

Abstract

Meta 2: Furthering Our Understanding of the Economic Value of Public Library Services: A Review of the Literature and Meta-Analysis is a two-year, three-phase project that expands and updates the results of previous research (Grant #: 11RE-04-08-0047) while focusing on two questions: 1) Is current research providing reliable and mounting evidence that public libraries contribute to the economic prosperity of the communities in which they are located?, and 2) If so, how might these benefits be accurately characterized and clearly communicated? During Phase 1, the project team will assemble a comprehensive collection of recent empirical studies that report economic benefit measures, integrate their findings, and assess the consistency of their estimates, the predictability of their magnitude, and the extent to which contextual factors figure in their variation. Without this attention, the value of these studies remains severely limited, and it is impossible to know if they contribute to a more integrated and comprehensive understanding of the economic contributions of public libraries. Phase 2 approaches the project's guiding questions using updated Public Library Survey data and the cost-benefit algorithm used in the original META project to measure advances from this perspective and triangulate with Phase 1 results. Phase 3 is designed to address the most important recommendation contained in the original META report: the need to look more carefully at the intangible benefits that are typically not taken into account in cost-benefit estimates. Recent progress on outcomes measures provides a timely opportunity to pursue this issue, and during Phase 3 the project team will develop and use more encompassing algorithms and an enriched data file to suggest a more forward-thinking value proposition that recognizes the new types of value created as public libraries realize their potential as vital, energizing community anchors. Both the professional literature and discourse suggest that this information will be of particular value in small and often diverse rural communities where public libraries sometimes lack the resources required to participate effectively in value-based funding and policy conversations. Middle size and larger libraries that wish to customize the results will have the opportunity to do so using the tools and resources added to the USC META website.

Narrative

The META 2 project is designed to update and respond to the findings of the META 1 project originally funded by the IMLS. The META 1 project and findings are briefly reviewed in Part 1 of this narrative. Part 2 of the narrative details the META 2 project, including the statement of need, project design, research questions, methodology, project phases and deliverables, diversity plan, and dissemination strategies.

1. META 1 *Assessing the Value of Public Library Services: A Review of the Literature and Meta-analysis* (Grant #: RE-04-08-0047)

The research that funded this project began with the premise that there are many reasons to measure organizational performance. They typically begin with the basic question, “Is my organization doing what it is intended to do?” Beyond this point, performance measurements can be used to guide the allocation of funds, motivate and direct employees, identify needs for improvement, and foster organizational culture. In the public sphere, perhaps even more importantly, performance measures are a powerful tool for communicating programmatic value and accomplishments to both stakeholders and constituents.

The value of this type of dialog and the measurements needed to sustain it were recurring themes in public library discussions (Durrance & Fisher, 2005; McCook, 2000, 2004; Usherwood, 1999), including those that centered on making the case for the public library in economic terms (Holt, 1998; Morris, Sumsion, & Hawkins, 2002; Elliott, 2005; Imholz & Arns, 2007). Arguments made by Glen Holt and Donald Elliott figured prominently in these discussions. Forums hosted by The Americans for Libraries Council also pointed to the importance of this dialog, as did the Urban Libraries Council, OCLC, State Librarians, and many practitioners. In response, there were multiple examples of studies and prominent discourse that used a variety of methodologies to create a picture of the contributions that public libraries made in American communities.

Much less progress had been made in systematically analyzing and consolidating the results of these efforts (Imholz & Arns, 2007), and as a consequence, there remained much to be learned concerning: 1) the consistency of the benefit estimates, 2) their predictable magnitude, and 3) the contextual factors that figured in their variation. It was also, if not a waste of scholarly resources, almost impossible to build a cumulative research agenda or make significant strides toward more comprehensive assessments without this type of information (Wolf, 1986). META 1 addressed this situation with two related research questions: (RQ1) whether the data reviewed provided mounting evidence concerning the contributions that public libraries make to the economic prosperity of the communities they serve, and (RQ2) what steps needed to be taken in order to strengthen this assertion.

The answer to the first question was affirmative. Data from multiple perspectives indicated a pattern of mounting evidence concerning the positive contributions that public libraries make to

the economic prosperity of the communities they serve. That evidence supported the reasonable suggestion that Americans typically receive benefits in the range of \$5 to \$6 for every \$1 they spend on public library services. The evidence also suggested that it is likely that these estimates undervalued the contributions of public libraries and might be strengthened through: 1) closer attention to the intangible benefits of library services, such as improvements in childhood literacy and community engagement; 2) the development of improved reporting standards; and 3) greater methodological consistency. META 2 updates these findings and begins to respond to these recommendations.

