, with limited staff and hours.[1] To the extent that Internet access alternatives and rural libraries' resources are both highly limited in rural areas, better understanding how hotspot lending programs extend digital tools, infrastructure and services and enable rural libraries to serve user and community needs has significant potential for national impact on providing access to all library users. A thorough investigation of this topic would provide important insights into specific opportunities identified in the convening report on the National digital platform – namely, engaging communities, enabling technologies, and systemic collaboration.

This research will investigate the user, community and the organizational dynamics associated with hotspot lending programs in rural libraries. We will examine (1) various user and community outcomes that may be associated with these extending digital resources through hotspot lending programs and (2) the organizational and staff challenges associated with operating such programs, including training and staff expertise needs, costs and funding, and opportunities for collaborating with local vendors (Internet Service Providers or ISPs).

Project Team: Our team has deep expertise in the structures of rural communities, the role of rural libraries, and the impact of broadband connectivity programs. Sharon Strover, University of Texas at Austin – College of Communication, has undertaken rural infrastructure research around the country, attending to community, education and other service dynamics associated with broadband connectivity. Brian Whitacre, Oklahoma State University –Agricultural Economics, investigates economic development dynamics in rural regions. Colin Rhinesmith, University of Oklahoma-Library and Information Studies, has examined public libraries and broadband adoption. All team members have experience leading research projects in rural locations.

Work Plan: We are targeting two hotspot lending programs, one in Maine and one in Kansas. They already are associated with a hotspot program initiated by the New York Public Library and all three systems are using the same preliminary questionnaire to gather data from users regarding the efficacy of the hotspot loan, enabling some initial comparisons. The Maine project serves approximately six libraries in one of the state's poorest counties, and the Kansas program operates in 18 rural libraries.

We plan to (1) gather and analyze data from surveys that users complete when they check out and return their hotspot device to the lending libraries; (2) gather additional, post-check-in survey data from the participating users as well as some nonusers in the communities 12 to 18 months into the program; (3) undertake qualitative data gathering by conducting focus groups in targeted communities with small groups of hotspot users; and (4) interview library staff in the rural libraries in order to assess training needs, their perceptions of community needs, and the tools and services they are most useful to them in extending Internet access and expertise to their constituencies. We also will gather cost data and assess connectivity alternatives. We anticipate incorporating available third party data (such as from the IMLS, the National Broadband Map, the Current Population Survey, or business-related data) pertinent to our research settings in order to generate more detailed pictures of these ecosystems.

---

[1] IMLS (2013). The State of Small and Rural Libraries in the United States. Research Brief No. 5. www.imls.gov/AssetManager//Brief2013_05.pdf.   P. 2. Accessed August 14, 2015.

The overall research design will account for contextual features in the library settings that affect individual use of and community outcomes associated with broadband. Having at least two time points - one shortly after using the hotspot and another at least 12 months later - for data gathering will strengthen our understanding of the dynamics of Internet access and use in rural regions, and provide an opportunity to examine connectivity and digital literacy as a *process* for the users. How broadband adoption and use affect these small communities constitutes one overarching question. Second, as significant institutions in rural regions, libraries are extending their walls with these programs and possibly creating new user demand as well as new opportunities. Our research seeks to probe these institutional roles as well, and to learn something about the tools, data, relationships to schools and the new applications used in education, services and staff expertise that might contribute to successful outcomes; connectivity options available in rural regions relevant to library needs also will be scrutinized.

Relevance to Agency Priorities: While rural libraries serve smaller constituencies than do urban sites, they play an outsize role in their communities because fewer resources and options are available. Understanding libraries' full role in the local information ecosystem of their communities - which often extends to dispersed households in more remote regions - can facilitate a nuanced understanding of how digital platforms function in these regions and the possibilities present in technologies that may allow libraries even greater impact. Our focus on responses of the user community to this library program will enable us to get a fresh picture of individuals' and broader community needs and where the library fits in responding to those needs. Understanding the types of training and support needed in rural libraries can help strengthen statewide systems and lead to a better information base that would be usable throughout the country. This research will shed light on where hotspot programs fit within the broader digital platform ecosystem.

Potential Impact: This project will provide much needed data on the efficacy of hotspot lending programs, a topic on which research is sparse despite its recent rise in popularity. It will inform us directly about library users' responses to home-based connectivity and how broadband connectivity fits within the rural information environment, in turn affecting the local library's role. The types of tools, data and services rural libraries can provide their digitally literate constituencies will be investigated. Longitudinal data-gathering will allow us to begin to comment on broader community-level outcomes.

Our investigation also will shed light on the organizational needs of rural libraries as they contemplate offering this service, and provide insights on staffing, training, evaluation and other support systems that are required for successful and efficient hotspot lending programs. Understanding cost and vendor alternatives such as the local Internet Service Provider terrain for hotspot connectivity can help rural libraries evaluate how they might offer or extend such programs. Similarly, understanding relationships between individual libraries and library systems and how they can effectively work together also may illuminate opportunities to strengthen both.

Projected Performance Goals and Outcomes: This research contributes to improved understanding of how rural libraries can extend their digital platform services into communities. Inasmuch as it will provide a deeper picture of library hotspot program utility, it will shed light on the needs of rural populations and highlight ways that libraries can engage their constituencies, community institutions, local vendors and support each other in developing meaningful services. One important goal will be to share the research findings in order to help libraries, service vendors such as ISPs and communities work with each other and address regional problems. The Center for Rural Strategies and the Association for Rural and Small Libraries have expressed interest in the project. Documenting community outcomes will be important for both libraries as well as the regions.

Budget: We anticipate most of our requested funding would support the travel and data gathering costs associated with being in Maine and Kansas. Advanced graduate students will assist with the qualitative onsite interviews with staff as well as with the user focus groups. Additionally, there will be costs associated with the second wave of survey-based data gathering, which will include methods of reaching people beyond using the library as the point of contact. University overhead rates (55% at the University of Texas) suggest an overall budget of about $480,000 will be adequate to fund the project.