

Libraries in Community Systems

The Northern New York Library Network proposes a 3-year national research in service to practice project, Libraries in Community Systems, to create clearer understanding of the unique role of public and tribal libraries within community systems. We each live and work within dynamic interconnected systems. At the community level these include education and health systems which we use and, in our role as librarians, often contribute to in direct and indirect ways. We refer to the practice of situating action within a system as a systems approach. Current library research and practice initiatives highlight the importance of exchange between the library and other community entities. Further, they suggest that libraries can maximize the impact of those exchanges for the wellbeing of residents if they have a clear view of community systems and their place within them. The practice that would come from such an understanding we refer to as a community systems approach.

Libraries in Community Systems asks, **what is the tribal and public library's measurable value to their local community?** The answers will produce clear valuations of library service in terms of social wellbeing outcomes, or access to a high quality of life, described according to the IMLS social wellbeing dimension framework¹ and the [World Health Organization's definition of health](#) as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." This valuation would support decision-makers to prioritize these outcomes, assist library staff to identify effective potential partners, and leverage a common community anchor to advance equity in the experience of everyday life.

Statement of National Need

After decades of public sector disinvestment² and private sector deregulation³, libraries have taken on more social tasks but struggle to know how to prioritize for improved positive impact on local quality of life. Excellent research has laid the groundwork for understanding the interrelated nature of community life⁴, social wellbeing⁵, health⁶, economic⁷, and human development⁸, place-making⁹, ecology¹⁰, social capital¹¹,

¹ The dimensions of social wellbeing include cultural, economic, educational, environmental, housing, political, health, and social components. Source, detailed definitions, with the specific data and sources we will use, see Table in Supp. Docs.

² Dewar, M., Deng, L., & Bloem, M. (2020). [Housing Policy Debate Challenges for Low-Income Housing Tax Credit Projects at Year 15 and Beyond in a Weak Housing Market](#): The Case of Detroit, Michigan. *Housing Policy Debate*, 30(3), 311–334. provides an excellent case study.

³ Gilblom, E. A., Sang, H., Messemer, J. E., Galletta, A., & Molenaur, R. (2020). [A tightly wound braid: Forces of opportunity and exclusion within an era of school choice legislation](#). *Journal of Urban Affairs*, 42(4), 634–662.

⁴ Gustina, M. E., Guinnee, E., Decker, H., & Bonney, R. (2020, September 24). [Pathways to Wellbeing: Public Library Service in Rural Communities](#). [Preprint housed Open Science Framework - pending with PLOS One].

⁵ Norton, M. H., Dowdall, E., Reich, C., Carr, M., Fuller, S., Weidig, C., Rosch, J., Steinberg Felton Thomas, A., Howard, C. W., Professor, A., & McNulty, B. (2017). [Strengthening Networks. Sparking Change: Museums and Libraries as Community Catalysts](#). Institute of Museum and Library Services.

⁶ Simon, M. A., O'brian, C. A., Nava, M., Dahdouh, R., Wafford, Q. E., Mack, S., & Holmes, K. L. (2021). [Public Libraries as Key Partners for Advancing Health Equity](#). *American Journal of Public Health*, 111(1), 40–42.

⁷ Stolarick, K. and Silk, K. (2013) [So Much More: The Economic Impact of the Toronto Public Library on the City of Toronto](#). Martin Prosperity Institute, University of Toronto. And many others.

⁸ Heron-Hruby, A., Hagood, M.C. & Alvermann, D.E. (2008) [Switching Places and Looking to Adolescents for the Practices That Shape School Literacies](#), *Reading & Writing Quarterly*, 24:3, 311-334,

⁹ Azuma, A. M., Permanente, K., Cermak, M., Chamberlain, J., & Blueshield, B. (2016). [The Case for Healthy Places: improving health outcomes through placemaking](#). Project for Public Places.

¹⁰ Lenstra, N., & Carlos, J. (2019). [Public Libraries and Walkable Neighborhoods](#). *International Journal of Environmental Research and Public Health*, 16(1780).

¹¹ Johnson, C. A. (2010). [Do public libraries contribute to social capital?](#) A preliminary investigation into the relationship. *Library and Information Science Research*, 32(2), 147–155.

infrastructure and connection¹², and public libraries. Library leaders have long called for metrics that adequately convey the value and impact of a public library. ROI calculators have shown libraries to be a wise taxpayer investment, but reducing a library's value to financial value alone has rightly been criticized as itself a devaluation of the public good represented by a library.

Practitioners grapple with the conflict of knowing that data and concrete evidence is expected to undergird claims of libraries' ongoing relevance while also knowing that experiences and moments are happening that are lost on current impact measures. Librarians continue to strive toward effective valuation, assessment, and decision-making through initiatives like [Project Outcome](#) and [Measures that Matter](#), while also trying to fill in the picture with anecdotes. At a 2011 workshop in Leeds *Measuring the Value of Public Libraries*, one participant captured a core question in the work of assessing a library's value when they asked "Going right back to fundamentals—is there an agreed outcome on what libraries produce?"

We submit that the function of the tribal and public library is to facilitate and produce wellbeing, as defined by the capability to belong, to participate in networks of mutual aid, and to determine one's own future.