2. META 2: Furthering Our Understanding of Economic Value of Public Library Services

Statement of Need

Recent statistics indicate that the USC web site that houses *META1 Assessing the Value of Public Library Services: A Review of the Literature and Meta-analysis* (Grant #: RE-04-08-0047) (http://www.libsci.sc.edu/metaweb/ValuingPublicLibraries_FinalReport.pdf) was accessed over 5,000 times during the previous year. The information found there continues to be of broad and international interest. However, it now falls short on several fronts. Most importantly, it fails to take into account the transformations that are reshaping national public library services and sheds little light upon the types of value created when these institutions realize their potential as vital, energizing community anchors (see, for example, Alemanne, Mandel, & McClure, 2011; Moxley & Abbas, 2016; Smith, 2018).

Renewed attention to systematically analyzing and consolidating recent findings is also needed if progress toward the comprehensive assessments required to produce reliable and generalizable value estimates is to be maintained. Research and discourse suggest that this type of information enriches multiple perspectives, including conversations aimed at fairly apportioning public resources (see, among others, Greenwalt, 2013; Peet, 2015; King, 2015; Tessler, 2017; Return on Investment Analysis of Toledo County Public Library, 2016; Texas Public Libraries Economic Benefits and Return on Investment, 2017). When reliable, generalizable public library value estimates are lacking or non-adaptive to local conditions, opportunities to participate effectively in efforts to assess the relative merits of competing public investment strategies are limited, and the expression of an inclusive public library value proposition becomes difficult, if not impossible, to convey effectively at local and national levels.

Project Design

Theoretical Perspectives - Public Value Theory

In the years that have passed since META 1 was completed, public value theory has gained both attention and relevance. Originally proposed by a small number of writers (Bozeman & Bretschneider, 1994; Moore, 1997, 2013), the basic tenants suggest a public value proposition that accounts for both individual and societal outcomes. Broadly interpreted, the individual model rests on characterizations such as the public library helps me advance in life, enjoy new experiences, interact with people in my community, and learn more about myself and others. Upon first glance, it is obvious that these propositions are bounded by neither place nor media.

At the societal level, public value theory suggests that what people really want from government is the efficient and effective achievement of mandated social outcomes, such as clean air, reliable transportation, safe housing, and fair taxation—a value model that is not really the same as a value proposition deeply rooted in the idea that value is created by satisfying customers (de Jong, 2017). Value is instead consumed collectively both directly and indirectly.

Theoretical Perspectives—Economic Theory

Although economic theory has also made progress, its relevance has remained fairly stable. Assessments of the economic value of public library collections and services are complicated by their hybrid nature. Although library services are more accurately characterized as merit goods, or goods that should be supported because they benefit the public, the information they provide and many of the experiences they afford generally approach the definition of public goods. In most cases, these commodities, like the light that flows from a fireworks display, is not depleted as it is consumed. Nor does the use by one person usually preclude use by another, and for these reasons public libraries seem to fit within the classification of goods that should be provided by the public sector because there is no profitable private market for them. There is also an historical explanation for this location—that public libraries, like public schools, are of sufficient cultural importance to be guarded from the whims of political influence and the dangers associated with market fluctuations (Joeckel, 1935; Garceau, 1949; Foster, 1997). Over time, the advantages of this position have been sufficient to maintain this situation, but they also deprive public libraries of the advantages gained through a marketplace that can reach equilibrium and demonstrate market value.

Theoretical Perspective – Classification and Measurements

Economic theory

As noted in META 1, several types of measurements typically suggest themselves for theoretically supported economic evaluation and analyses (Chen & Rossi, 1992). The first, contingent valuation is widely used to value non-market goods within both the public and private sectors. These analyses provide an estimate of the demand for public goods and services, and they serve as a useful tool for aggregating perceptions concerning the benefits derived from these products and endeavors. Examples of studies using contingent valuation measurements are readily available in the fields of public health, environmental protection, national security, and public works. Hajek and Stejskal (2015) and Kwak and Yoo (2012) provide examples of the use of this approach.

