Information for Empowerment: recovery and sustainability in Puerto Rico.

The Graduate School of Information Science and Technologies (GSIST) of the University of Puerto Rico submits this Master's level proposal for a planning grant to explore the information needs of residents of distinctly diverse communities in Puerto Rico. This project is designed and proposed in the context of the Institute of Museums and Library Services' (IMLS) Community Catalyst project category.

As Puerto Rico struggles to recover from a deep financial crisis and from the aftermath of two hurricanes that left the island severely affected since 2017, a series of earthquakes and replicas affected the southwest area of the island during the beginnings of the current year. These recent events present a new paradigm in the lives of the over three million citizens that live in Puerto Rico, since the last major seismic incident experienced took place in 1918.

Citizens' participation in the recovery efforts has been active; however, said efforts can be curtailed by what is often a lack of understanding of complex, technical, scientific, environmental or financial information regarding these matters and events. There is a need for experts, who can explain to laypersons the consequences of government actions or inactions. This expertise is needed in regard to relaying valuable information about environmental issues such as coastal erosion, the effects of coal burning, deforestation, and global warming, among others. These issues are greatly affecting different areas, if not all parts of the island.

Much-needed warnings, both on the devastating consequences of an extremely serious financial crisis, as well as the need to prepare and take measures to protect against natural disasters, have been met in the past with disbelief. However, recent events have proven how accurate said warnings have been. This planning grant seeks to design and organize a broad initiative to promote serious learning at two levels. First, by building librarians' and LIS students' knowledge and skills in communicating this important information to the citizenry and secondly to develop information resources, innovative strategies and outlets through which to make a critical contribution to the development of an informed and aware citizenry that is also willing to participate in the prevention and mitigation of the effects of these events. Unearthing and identifying citizens' information needs and skills in these critical areas is of the utmost necessity to address them properly. For this planning grant we are requesting $100,000.00

Statement of Broad Need

The project we propose is an exploratory one within the scope of the project category. We seek to identify the information needs of residents of communities in three geographical areas 1) the San Juan metropolitan area, 2) two municipalities in the southwest part of the island and 3) one island municipality. The exploratory phase in these areas will be focused on determining the different communities' current level of scientific knowledge regarding issues such as how to implement preventive measures for communities to undertake before any future natural disasters occur. The geographic location of Puerto Rico presents an unequivocal need to take action, as we are likely to experience the effects of climate change and other natural phenomena, as evidenced by frequent natural events due to our location in the Caribbean basin. The increase of said events, such as the recent major hurricanes experienced in the region has not been met with innovative

strategies. There is also a clear need for greater resources in order to educate our citizens. A lack of available funds in municipal and state government agencies has created a need to devise innovative approaches to address this need. The efforts conducted by authorities from the municipal and central governments have traditionally been oriented to addressing the areas impacted directly only after disasters have occurred. We will, instead, take a preventive approach to address citizens' knowledge regarding said events, thus empowering them in the process by preparing them for any future disasters.

Hurricanes have always been part of the lives and reality of the residents of Puerto Rico due to its location. However, many Puerto Ricans and residents of the island have come to develop a false sense of safety because the path of the hurricanes tended to shift. This belief was due to the fact that during the last decade many hurricanes headed our way changed their course a day or two before arriving at our coasts. As is known, this trend ended with the passing of hurricanes Irma and Maria on 2017, greatly affecting the lives of all residents. These hurricanes changed the course of our history, as well as people's mindsets. Although there is renewed awareness about hurricanes, earthquakes and other natural disasters, there is still a great need to relay relevant information, through innovative educational strategies. We aim to reach a wide and greatly disadvantaged audience to give them the tools needed to deal with these atmospheric phenomena. Although many citizens of the island have yet to recover from the effects of these hurricanes, many residents experienced an additional burden in the first months of 2020. As previously mentioned, a number of significant earthquakes affected the island and a great number of its inhabitants.

The last major earthquake that Puerto Rico had suffered, prior to the ones experienced at the beginning of January, took place on October 11th, 1918. Said event occurred in the northwest area of the island and had a magnitude of what would have been 7.3 on the Richter scale (said scale had not been created yet). In 1918, over a hundred people died and material losses were estimated in over 4 million dollars, a significant sum at the time.