The American Library Association produced *A National Plan for Public Library Service* in 1946, in which librarian Lowell Martin envisions a plan whereby libraries "aid all Americans to achieve their personal and social potentialities." The mechanism by which libraries "aid all Americans" in the plan was identified as "the communication of information and ideas"¹³. Research conducted through the IMLS's Community Catalyst Initiative, as well as independent work done through our nation's iSchools, refines our understanding of the "personal and social potentialities" libraries can support, while also expanding the means by which they might achieve such outcomes. Unfortunately, for many libraries, these concepts, and the evaluative practices built on them, look like extra work, or worse, like "mission creep." They are thought of as neat ideas too cumbersome to bring into practice, or tangential to *real* library work.

Libraries in Community Systems researchers have researched how library services have facilitated social wellbeing in isolated communities in the [Rural Libraries and Social Wellbeing project](#). Through interviews with hundreds of community residents and dozens of rural library directors we learned two relevant things:

- Where library staff see themselves as of the community they serve, they view social connection and community wellbeing as core library services.
- Where reciprocity ("everyone would give the shirt off their back to me") was a community-wide value and practice, library staff were further from burnout—even while working quantitatively more paid and unpaid hours.

We will use library research in assessment, community anchors, and social wellbeing as the foundation for original research to establish an evidence-based model of the effects libraries have within their communities measured in terms of wellbeing. We will add theory and methods from health, labor, and environmental economics and the discipline of program evaluation to the extant foundation of librarianship literature. Economic valuations of public libraries have historically focused on the exchange between the library and the local market economy—incomes and expenditures, cost savings to patrons through resource sharing, and so

¹² Klinenberg, E. (2018). [Palaces for the People: how social infrastructure can help fight inequality, polarization, and the decline of civic life](#). In *Penguin Random House*. Crown.

¹³ Martin, L. (1946). [A Plan for Public Library Service in America](#). *A.L.A. Bulletin*, 276–283. Retrieved January 15, 2021.

on—often ignoring non-monetized social goods. We propose, instead, an approach developed in economics which allows for the valuation of non-market services and plurality of community values.

Research Question

What is the tribal and public library’s measurable value to their local community?

Our answers will produce the following:

- valuation model of tribal and public library wellbeing production
- economic model incorporating wellbeing valuation
- a valuation calculator for current service provisions
- a returns (cost-effectiveness) calculator for evaluating service change
- foundation research for a more complete model of libraries within their local social, political, and ecological systems.

Project Design

Theoretical Framing

In the *Journal of Research Practice*, Kim Tallbear exhorted readers and researchers to “soften the boundary” between the inquirer and those who are “inquired on” or whose “lives, lands, and bodies are inquired into”¹⁴. Throughout our project design, we will draw from these theoretical foundations for our methods:

- Hermeneutical phenomenology: lived experience as valuable data and trustworthy source for understanding reality. Widely used in qualitative research, it helps us balance experiences with aggregated quantitative data. True stories are complex and individual experiences complicate what numbers tend to smooth out—helping us inform the data toward more accurate interpretations. Framing of that data should come in partnership with community interpretations.
- Community-based participatory research: partnering with subjects early in the research lifecycle so their guidance is woven into the process. This means that the design is aligned with their lived experience and their values, that participants build capacity to inquire of themselves and speak in their voice of their own data, and that the products are richer, many-voiced, and of practical use.
- Capabilities approach to human development: each person has value to themselves and to the whole, not merely as a data point in a general aggregation; there are core “ways of being and doing”¹⁵ one must be capable of achieving in order to live a fully realized life.

Partners & Contributor Roles

To answer our primary research question about the library’s value to its community, we will draw from diverse disciplines of tribal and public librarianship, health, labor, and environmental resource economics, as well as statistical data analysis, regional planning and design, program evaluation, and information science. To effectively incorporate these disciplines into the project, we have key roles for different critical voices to occupy.

Advisory Board: Our five advisory board members will critique and guide methods, analysis, actions, and dissemination at the start and end of each phase of the project. They include: Jerica Copeny, LJ Mover &

¹⁴ Tallbear, K. (2014). [Standing With and Speaking as Faith](#): A Feminist-Indigenous Approach to Inquiry. *Journal of Research Practice*, 10(2).

¹⁵ Nussbaum, M. C. (2013). *Creating Capabilities: the human development approach*. Belknap Press of Harvard University Press.

Shaker 2018 for community data science (Senior Design Researcher at Nextdoor); Laurenellen McCann, policy consultant (Founder and Lead Trainer at BuildWith); Beth Patin, community knowledge scholar (Assistant Professor, iSchool, Syracuse University); Bill Reed, architect and regional planner (President, Integrative Design Collaborative, founder US Green Building Council); and Della Warrior, educational policy developer (Director, Museum of Indian Arts and Culture/Laboratory of Anthropology). These advisors represent a breadth of expertise in information science, regenerative development, data science, education, cultural heritage, indigenous knowledge systems, research methods, and library practice.

Critical Readers: There are so many valuable insights to gain from people working in these fields that we have included a readers role. This project design includes dissemination of phase findings throughout the research life-cycle. Readers are individuals skilled at critical evaluation and editing, but without the capacity to engage with the project as advisors, including Bharat Mehra (Professor, The University of Alabama) and Ben Haggard (Founder and Systems Consultant at Regensis Group).