The second type of measurement, cost benefit analysis, provides a well-recognized organizational framework for estimating the value of public services and the rate of return that accrues from public investments. Like contingent valuation estimates, cost benefit measurements have been used for several decades to assign economic value to the results of efforts ranging from medical procedures to natural habitat protection. Mandel, Spears, Gunther, and McClure (2013), Linhartova and Syejskal (2017), and *The Economic Impact of London Public Library on the City of London* (2015) provide examples of the use of this approach.

Public Value Theory

A third type of measurement aligns more closely with public value theory—the use of economic modeling software to generate assessments of the regional impact of policy initiatives. Benefits, as they are characterized here, accrue to a diverse but usually specified group of stakeholders, rather than those who participate in a particular transaction. The benefits captured in these assessments typically include income streams such as those created through public service employment and public expenditures that flow through local businesses and economies. This type of assessment has been used to characterize economic benefits for several decades, and examples of its use can be found in assessments of the economic impacts of activities in the environmental, cultural, medical, and transportation industries. The *Texas Public Libraries: Return on Investment Study* (2017) and *Taxpayer Return on Investment in Florida Public Libraries* (2013) provide examples of the use of this approach.

The last and most difficult of these measurements, assessing the value of community-wide economic externalities (Cornes & Sandler, 1996) play an important role in public value theory. Benefits are often exemplified with health care interventions, such as inoculations, that contribute to the well-being and health of those who do not directly receive the services in question or participate in related transactions in any way. In some cases the monetization of these benefits is straightforward, such as the cost of an injection, but in other cases the major

challenge lies in linking these important value measurements to appropriate constructs (Usherwood, 1999). While expanded discussion appears sparse, Neto (2017), Arns (2013), and Imholz and Arns (2007) are relevant to this topic.

Assessment Theory

Assessment theory rests on the rational assumption that a set of indicators or data elements can be used to describe observations about events in the real world. Within this framework, aspects of these observations can be assigned values (Gupta, 1994), used to measure and explore accomplishments (Greenberg, 2017) and combined into data sets in which each line represents a different entity or case. Meta-analysis tests for conformity among entities or cases based on the idea that “instead of looking at any study in isolation, we need to look at the body of evidence” in order to understand the utility of events or interventions (Bornstein, Higgins, & Rothstein, 2009, p. xxi). Phrased differently, meta-analysis attempts to “integrate results from existing studies to reveal patterns of relatively invariant underlying relationships and causalities, the establishment of which will constitute general principles and cumulative knowledge” (Hunter & Schmidt, 2004, p.16). Utility is increased and knowledge advances when synthesized data are found to conform to similar principles or results.

Research Questions

This project differs significantly from previous valuation efforts in a number of ways, including the fact that the META 2 research questions are guided by those used in the META 1 study. As a result, they can be expected to provide a unique opportunity to develop a clearer picture of a population that shares a single characteristic—a commitment to the use of public funds for the purpose of providing public library services—from a longitudinal as well as a static perspective.

- RQ1. Is there new, reliable, and mounting evidence that public libraries contribute to the economic prosperity of the communities they serve?
- RQ2. How might these benefits be accurately characterized and communicated?

Data Collection and Analysis

Phase 1: During Phase one, the project team will assemble a comprehensive collection of recent studies that report economic benefit measures, integrate their findings, assess the consistency of their estimates and the predictability of their magnitude to determine whether this body of literature suggests mounting evidence that public libraries contribute to the economic prosperity of the communities they serve.

Phase 1 Work Plan

The Phase 1 work plan closely mirrors the steps associated with this Phase in META 1, beginning with the identification and assembly of a comprehensive international collection of studies that report economic benefit measures developed using the four approaches previously examined: contingent valuation, cost-benefit analysis, economic modeling techniques, and externality assessments. As these are assembled, the research team will create bibliographic records for

each study as well as META2 metadata that indicate the methodology used to create the measurements, the type of benefit reported, the size of the benefit effect, and additional contextual variables that are likely to influence the size of the benefit effects reported.

These descriptive and contextual elements were originally drawn from the meta-analysis eligibility criteria developed by Lipsey and Wilson (2001), as well as exemplary meta-analysis studies conducted in the medical, environmental, and public policy domains in order to develop a theoretically supported coding scheme. The Graduate student specified in this proposal will take the lead in identifying eligible studies and obtaining copies for review. The Co-PI will supervise the Graduate student and take the lead on coding metadata elements with input from Drs. Von Nessen and Miller concerning additional coding elements.