On January 2020, the southwest area of Puerto Rico experienced a 6.4 level earthquake and over a thousand replicas of varied intensity happened thereafter, with a large number being of significant magnitude. Schools, places of commerce and residences were destroyed. Buildings and homes had to be abandoned, and afterwards temporary housing and improvised refuges had to be established to attend to the needs of hundreds of displaced families. Traditionally, Puerto Rico has depended on school buildings to accommodate those who have lost their homes due to floods or the results of hurricane winds. In this recent event, schools were not deemed safe to accommodate those whose living structures were destroyed, as many of the schools collapsed either partially or totally, making them unsafe. Still today, thousands of schoolchildren have not been able to return to their classes due to major damages to either direct collapse of the structures or the imminent risks presented by their school buildings. This recent event took many by surprise and unprepared despite years of warnings by seismologists and other specialists. These specialists tried to make the government and citizens aware of the dangers of not following building codes and housing developments built too close to the coastal areas, among other concerns regarding preparedness.

This project is proposed to unearth and document the information needs of diverse populations in Puerto Rico and to identify opportunities for community-based public librarians and academic librarians. In so doing, librarians will be able to generate initiatives to address current and future information needs. Additionally, Master of Library and Information Science (LIS) students will benefit of our initiative by taking part in the project activities at different moments of implementation. The project will be a novel approach to identifying information needs and in its exploring new ways to develop information resources to address community needs. It is also expected that participating students will develop presentations at the Graduate Research Fair and at ALISE's conference of 2021, having a direct influence upon their peers. Thus, the main objective of this planning grant is to implement design thinking and the gathering of much needed information in order to address the information needs of diverse populations. In a digital-driven society, it is imperative that information professionals learn and practice one of the fundamentals tasks of librarians, which is addressing the information needs of library users, be it at a university, school or community settings.

Our team strongly believes that making information available to citizens is the most effective way to building an informed citizenship. Various means and strategies to identify participants' information needs have been considered. The use of design thinking strategies as a way to unearth information needs is one of the strategies to be employed. Design thinking can provide an effective approach to information needs assessment. In the Sept-Oct 2018 issue of the Harvard Business Review, Liedtka states that one-way design thinking has proven useful is by overcoming the definition of the obvious. She states, "Defining problems in obvious, conventional ways, not surprisingly, often leads to obvious, conventional solutions. Asking a more interesting question can help teams discover more original ideas." In this sense, our team will approach the needs assessment task in a way that will provide information relevant beyond the obvious responses expected.

Design thinking has served as a strategic way to address ill-defined issues. Although we might consider information needs assessment as a "traditional" task conducted by librarians it is not so clear that traditional approaches would suffice in this particular context. "Design thinking is described as a process composed of a cycle of "inspiration, ideation, and iteration," and is generally considered to have a series of five design phases; Understanding, Observation, Visualization, Evaluation and Implementation. (ACRL, 2018)

The diversity of the participating population in terms of age, schooling, employment, living conditions and level of understanding in regards to traumatic events makes it necessary to implement novel approaches to unearth not-so-obvious information needs. The application of design thinking in this context aligns with the idea that said design represents a process and not a one-time activity. This approach takes into consideration factors such as "creativity, intuition and human-interactivity" (Devitt & Robbins, 2013). There is also the belief that within the constructivist paradigm it this undertaking aligns with the idea that "knowledge is primarily resident in the thinker or the context" Devitt & Robbins, 2013). We understand that knowledge is continuously being built upon and changes with contributions from new participants, experiences and understandings. In this sense, it becomes apparent that design thinking requires an iterative approach to identify which knowledge becomes relevant at different stages of a determined process or initiative The reason to incorporate this approach to information needs identification

rests in our belief that the information we will deliver also needs a way to be communicated in new, creative an understandable forms. This project ascribes to an exploratory phase in regard to project maturity since what we are proposing does not have any precedent in Puerto Rico.

Absences of reasonable and easily understandable explanations to events for the general populace, and a lack of proposals and actions, contribute to the feelings of powerlessness and uncertainty that have been experienced by Puerto Rican citizens in recent years. These feelings of uncertainty are additionally fueled by a lack of accurate and accessible information that can help citizens understand the complex situations they face. This lack curtails possible contributions by community members to propose possible solutions to address such pressing problems. Through this project we expect to promote lifelong learning for all participants through the development of information resources. This will be done taking into account the data gathered. The results will be disseminated in ways that are understandable for citizens with differing education levels.