Economics Faculty: Lead researcher Margo Gustina, MSLIS, is a certified public librarian, and a PhD candidate in University of New Mexico's Department of Economics. She will be guided and directly aided by a department which has made significant contributions to the fields of health (David van der Goes, Director, Robert Wood Johnson Foundation Center for Health Policy) and environmental resource economics and non-profit service valuation (Melissa Binder, Director, Evaluation Lab, Associate Professor of Economics).

Facilitators: Skilled facilitators bring out the best qualitative data from groups. The facilitator will guide participants through large qualitative data gathering components to inform our definitions of library service and of the relationships between local community systems (the processes through which agencies and people in a community interact with each other and external resources).

State Level Partners: Alaska, New York, South Carolina, and Texas together serve 16% of US tribal and public libraries. They will use their positions to convene conversations, identify candidate communities for model and calculator testing, and gather and share state specific data with the researcher. Further, they will be dissemination partners, both sharing and incorporating research findings and resources into statewide professional development opportunities.

Model Testers: With assistance from our advisors and state level partners, we will work with 30 communities across Alaska, New York, South Carolina, and Texas (8 tribal, 8 urban, 8 suburban, and 6 rural as defined in the IMLS Public Library Survey by governance type and locale code) to develop shared definitions of library, value, and community, as well as test the resultant models for accuracy within their settings, including discussion with community partners and stakeholders in locally relevant ways. They will be chosen in cooperation with our partner state library agencies from libraries interested in measuring social wellbeing outcomes of library service.

Work Phases

The following details each phase of the project's research and dissemination methods, including data gathering, analysis, and use, as well as its timing, budget requirements, and project roles involved. To see a month by month description of activity, see Schedule of Completion. Details of compensation for project roles are in the Budget Justification.

Phase 1: Shared Definitions | 2021-2022 | \$103,960 | All Roles Engaged

Questions answered in this phase: What is a public or library within the context of community systems and how is it described? What is the library's value and how is it described or currently measured?

Produced from this phase: (1) Shared definitions of library, value, community. (2) Insights into what quantitative data is appropriate to use, for which measurements, with community-based contextual framing. (3) Index of library value language for future data mapping.

Overview: Building a model for practice begins with shared language, definitions, and understandings. During this phase of work, we will virtually convene a series of facilitated conversations with libraries and their invited community partners. The result of these conversations will be descriptions of the library, its role in the community it serves, and its perceived value within the broader network of community systems.

Actions: Upon being awarded the grant, we will meet with our State Library Partners to identify tribal and public libraries within their state to work with the Libraries in Community Systems project as Model Testers. These will be library partners who are interested in understanding, valuing, and quantifying social wellbeing outcomes from their library service.

We will present our plan to the advisory board, including specific steps we will take to virtually convene 16 conversations (1 per state for each rural, suburban, urban, and tribal community). We will use group visuals, diagrams (research method: graphic elicitation¹⁶), and notes to capture language and terms used by participants as they discuss value, the library, and its role in the community.

Through late fall and early winter, the Facilitator will host these conversations via Zoom with breakout room note-taking support from Gustina and NNYLN.

These diagrams and notes will be made anonymous during data analysis and shared via an Open Science Framework (OSF). Analysis using common qualitative coding practices will draw out themes and common language used to describe community systems, define libraries within those systems, and define value.

Once refined into clear description and definitions, we will reconvene participants for a second conversation to test these statements against their beliefs, experiences, and understandings.

Draft versions after these conversations will go through our critical readers, and once refined, go to the advisory board. When finalized, an interactive systems diagram will be added to the project web site, which will also include information on project designs, purpose, and participants, as well as a way for people to subscribe to project notifications. The web site will be shared through our state partners, board members, and with professional associations like ALA, Association of Rural and Small Libraries, REFORMA, and Urban Libraries Unite.

To give a shared base on which these new definitions will be built, we share these assumptions which frame the project design:

- **Economics:** Study of how we create and exchange value together in the context of built and living environments.
- **Life has inherent value:** Some calculations included in economic models have high discounting of our future resources (the future isn't worth much compared to the present), and older age is negatively appreciated (because health is financially costly). We pull from Quality Adjusted Life Year methods

¹⁶ Bravington, A., & King, N. (2019). [Putting graphic elicitation into practice: tools and typologies for the use of participant-led diagrams in qualitative research interviews](#). *Qualitative Research*, 19(5), 506–523.

developed by health economists to counter these practices. Our calculations will favor life and a life well-lived as quantified in a Wellbeing Adjusted Life Year¹⁷.

- **Social wellbeing:** our initial indicators for measurement are in Table 1 [Table in supp. docs]. These will be informed by findings from “Pathways to Wellbeing” which explores the processes by which libraries use belonging, mutualism, and self-determination pathways to support the improvement of these dimensions over time⁵.
- **Function of the library:** to facilitate and produce wellbeing, as defined by the capability to belong, to participate in networks of mutual aid, and to define and determine one’s own future.

Phase 2: Shared Valuation | 2021-2023 | \$96,710 | All Roles Engaged

Questions answered in this phase: What is the value of public library service for social wellbeing outcomes? What is the tribal and public library’s measurable value to their local community? Based on definitions, refine data collection and analysis techniques. What is valuable?

Produced from this phase: (1) Literature review of valuation theory, methods, and indices currently used in education, place-making, public health, and economic disciplines. (2) Based on a refined set of indicators, data will be mapped to value definitions and initial valuation model built.