Once the coding is completed, the records will be entered into a master database for statistical analysis (McClave & Sincich, 2009) using Microsoft Excel®, the R Project for Statistical Computing (<http://www.r-project.org/>), and Tableau data visualization software (<https://www.tableau.com/>). The statistical analysis will summarize the META 2 economic benefit findings, examine the trajectory that emerges when data from the two studies are combined, and indicate whether, as a group, these studies appear to provide a pattern of mounting evidence concerning the contributions that public libraries are making to the economic prosperity of the communities they serve. The Co-pi will take the lead on this analysis with assistance from Dr. Miller.

Phase 2: During Phase 2, the project team will use a non-parametric meta-analysis approach to determine whether recent Public Library Survey data provide mounting evidence that public libraries contribute to the economic prosperity of the communities they serve.

Phase 2 Work Plan

The Phase 2 work plan also closely mirrors the steps associated this phase in META 1. While the methodological heterogeneity of the public library economic benefit literature typically suggests descriptive analysis, the IMLS Public Library Survey (PLS) entries meet several of the requirements for meta-analysis. They are accompanied with operational definitions of each of the variables. The units of analysis are uniform and relatively consistent. The number of responses for each variable is known and for the most part suitable for statistical manipulation.

The data also present two constructs that can be used for benefit analysis. The first, *investment*, will be operationalized using the amount of local dollars committed to or spent on library services—a figure that may also be thought of as the cost to the

community of buying shares in this endeavor. The second, the *benefits* derived from this investment, will be conceptualized in terms of the library services provided as a result of these investments. The original South Carolina benefit algorithm developed with assistance from the USC Darla Moore School of Business will be used during this Phase to convert benefits to dollar-based variables, including proxy measurements. Use of the same algorithm will allow the results of the META 2 calculations to be compared to and combined with the META 1 calculations. Once this step is completed, the project team will use Comprehensive Meta-Analysis (V2) software to examine both files to determine whether they suggest new and reliable evidence that public libraries are contributing in to the economic prosperity of the communities they serve. The benefit estimates will also be triangulated with the benefits identified in Phase 1. The project PI and Dr. Miller will take the lead on this analysis.

Phase 3: This new section is designed to address the META 1 and 2 research questions from the perspective of two of the findings and recommendations that conclude the META 1 report—the possibility that these calculations undervalue their target and the likelihood that more accurate and powerful figures could be developed. Two approaches were recommended: closer attention to intangible benefits, such as improvements in childhood literacy, and a revised algorithm that takes into account additional factors such as those that are gaining prominence as public libraries realize their potential as community anchors.

Work Plan Phase 3

At this point the project team will begin to focus on the development of a second algorithm that more accurately reflects the value of 21st century public libraries and the new type of value created as they become energizing community anchor institutions. This effort complements and aligns with the objectives of several data initiatives, including the IMLS funded initiative Measures that Matter (<https://www.ims.gov/news-events/news-releases/ims-and-cosla-announce-project-develop-public-library-data-and-outcomes>) and PLA's Project Outcomes (https://www.projectoutcome.org/ckeditor_assets/attachments/359/pla-project-outcome-2-year-annual-report-final.pdf); and it will draw from typologies such as those developed by the *National Impact of Library Public Programs Assessment* project (<http://nilppa.org/>), the Pew Research Center typology project (<http://www.pewinternet.org/2014/03/13/library-engagement-typology/>), and the Anchor Dashboard developed by The Community Wealth Organization (<https://community-wealth.org/indicators#reports>) and expanded by the Dashboard Learning Cohort (https://www.scribd.com/doc/306536849/anchor-dashboard-flyer-final-web-page-2?secret_password=eywAwtESi8Ow8XG4yyRy). Dr. Miller, Dr. VonNessen, and the PI will take the lead on this task.

During this period, the project team will also begin work on a bibliographic database that captures recent community engagement activities that make references to

individual and societal benefits and then pairs these against the new algorithm to identify value sources that may not have been initially included in the calculation. Our ongoing partnership with the Charleston County Public Library will be of value here, and we will be able to bring their expert opinion and advice to the table at this point as well and others during the META 2 project. The Co-PI and Graduate student will take the lead on this section.