Additionally, the project will have a direct impact upon LIS Master's level curricula. The novel approaches to be employed will directly benefit LIS graduate students, who will have an active part in their implementation. Tailor-made trainings will be designed for LIS students, as well as for public and academic librarians. These efforts will strengthen their capacity for more focused work and a broader way of approaching LIS education and practice. To design and conduct these trainings we will recruit a specialized, certified design-thinking expert. Additionally, we intend to make use of storytelling techniques as a way to develop information resources in various formats, providing in this way a narrative for diverse populations. Our results will provide a valuable contribution to a better LIS practice, as materials developed can address the information needs of people at different levels of understanding.

Once the information needs are assessed, the team will initiate its analysis and the design and development of information resources to provide citizens a response to their needs. Since the project proposed is a planning grant, our efforts are oriented to first build our capacity, to be followed by the implementation of an educational project based on the outcomes of this planning grant. A web-based platform will be developed as a repository of the information resources developed and piloted. These materials will also be made available in various formats, but always following an innovative storytelling approach to make the information relayed readily understood by the communities we shall serve, and beyond.

The project follows the notion that science needs to be understood by broad audiences in order for it to become meaningful (ElShafie, 2018). Although we do not intend to address all science knowledge issues, it is important that citizens understand the science behind the occurrence of issues associated with natural events that can affect them in order to develop effective prevention strategies, as well as mitigation measures. Information materials need to be clear, understandable and validated by the scientific community. For these tasks we will also recruit a science storytelling expert who will train and assist us in developing materials applying this innovative approach. The person in charge of this task is a certified expert in the practice of storytelling and has a solid academic and professional background in science. Storytelling is a recognized strategy when there is a need to make a complex body of knowledge understandable to laypersons. In Puerto Rico, we have a strong cultural tradition of storytelling. Despite this,

storytelling is seldom applied to the tasks were the main focus is science and the audiences are ~~so~~ varied in age and academic level. Our expert is a leader in this field and has conducted workshops in Puerto Rico on this theme. She has a degree on Earth and Atmospheric Science and holds a Ph.D. from the University of California, Berkeley. She is also certified by the Pixar Animation Studios, and has conducted workshops for the University of California Paleontology Museum.

The site will host information resources on a number of issues that affect the living conditions and wellness of participating communities and beyond, as well as graphic materials that will be accessible so that they can be reproduced throughout the communities in the main island and the island municipalities, as well. All materials developed will be made available to be freely accessed by citizens and groups from the civil society, as well as schools and community organizations by employing a Creative Commons license. The information resources developed can be made applicable at other locations by adapting the content to local communities. We will share the knowledge developed at conferences held by the American Library Association (ALA) and the Association for Library Science Education (ALISE), as well. We will document the process by which we conducted this project in order to share the methodology employed with those from other communities in Puerto Rico and beyond.

It can be argued that Puerto Rico does not have a focused strategy to develop an informed citizenry. NGO's have developed initiatives to educate citizens on a number of different issues and through various strategies. Community newspapers, websites and public lectures have been held regarding different themes to impart some scientific knowledge, but, although well intentioned, they have fallen short in their reach. Scholars and activists have led informal science activities and talks on environmental conservation areas. *Para la Naturaleza* ~~is~~ a group with one of the broadest efforts in employing a citizens' science approach, but they reach a very limited amount of people. Their effort depends on a scientist who can lecture at different sites on a particular theme, be it water conservation, coastal erosion, ~~or~~ among other themes. Other non-governmental organizations are likewise striving to provide information and to promote a culture of open information access, but they also have a limited reach due to the lack of funds, resources and volunteers. Additionally, these efforts at times may fall short of addressing the need to explain in layperson terms the complex issues that citizens may face. This scenario is worsened by the recognized long-term deficiencies in elementary and secondary education. K-12 education has greatly suffered for many years from a poor science education in many schools. Although a great number of projects have been devised and implemented as an attempt to solve this, they have not been successful as has been recognized by public education officials.

Initiatives to address the needed improvement of the teaching and learning of science and other subject matters at the K-12 level have not been sufficient. In consequence, we have a citizenry with a lack of "scientific literacy" regarding environmental concerns in their lives The understanding of basic science as it relates to everyday living is not at the level that it should be, and we cannot consider the average citizen to have developed this scientific literacy as a result of their education. Chen (2019) discusses the contributions of various authors to this issue and concludes that; "scientific literacy has expanded to include more than just asking students to know science content. Instead, students are asked to apply their scientific knowledge by interpreting information critically using reasonable evidence, making scientific decisions with

evidence, and managing their uncertainty and negotiating ideas with conflict claims." In this sense, Puerto Rico is lacking a scientific literate citizenry, at times even among the most educated of our citizens. This lacuna affects residents' lives directly.