Overview: Economic valuations of public libraries have historically focused on the exchange between the library and the local market economy—incomes and expenditures, cost savings to patrons through resource sharing, and so on—often ignoring non-monetized social goods. We propose, instead, an approach developed in economics which allows for the valuation of non-market services and what the plurality of people in a community values.

Actions 2021: Upon being awarded the grant, we will complete the literature review of valuation theory, methods, and indices currently in use within disciplines relevant to this study (see bibliography of key research in Bibliography in supp. docs). This literature review will be examined by critical readers and revised, then published to the project’s OSF repository, linked on the project website, shared on social media, shared via listservs from the advisory board and state library partners, and sent to library and economics professional associations.

We will also identify the smallest geographic boundary shared by all study communities for key indicator data, like reading proficiency and poverty rates (see Table in supp. docs for our data indicator starting point, based on research previously funded by IMLS). We will gather this data for the most recent year available for all communities and indicators along the identified shared boundary.

Expository analysis will be run as data is gathered according to these boundaries, including mapped layers, both naive and restricted regressions, and data visualizations to better understand the nature of the data we have gathered, as well as to see outliers, patterns, and potential data failures. This will happen throughout the fall and early winter (2021-2022), and again any time we try to include a new data set.

Actions 2022: Beginning in February 2022, we will map this data indicator catalog to the shared definitions and values identified in Phase 1. This map will identify both values for which we have not yet gathered an appropriate data indicator, and data indicators which do not support our understanding of value. We will revisit the literature review for guidance on what data for commonly used wellness indices are used, how to

¹⁷ Brazier, J., & Tsuchiya, A. (2015). [Improving Cross-Sector Comparisons](#): Going Beyond the Health-Related QALY. *Applied Health Economics and Health Policy*, 13, 557–565.

gather and analyze them, and why they are seen to make sense in the context of community or individual capabilities.

This data-to-value map will be shared with our model testers (the 30 libraries we will partner with throughout the project) for a resonance and reality check.

Given what we find through the completed literature review, expository analysis, mapping between data and value, and the data available to us, we will present a data cleaning and analysis plan to the advisory board and faculty advisors for review. After refinement, this plan will be added to our OSF repository as well as shared via our website and social media for interested parties to provide insights and comments.

Detailed quantitative analysis using the data-to-value map will be done on each of the model tester communities. Presumed methods we will use include hedonistic measures to derive willingness to pay valuations (like housing prices or distances traveled by library patrons to attend an event), as well as difference in differences analysis. This would mean looking through place histories and data for potential correlations, differences, and where exogenous relationships exist between wellbeing indicators and library service interventions. A current research example of this type of study is currently being written on large capital investment in libraries and its causal relationship to improved reading test scores¹⁸. Difference in differences is the analysis technique widely used to do this where the researcher looks for “shocks” or big changes that could be used to mimic experimental intervention effects.

This information will help us build our initial analytical and predictive models—formulas that help us look at both the relationships between factors, and what shifts in those relationships would mean on a measure of interest. This work will include adapting the established Quality Adjusted Life Year (QALY, a unit to value healthy life used by governments and health policy analysts), as well as the nascent Wellbeing Adjusted Life Year (referred to in the literature as the WELBY) to better understand the value of library service to a life well lived.

Individual reports will be shared with the model testers who will be encouraged to share them with their partners and community stakeholders. This is both a resonance check and a check on the story being developed out of the data. Iterating based on responses from our model testers will take place over the late spring and through the summer 2022.

The refined data-to-value map with index for measuring library value will be the foundation for convening discussions with our model testers and people who attended the 2021 conversations on community systems who are willing to participate again. The facilitator will share the data-to-value map and overarching value schema into which the models will fit. Notetakers will gather insights from discussions among each community type: tribal, rural, suburban, and urban.

Actions 2023: Insights from these conversations will be used to finalize the data analysis and modeling plan (based on what worked during expository analysis and what we hear from testers and advisors, this includes the specific details of what years, boundaries, and data we will use, how they will be cleaned, and exactly what scripts or formulae we will use on them), service evaluation plan (based in valuation descriptions we heard and the library service data we have available, this will detail what specific value in terms of QALY/WELBY we will ascribe to each service item), and calculator development plan (based on exemplar calculators which exist in health economics, this plan will detail specific inputs libraries will enter themselves, which data assumptions will be built into the calculator, and the formulas which will use these assumptions to

¹⁸ <https://www.peternencka.com/research> Draft titled “The returns to library investment” with Greg Gilpin and Ezra Karger

produce a valuation unit). All plans will also include a draft of the evaluations model testers will use to judge the usability and truthfulness of the models. These will be presented to the advisory board and economics faculty in winter 2022-2023. Once finalized, the plans will be added to OSF.

From spring through summer 2023 data analysis, model-building, and service evaluation plans will be implemented.

Initial findings will be shared in August 2023 with IMLS, to our list of subscribers, and all our partners. All content of the analysis and data definitions necessary to make informed judgements about, or run replications on, the work will be shared to OSF.

Phase 3: Shared Framework for Practice | 2023-2024 | \$97,460 | All Roles Engaged

Questions answered in this phase: What is a library within a community? What is the library's value within the community?