Once these steps are completed, the new economic benefit algorithm will be validated against a random sample of public libraries taken from the most recent Public Library Survey and used to re-calculate the META 1 and META 2 economic benefit values using the original and most recent Public Library Survey files. Those results will then be tested using meta-analysis software for mounting evidence of economic value. The new algorithm will be used a third time to create a third value estimate using a full Public Library Survey file that has been enriched with socio-demographic and economic data indicators extracted from publicly available sources such as The U.S. Bureau of Economic Analysis (<https://www.bea.gov/>), the U.S. Census Bureau (<https://www.census.gov/>) and through University memberships in organizations such as the International City County Management Association <https://icma.org>. The project team regularly works with these data, and they are experienced with file-crossing methods. The results of this step are expected to produce an updated public value narrative and provide a benchmark for future analysis. Dr. Miller and Dr. Von Nessen will take the lead on this section.

Diversity Plan

The University of South Carolina, our leaders, and our campus community are actively engaged in efforts that enrich the lives of our students, faculty, and staff through a commitment to an environment favored with the riches created by a diverse community. This research project team is mindful of this commitment and will ensure that those who are involved will be able to provide diverse perspectives. Dr. Clayton Copeland, a national expert on diversity topics, will provide leadership with respect to these goals, provide input as needed throughout the project, and organize regular meetings with an Advisory Panel consisting of members of the School of Library and Information Science Diversity Leadership Group <http://www.libsci.sc.edu/aalgroup/>.

Impact

- Improved decision-making based on enriched, objective evidence of the value created when public libraries act as strong community anchor institutions that promote economic vitality as well as civic and cultural opportunities;
- More complete and accurate characterizations of public library value using an expanded set of tools and reliable metrics;

- Increased national interest in the relationship between public library services and community economic development.

Dissemination Strategies

Dissemination of our research results will take place through multiple channels, including both traditional academic and practitioner journals, such as *Public Library Quarterly*, *Library Quarterly*, *Library Journal*, and *Library and Information Research*, as well as through presentations at state and national library conferences. The project team has successfully shared the results of META 1 through these channels, and the presentations have been consistently well received at regional, national, and international meetings. The Meta 1 website will also be redesigned and updated with openly accessible phase-related progress reports, presentations, and webinars. A full report and white paper similar to the Meta 1 project will be made freely and publicly available on the site. The new site will also include a methodology forum that provides the algorithms and files used during this project in an interactive format that will allow individual service areas and stakeholders to adapt the research and calculations to local situations and contexts while providing opportunities for additional researchers to replicate and post their results. Three webinars, each corresponding to a research phase, will also be produced to encourage future use of these materials and to promote benchmarking opportunities where these tools can be used with others to express the new types of value and the new narratives that are emerging as 21st century libraries take their place as vital, energizing community anchor institutions.

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Year 1	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	AUG	Sept	Total
Collection of Phase 1 studies		\$25,634											
Creation of bibliographic data base				\$30,256									
parsing by methodology						\$23,080							
Benefit Analysis								\$28,228					
Module completion summaries										\$9,931			
Phase 2 File preparation											\$6,979		
Meta-Analysis											\$6,474		
Web site update												\$7,409	
Module completion and summaries												\$8,110	
Cumulative expenditures		\$25,634		\$30,256		\$23,080		\$28,228		\$9,931	\$13,453	\$15,520	\$146,102
Year 2	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Total
Phase 3 development and validation of new cost-benefit algorithm		\$21,488											
Analysis of Meta 1 and Meta 2 Public Library Survey data applying new algorithm				\$17,791									
Collection of community/civic engagement studies valuing public libraries as community anchors			\$12,152										
Parsing database by community/civic engagement benefit characteristics					\$25,594								
Meta-analysis							\$30,424						
Final Report and publication preparation										\$16,565			
Final Web site update and design												\$20,920	
Cumulative expenditures		\$21,488	\$12,152	\$17,791	\$25,594		\$30,424			\$16,565		\$20,920	\$144,934

University of South Carolina
Schedule of Completion

\$146,102	Year 1
\$144,934	Year 2
\$291,036	Total

DIGITAL PRODUCT FORM

Introduction

The Institute of Museum and Library Services (IMLS) is committed to expanding public access to federally funded digital products (i.e., digital content, resources, assets, software, and datasets). The products 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 can be challenging. 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

Please check here if you have reviewed Parts I, II, III, and IV below and you have determined that your proposal does NOT involve the creation of digital products (i.e., digital content, resources, assets, software, or datasets). You must still submit this Digital Product Form with your proposal even if you check this box, because this Digital Product Form is a Required Document.

If you ARE creating digital products, you must provide answers to the questions in Part I. In addition, you must also complete at least one of the subsequent sections. If you intend to create or collect digital content, resources, or assets, complete Part II. If you intend to develop software, complete Part III. If you intend to create a dataset, complete Part IV.

Part I: Intellectual Property Rights and Permissions

A.1 What will be the intellectual property status of the digital products (content, resources, assets, software, or datasets) you intend to create? Who will hold the copyright(s)? How will you explain property rights and permissions to potential users (for example, by assigning a non-restrictive license such as BSD, GNU, MIT, or Creative Commons to the product)? Explain and justify your licensing selections.

META 2 reports, presentation materials, and educational modules will be licensed under the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) license so that they can be freely shared and adapted for non-commercial use (with attribution).

The META 2 bibliographic database and the extended Public Library Survey datasets containing demographic and economic public data will be licensed under the Open Data Commons Attribution License (ODC-By) v1.0, which grants permission to freely share, copy, distribute, and use the database; to produce works from the database; and to modify, transform and build upon the database as long as any public use of the database, or works produced from the database, is attributed to the original creator. Any use or redistribution of the database, or works produced from it, must make clear to others the license of the database and keep intact any notices on the original database (see <https://opendatacommons.org/licenses/by/summary/>).

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.

New digital products will be freely and openly available (with attribution) under the terms of the CC BY-NC 4.0 and ODC-By v.1.0 licenses. Links to those licenses will be embedded in the digital materials and the rights statement included in the database metadata.

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.

No privacy concerns are associated with the public data analyzed in META 2.

Part II: Projects Creating or Collecting Digital Content, Resources, or Assets

A. Creating or Collecting New 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 format you will use.

Digital content will be produced by each of the three phases of the project. The first phase will result in a bibliographic database in Excel format and a summary benefit analysis report in PDF format. The digital content produced in phase two includes updates to the Excel formatted bibliographic database, a meta-analysis report in PDF format, conference-ready presentation materials in PDF and Powerpoint formats, a summary report in PDF format, and a website hosted by USC SLIS to house and provide freely available access to project materials and work product. The digital content produced during the third phase of the project includes updates to the Excel formatted bibliographic database, development of extended Public Library Survey files containing demographic and economic public data in Excel format, a meta-analysis report in PDF format, conference-ready presentation materials in PDF and Powerpoint formats, a final report in PDF format, and updates to the website hosted by USC SLIS to house and provide freely available access to project materials and work product for use by institutions and practitioners. An educational webinar will be produced at the end of each of the three project phases using Camtasia software and posted on the project website for streaming and downloads.

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

The digital products will be produced by project staff using Excel, Adobe PDF software, and Camtasia screen and video capture software currently in place as well as Tableau and meta-analysis software licensed using grant funds.

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

Camtasia Webinars:

Resolution: 720 Pixels

Pixel dimensions: 768x480 minimum

Frame rate: 30

Encoding mod: video

File format: mp4/HTML5 – will allow learning modules to be seen on ipads, mobile devices, and a variety of platforms

B. Workflow and Asset Maintenance/Preservation

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

The Co-PIs will take the lead in monitoring and evaluating the workflow and products during each phase of the product. They will be assisted by Dr. Miller, whose experience includes multiple semesters teaching the Master's level SLIS725 Digital Libraries and SLIS719 Preservation Planning and Administration courses as well as professional experience managing disaster recovery planning for a financial institution.

B.2 Describe your plan for preserving and maintaining digital assets during and after the award period of performance. Your plan may 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).

A website that provides the results of the project, ongoing reports, and prototypes will be maintained on the USC SLIS server. The server has an automatic daily backup function. Regular content reviews, including migration planning, are conducted at five year intervals, and content is not removed without authorization.

C. Metadata

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

The PBCore 2.0 metadata structure will be adopted for the video materials produced during the course of the project (<http://www.pbcore.org/elements/>). Qualified Dublin Core will be adopted to produce the technical, descriptive, administrative, and preservation metadata for textual materials produced during the course of the project and for the bibliographic database constructed during the project. Dublin Core namespaces and controlled vocabularies such as the Library of Congress Subject Headings and Virtual International Authority File (VIAF) will be used to guide metadata content creation.

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

Metadata created during the project will be preserved and maintained on University of South Carolina networked servers and uploaded to the DPLA (see C.3). After the grant period, the metadata will continue to be maintained on University of South Carolina networked servers and may be re-published using the Resource Description Framework (RDF) as linked open data.