Produced from this phase: (1) Community systems schema, to provide context for valuation and calculators, as well as giving support for further work in that area; (2) Program evaluation paradigm relating systems schema and valuation model; (3) Self-guided calculators for library decision-makers to evaluate service, cost, and impact of additional resources; (4) Construction of schemas, models, and paradigms upon which future research should test and build.

Calculators and models will be developed into both desktop interactives and online interactives. Examples of cross-over work we will look to and adapt include [County Health Rankings Model](#) from the Robert Wood Johnson Foundation, interview database and self-guided interactive tools from Gustina's project [Rural Libraries & Social Wellbeing](#), and project advisor David van der Goes's calculator for analysis of Community Health Worker value to townships²⁰.

Overview: Synthesizing what we have learned to date, we will develop a model which describes community systems and a framework for testing this model in the real world. This model will be tested using two calculators by our 30 library model testers for a total of four months (two two-month intervals) in 2023. Final products will be available as interactive online tools as well as downloadable desktop versions.

Actions 2023: We will work with our advisory board to refine the model and calculator evaluation protocols for model testers to use. To develop these calculators, simple cost-effectiveness modeling¹⁹ will be enriched with dynamic modeling methods used in natural resource and labor economics, to build on the analysis from Phase 2. Desktop versions of both calculators will be completed for testing by 2024.

Actions 2024: Systemic program and intervention evaluation in organizations will contextualize implementation and use of the model, as well as inform the end calculator production. Examples of ROI calculators exist for complex health outcomes. We will build on these to calculate our weighted and intertwined social wellbeing outcomes, as well as low variance of outcomes across population demographics (equity).

We will convene model testers in a conversation to launch model and calculator testing. This conversation will introduce the testers to the evaluation they will use to judge the truthfulness and effectiveness of the model, the accuracy of the calculators, the practicality of the calculators in terms of things like local availability of necessary data, and finally the usefulness of the results.

Two months of field testing and evaluation will lead to a round of revisions to the desktop versions and form the basis of the online interactive version, which will be produced in this phase.

¹⁹ van der Goes, D. N., Edwardson, N., Rayamajhee, V., Hollis, C., & Hunter, D. (2019). [An iron triangle ROI model for health care](#). ClinicoEconomics and Outcomes Research, Volume 11, 335–348.

Another two months of field testing and evaluation using the online calculators, our research project will conclude with revisions and a final virtual convening in late July 2024, during which model testers will share their insights about the interactive models and calculators.

Wherever possible and appropriate, when disseminating these final products we will share the model testers' own words and descriptions of the products; every person in libraries has a voice that resonates with someone else. Our best hope of uptake is to maximize the inclusion of perspectives, descriptions, and voices describing the concepts and use of the research products.

Calculators will live with the findings and project information online with permanent hosting managed by the Northern New York Library Network. The project's 30 testing libraries, project board, and partners will all be invited to share and train on the calculators built as part of this research. By the time this project is completed, every product will have been reviewed and tested by dozens of partners across disciplines.

Project participants, researchers, and advisors will be asked to share their experience and the utility of the research projects along with the final findings and results across their professional networks. Additionally, they will be encouraged to present on this project from their own perspective.

Diversity Plan

Accepting equity as a value and a goal of librarianship requires a means to evaluate our service suite for improved equity across capabilities: individuals' ability to speak and have their voices heard and acted on, to be free from risk of bodily harm, and to have unfettered access to tools which support imagination, delight, and beauty. Progress toward "capability equity" can appear in observable, measurable form, yet a mechanism by which to detect such equity (or disparity) remains unavailable. This deficiency does not have to persist. We can choose to build tools that expose circumstances that perpetuate inequity, and that value increased equity, and with rigor, we can then evaluate our libraries against this valuation and design programs and services to create meaningful change. Economists have been elbow deep in figuring out how to stop zip code or census block (and therefore race and economic class) from being the largest determinant of life expectancy. And program evaluators have been working with economists and public health scholars to test whether service interventions have the impact we want: lives filled with capability, beauty, and support.

Our advisory board, critical readers and model testers will represent a diversity of expertise, personal identities, and professional domains. Further, our model testers will engage community residents, library stakeholders, and partners to uncover both value and need within their communities, in order to successfully evaluate the research and its products. This project is designed to support libraries taking their place as community anchors and power brokers who actively dismantle systems of discrimination and oppression. A more sophisticated understanding of the network effects and emergent properties of the interrelated systems they work within will help them discover what is hard to see and open new ways to make progress on the most difficult social challenges.

National Impact

We want capabilities for a life well-lived to be within reach of every single community member and we want the work of the public library to be a part of their set opportunity access points. Project Outcome and Measures that Matter are driving toward that goal. The Community Catalyst Initiative built a robust foundation of research that demonstrates the library's contribution to social wellbeing through case study analysis and partnerships that show us how to leverage our assets for robust, library-engaged, community development.

What we offer with this project is the introduction of econometrics and economic modeling tools to clarify valuation of service and provide a framework and calculator for its on the ground application. We offer interdisciplinary criticism to our models so that they can become more resonant and true across community typologies and geographies. Finally, we offer data science replicability protocols so that every phase can be tested with replication studies and efforts.

For replicability, raw data from each phase of work will be posted in our OSF project repository, along with a codebook detailing data sets used in research: where they were found, links or directions to where others can get them, description of steps taken to clean and analyze the data, and the formulae used for each.

For perpetual storage, maintenance, and use beyond the grant funding window, Northern New York Library Network is well-positioned to ensure the sustainability of research products. They are experienced with mapping content management standards and designing for ready access and long term use.

For dissemination, findings will be shared as they are developed, at least once per phase. Three primary venues for dissemination will be used. First, findings will be shared on the project's website so that our partners can refer interested library people to a dedicated space.. Second, messages will be posted and discussion invited on national and state level listservs, and third, communications will be sent to library and economic professional associations. Already our state level partners have committed to prioritizing professional development to libraries aligned with this eventual framework for service value.

Libraries in Community Systems takes a comprehensive approach to systemic change within communities, seeing libraries as both anchor and catalyst with the potential to influence resident belonging, their access and contribution to networks of mutual support, and a window to agency and self-determination. Designed for library practitioners, our products will be ready-to-use online or on your desktop with narrative descriptions to guide novice data users. At its core and in every step, this is research to aid practice.



DIGITAL PRODUCT FORM

INTRODUCTION

The Institute of Museum and Library Services (IMLS) is committed to expanding public access to digital products that are created using federal funds. This includes (1) digitized and born-digital content, resources, or assets; (2) software; and (3) research data (see below for more specific examples). Excluded are preliminary analyses, drafts of papers, plans for future research, peer-review assessments, and communications with colleagues.

The digital products you create with IMLS funding require effective stewardship to protect and enhance their value, and they should be freely and readily available for use and reuse by libraries, archives, museums, and the public. Because technology is dynamic and because we do not want to inhibit innovation, we do not want to prescribe set standards and practices that could become quickly outdated. Instead, we ask that you answer questions that address specific aspects of creating and managing digital products. Like all components of your IMLS application, 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 digital products in the course of your IMLS-funded project, you must first provide answers to the questions in **SECTION I: INTELLECTUAL PROPERTY RIGHTS AND PERMISSIONS**. Then consider which of the following types of digital products you will create in your project, and complete each section of the form that is applicable.

SECTION II: DIGITAL CONTENT, RESOURCES, OR ASSETS

Complete this section if your project will create digital content, resources, or assets. These include both digitized and born-digital products created by individuals, project teams, or through community gatherings during your project. Examples include, but are not limited to, still images, audio files, moving images, microfilm, object inventories, object catalogs, artworks, books, posters, curricula, field books, maps, notebooks, scientific labels, metadata schema, charts, tables, drawings, workflows, and teacher toolkits. Your project may involve making these materials available through public or access-controlled websites, kiosks, or live or recorded programs.

SECTION III: SOFTWARE

Complete this section if your project will create software, including any source code, algorithms, applications, and digital tools plus the accompanying documentation created by you during your project.

SECTION IV: RESEARCH DATA

Complete this section if your project will create research data, including recorded factual information and supporting documentation, commonly accepted as relevant to validating research findings and to supporting scholarly publications.

SECTION I: INTELLECTUAL PROPERTY RIGHTS AND PERMISSIONS

A.1 We expect applicants seeking federal funds for developing or creating digital products to release these files under open-source licenses to maximize access and promote reuse. What will be the intellectual property status of the digital products (i.e., digital content, resources, or assets; software; research data) you intend to create? What ownership rights will your organization assert over the files you intend to create, and what conditions will you impose on their access and use? Who will hold the copyright(s)? Explain and justify your licensing selections. Identify and explain the license under which you will release the files (e.g., a non-restrictive license such as BSD, GNU, MIT, Creative Commons licenses; RightsStatements.org statements). Explain and justify any prohibitive terms or conditions of use or access, and detail how you will notify potential users about relevant terms and conditions.

The Libraries in Community Systems project will produce digital content, resources, and research data made available with open access conformant licenses as follows:

Digital Content, as well as stand-alone **Resources** will be released with **CC BY 4.0** Creative Commons licensing, making these items free to copy and redistribute the material in any medium or format, as well as to remix or transform the material for any purpose, even commercial purposes. Creators will retain attribution rights and Northern New York Library Network will retain back-up files, but not “copyright ownership” over any item produced through this project. Each digital product will contain a CCBY4.0 statement in its footer or printable matter.

Original **Research Data**, including formulas, analysis, full original sets, and visualizations will be released with **ODC-PDDL** Open Data Commons licensing, immediately dedicating these outputs to the Public Domain. This license will be shared by viewers through the Open Science Framework platform for sharing research components like this one.

It is our view that this mix allows for maximum transparency, replicability, and use while incentivizing creators to produce content that they can be professionally accountable to and benefit from.

A.2 What ownership rights will your organization assert over the new digital products and what conditions will you impose on access and use? Explain and justify any terms of access and conditions of use and detail how you will notify potential users about relevant terms or conditions.

Northern New York Library Network will not assert ownership rights over the newly created digital products. Web content, digital content, and resources will be attributed to their creators who will hold the CCBY4.0 license on each product.

All research data produced by this project will be shared using ODC-PDDL which dedicates the data to the public domain at the moment of publication.

All products will have their licensing with them, in their footer in web or print-ready digital content, and/or as part of their metadata and heading in their Open Science Framework component.

A.3 If you will create any products that may involve privacy concerns, require obtaining permissions or rights, or raise any cultural sensitivities, describe the issues and how you plan to address them.