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).

Three strategies will be used to facilitate widespread discovery and use of the digital instructional materials created during the project: (1) posting all project work products and databases on the project web site for open access (2) search engine optimization (SEO), and (3) metadata upload to DPLA. SEO will be optimized by adopting the VideoObject schema described at <http://schema.org/VideoObject> to embed structured metadata in the instructional material web pages for use by search engines. Metadata will also be uploaded to DPLA according to the Metadata Application Profile version 3.1 (2014-07-03) described at <http://dp.la/info/map>. Acknowledging that the DPLA standard may still be evolving, the most current version of the Metadata Application Profile will be adopted at the time of metadata creation.

D. 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).

The final project will be openly available online through multiple platforms that use commonly available software, interfaces, and web browsers.

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

Part III. Projects Developing Software

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) it will serve.

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

B. Technical Information

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

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

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

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

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

C. Access and Use

C.1 We expect applicants seeking federal funds for software to develop and release these products under open-source licenses to maximize access and promote reuse. What ownership rights will your organization assert over the software you intend to create, and what conditions will you impose on its access and use? 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 and justify any prohibitive terms or conditions of use or access and detail how you will notify potential users about relevant terms and conditions.

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 deposit the source code for the software

you intend to develop: Name of publicly accessible source code

repository:

URL:

Part IV: Projects Creating Datasets

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

The data to be collected during the project consists of bibliographic data in extended Dublin Core format based on a code book (see A.6) compiled under the guidance of the Co-PI with the assistance of Dr. Miller. The bibliographic data will be used as input to the cost-benefit and meta-analyses conducted during the project, and it will updated during each of the three phases of the project.

During phase 3 of the project, IMLS Public Library Survey files will be enriched with demographic and economic public data available from the U.S. Census Bureau and the U.S. Bureau of Economic Analysis. The enriched IMLS Public Library Survey files will be made available for download on the project website in Excel format.

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 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).

No.

A.4 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.

No additional documentation will be collected.

A.5 What methods 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 bibliographic database will be collected by the project Graduate Assistant with guidance from the Co-PI and Dr. Miller according to the project code book (see A.6). The database will be maintained in Excel format and the versions completed at each phase of the project will be openly available for download and use on the project website. Preservation of and accessibility of each version of the database will facilitate replication of results by outside researchers.

IMLS Public Library Survey files will be extended with demographic and economic public data available from the U.S. Census Bureau and the U.S. Bureau of Economic Analysis using Microsoft Access to match files. After matching and quality control verification, the matched files will be extracted in Excel format for posting on the project website for public download. File documentation describing the demographic and economic public data will be developed and made available for download on the project website in Adobe PDF format along with the extended public library files.

A.6 What documentation (e.g., data documentation, codebooks) 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?

A project code book defining the extended Dublin Core fields within the database will be developed to guide the Graduate Assistant in the creation of the database fields. The code book will also guide the Co-PI in conducting quality assurance tests of the database. Additional database documentation will be available on the project website and in the summary reports released at each phase of the project. The code book will be posted along with the three versions of the bibliographic database on the project website, and the code book will be permanently associated with the database versions in the University of South Carolina institutional repository (see A.8).

The Adobe PDF formatted file documentation describing the demographic and economic public data appended to IMLS Public Library Survey data will be made available for download on the project website in Adobe PDF format along with the extended Public Library Survey files. The documentation will be permanently associated with the extended library files in the University of South Carolina institutional repository (see A.8).

A.7 What is your plan for archiving, managing, and disseminating data after the completion of the award-funded project?

Each version of the bibliographic database will be archived on the project website during each phase of the project so that the Excel database will be openly available for download. The extended Public Library Survey files will also be archived on the project website in Excel format for open access. Additionally, the database versions and codebook as well as the extended Public Library Survey files and documentation will be deposited in the University of South Carolina institutional repository (see A.8) for open access.

A.8 Identify where you will deposit the dataset(s):

Name of repository: Scholar Commons: The Institutional Repository of the University of South Carolina

URL: <https://scholarcommons.sc.edu/>

A.9 When and how frequently will you review this data management plan? How will the implementation be monitored?

The data management plan will be reviewed at the end of the three project phases to ensure the accessibility, preservation, and sustainability of the bibliographic database. The implementation of the data management plan will be monitored by the project Co-PIs during each project phase.