Neither research or data is neutral. Though our data does not raise privacy concerns or require obtaining permission or rights due to privacy concerns, we anticipate that our examination of communities, social wellbeing, and value to intersect with culturally sensitive information.

Our methods and research structure are designed to be shaped in partnership with the tribal, rural, suburban, and urban libraries and their stakeholders we will have the opportunity to interact with. As an example of our perspective on data, its use, and how we will balance analysis with help from our advisors and community level partners could be third grade reading proficiency scores. Elementary student performance has many factors, chief among them is small class sizes (<16 students). But the story of student performance is often linked to individual characteristics (poor and/or single parents, limited study time/space, low grit). As a researcher exploring data involving neighborhood reading proficiency scores, will I pair them with density of low-income households? Or with average class size?

We will be assisted in these kinds of questions by research literature across the dimensions of social wellbeing in question, and also from our project partners: our advisory board who represent a range of research and practice expertise and perspectives, as well as our model testing libraries who hold local knowledge and expertise in how what the quantitative data says plays out in town.

SECTION II: DIGITAL CONTENT, RESOURCES, OR ASSETS

A.1 Describe the digital content, resources, or assets you will create or collect, the quantities of each type, and the format(s) you will use.

This project is planned as a primarily digital experience, with convenings held virtually, resources shared via email, social media, and hosted in online platforms. Our planned products are listed below with their quantities and formats. Any additional

content made in the future that we haven't thought of yet will follow these same practices.

Website (1): Likely created in Wordpress (open-source content management system), our website will be hosted on servers maintained by Northern New York Library Network.

Diagrams (60): Created collaboratively using Google Jamboard, one diagram will be produced in each breakout room over 30 library virtual conversations. They will be saved and made available for browsing and analysis in Adobe .pdf form.

Representative samples of diagrams will be hosted as an image carousel on the project website.

Notes (5): Note sets from advisory board meetings, virtual convenings, and model tester meetings will be collected into single files from each group / round of convenings in Google Docs first and then made available as .pdf files.

Qualitative data codebook (1): Created in Microsoft Word, this document will describe the themes and analysis from conversations. Hosted on OSF as .pdf file.

Quantitative data assets - formulas / analysis (3): Formulas will be included in analysis results Excel .xlsx workbooks published with a sheet which details the data definitions, sources, and formulas used for cleaning and analysis. Formulas will also be published as stand alone files in two formats / programming codes: Stata .do code file and R .r script file.

Interactive models (3): Diagrammatic models displaying relationships within community systems, data relationships between social wellbeing indicators and perceived value, and weights will be available for user manipulation and play. Built with .php based developer tools, our contract will require the developer to share code according to CCBY4.0.

Desktop calculator files (2): Excel workbooks allow the greatest complexity in a format that is widely available at libraries. Both of these files will be built and made available as downloadable Microsoft Excel .xlsx files.

Interactive calculators (2): Created to accurately deliver the same results as the desktop calculator and built with .php based developer tools, the calculators will only compute valuation on one service at a time to be nimble enough for online use. Our contract will require the developer to share code according to CCBY4.0.

How-to videos (12): Screen-share how to videos on using digital assets will be recorded using Loom, downloaded as .mp4 files, edited using Adobe Premiere (if appropriate), and hosted on Vimeo. They will be embedded into our website at the point of access for the relevant asset.

Helper files (5): Text and image help files for using interactive and desktop assets will be available as .pdf files.

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

Laptops with cameras.

Zoom for virtual meetings.

Google Jamboard for collaborative diagramming.
Wordpress for web content management.
Hosting servers (NNYLN) utilizing Oracle's VirtualBox.
Open Science Framework for asset and research sharing.
Stata for data cleaning and analysis.
R for translating .do file into shareable .r file for data sharing and open-source replication.
Loom for creating screen-share content.
Microsoft Excel for producing end user calculators.
Adobe .pdf for end user text and text and image file sharing, including reports and findings.
Vimeo for video hosting.

A.3 List all the digital file formats (e.g., XML, TIFF, MPEG, OBJ, DOC, PDF) you plan to use. If digitizing content, describe the quality standards (e.g., resolution, sampling rate, pixel dimensions) you will use for the files you will create.

.XML ; .PHP
.TIFF ; .PNG
.MPEG4 ; .WAV
.PDF ; .XLSX
.DO ; .R

Workflow and Asset Maintenance/Preservation

B.1 Describe your quality control plan. How will you monitor and evaluate your workflow and products?

Each product goes through multiple layers of review, including being reviewed by the project's critical readers. Online interactives will be field tested by model testers over a period of two months with iteration time built in.

B.2 Describe your plan for preserving and maintaining digital assets during and after the award period. Your plan should address storage systems, shared repositories, technical documentation, migration planning, and 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 C.F.R. § 200.461).

Northern New York Library Network has strength in the preservation and maintenance of digital records. They will manage hosting and backing up of all assets utilizing Wordpress database backup modules and VirtualBox virtual machine automated archives via cloning. This will allow preservation of the hosted operating system and daily scheduled backups of the Wordpress database will allow for easy restoration in case of disaster or hostile penetration.

Metadata

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

Metadata describing all resources included in the project's OSF repository will be produced when added, and will include type of data, source, date gathered, indicator(s) described by the data, and related social wellbeing dimension. We expect Dublin Core to serve as an adequate schema.

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

Metadata will be preserved as a csv file, stored and maintained with the assets they describe.

C.3 Explain what metadata sharing and/or other strategies you will use to facilitate widespread discovery and use of the digital content, resources, or assets created during your project (e.g., an API [Application Programming Interface], contributions to a digital platform, or other ways you might enable batch queries and retrieval of metadata).

All project components will be discoverable through Open Science Framework as well as through standard internet discovery mechanisms.

Access and Use

D.1 Describe how you will make the digital content, resources, or assets 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, delivery enabled by IIIF specifications).

The full project datasets, findings, and publications will be available through Open Science Framework, as well as through papers written on the findings published in open access journals. Resources created for public and tribal librarians will also be shared using our project website. Further, all resources will be shared through our state level partners' email listservs, partners in the Association of Tribal Archives, Libraries, and Museums, and to professional library and economic associations.

D.2. Provide the name(s) and URL(s) (Universal Resource Locator), DOI (Digital Object Identifier), or other persistent identifier for any examples of previous digital content, resources, or assets your organization has created.

Lead researcher on the project, Margo Gustina, is lead on this project: [DOI: 10.17605/OSF.IO/WB56G](https://doi.org/10.17605/OSF.IO/WB56G) which has interactive assets here: <https://rurallibraries.org/>. Northern New York Library Network develops, maintains, and hosts NYS Historic Newspapers: <https://nyshistoricnewspapers.org/> which manages and makes findable over 11 million pages of NY newspapers.

SECTION III: SOFTWARE

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) it will serve.

Not applicable for this project.

A.2 List other existing software that wholly or partially performs the same or similar functions, and explain how the software you intend to create is different, and justify why those differences are significant and necessary.

Not applicable for this project.

Technical Information

B.1 List the programming languages, platforms, frameworks, software, or other applications you will use to create your software and explain why you chose them.

Not applicable for this project.

B.2 Describe how the software you intend to create will extend or interoperate with relevant existing software.

Not applicable for this project.

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

Not applicable for this project.

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

Not applicable for this project.

B.5 Provide the name(s), URL(s), and/or code repository locations for examples of any previous software your organization has created.

Not applicable for this project.

Access and Use

C.1 Describe how you will make the software and source code available to the public and/or its intended users.

Not applicable for this project.

C.2 Identify where you will deposit the source code for the software you intend to develop:

Name of publicly accessible source code repository: Not applicable for this project.

URL: Not applicable for this project.

SECTION IV: RESEARCH DATA

As part of the federal government's commitment to increase access to federally funded research data, Section IV represents the Data Management Plan (DMP) for research proposals and should reflect data management, dissemination, and preservation best practices in the applicant's area of research appropriate to the data that the project will generate.

A.1 Identify the type(s) of data you plan to collect or generate, and the purpose or intended use(s) to which you expect them to be put. Describe the method(s) you will use, the proposed scope and scale, and the approximate dates or intervals at which you will collect or generate data.

Quant 2021-Sept, 2023: wellbeing indicator (e.g. rates of poverty, education attainment, etc.), and library (e.g. funding, staffing, service program) data for model communities and for AK, NY, SC, TX for analysis (e.g. OLS & partitioned regression, geospatial mapping, propensity scoring.) To develop model of service to outcome relationships and assign value.

Qual 2021-22: Focus group discussion - 30 x 2 in AK, NY, SC, TX - diagrams and notes for community perception of wellbeing dimension importance and library role/value.

Qual 2023-24: Model tester evaluations of models and tools: 30 x 4 (total) AK, NY, SC, TX.

A.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?

No.

A.3 Will you collect any sensitive information? This may include personally identifiable information (PII), confidential information (e.g., trade secrets), or proprietary information. If so, detail the specific steps you will take to protect the information while you prepare it for public

release (e.g., anonymizing individual identifiers, data aggregation). If the data will not be released publicly, explain why the data cannot be shared due to the protection of privacy, confidentiality, security, intellectual property, and other rights or requirements.

No.

A.4 What technical (hardware and/or software) requirements or dependencies would be necessary for understanding retrieving, displaying, processing, or otherwise reusing the data?

A computer will be required to retrieve and display the data. Diagrammatic data can be accessed in print. Interactive visual models require an internet connection. Replicating quantitative data analysis will require R or Stata (script available for both). Using the calculators will require a desktop version of Excel or access to the internet

A.5 What documentation (e.g., consent agreements, data documentation, codebooks, metadata, and analytical and procedural information) will you capture or create along with the data? Where will the documentation be stored and in what format(s)? How will you permanently associate and manage the documentation with the data it describes to enable future reuse?

Data documentation, codebooks, and analytical information will be captured and stored in four formats: .pdf, .xlsx, .do, and .r. Available via Open Science Framework and stored in AWS.

A.6 What is your plan for managing, disseminating, and preserving data after the completion of the award-funded project?

This project design includes dissemination of phase findings throughout the research life-cycle. Each component of the research products and the relevant data will get a persistent Digital Object Identifier through the use of Open Science Framework.

A.7 Identify where you will deposit the data: Open Science Framework

Name of repository: Open Science Framework
URL: osf.io

A.8 When and how frequently will you review this data management plan? How will the implementation be monitored?

Project administrators will check this plan quarterly for fidelity with the project developing.