The importance of science in understanding our environment is not clear for a vast number of our citizens. We find the same concerns at the social scientific level. The majority of our citizens, for example, do not understand the profound financial crisis that affects Puerto Rico. In recent years, the government has implemented plans for infrastructure, energy, agriculture and other projects that supposedly have the purpose of bettering our living conditions. However, many citizens do not understand their impact nor have the basic knowledge to critically evaluate if the proposed projects are indeed beneficial, detrimental or even needed, considering austerity measures. An informed and knowledgeable citizenry could affect changes and develop new ways to approach these difficult issues in the years ahead.

There are concrete examples of natural events that continue to affect our present condition. More importantly, not addressing them can steer the island in a very dangerous course regarding our environment. Our capacity to respond to natural disasters directly influences how we can recover. Austerity measures, poor governmental financial decisions and acts of corruption have affected our capacity to invest in the development of strategies to revert our environmental situation. This program will strengthen and develop the capacity to rebuild in a more organized and sensible way. Recently, problems such as coastal erosion; energy production and distribution; and health management have become the most debated issues at a local level. Clear, reliable and understandable information presented in various formats and which can be easily accessed is needed to educate members of our communities of social, economic and scientific issues that affect their wellbeing. Ennis (1996) and Yacoubian, (2015, 2019), separately insist in the need to develop the scientific literacy of citizens so that critical thinking informs their "deliberative participation" and democratic decision making on important scientific and social issues.

Despite current challenges, the island does present favorable conditions for our project. Telephony and internet services are robust, as Puerto Rico has a wide and relatively strong telecommunications infrastructure. Internet penetration reached 78% of the population (SME, Estudios Técnicos, 2019) in residents 12 years old and older. This is equivalent to 2.3 million persons. Of this number, 93.2% are social media users. Telephony use is even higher, mostly through mobile devices by 96% of the overall population. This will be taken into account to determine which platform we will use to disseminate the information we will share. However, in order to reach the higher percentage of people we can, we must also develop graphic and audiovisual materials that can be distributed through other outlets.

Project Design

Dr. José Sánchez-Lugo, professor and a former Director at the Graduate School of Information Science and Technologies (GSIST), an educational technologist and information professional, with extensive experience in community development initiatives will lead this project. NGO's, government agencies and community residents will also participate as partners. The goals and objectives of this planning grant is to first identify the information needs from the adult and

young adult population of various communities in Puerto Rico regarding specific issues that we consider important for the well being of our citizenry and develop information resources to address some of these needs applying innovative strategies. The issues are the following: coastal erosion, health literacy and natural disasters (hurricanes and earthquakes) as they affect adversely to Puerto Rico. The end objective is to design and develop a project or initiative that can gather the means and resources to address the identified needs. At the same time the design will include innovative approaches and strategies to traditional LIS tasks like information needs assessment. Also, it seeks the training of librarians and LIS students in storytelling as a way of explaining the scientific and complex content with which the team will be dealing. This project then, is the first step in building the capacity to address complex issues within diverse communities in Puerto Rico. The team will work together with community leaders and NGO´s that are already addressing pressing issues in these communities. As the communities are further defined and contacted we will establish direct collaboration with community leaders, to focus on the exchanges of information to learn more about their context. We will recruit other members of the research team and the consultants, some of which we have already identified. The team will include the principal investigator, public and academic librarians, LIS Masters' students and specialists with expertise in design thinking and storytelling.

The sequence of activities can be described as follows considering that it will be started on August 2020:

a) Since the GSIST already have contacts in various communities, this first stage will not take a considerable amount of time. Our deadline will be one and a half months, August through mid-September. Community and team participants will be recruited (communities, NGO's, LIS students, public and academic librarians). Some of the collaborators we have identified are *Espacios Abiertos,* an information access advocate group and IDEBAJO, a community group in the southern coast of the island. We also have strong ties with Vieques community groups. This is the case because we have been providing support to their historical archive efforts. We will further already be established bonds based on the GSIST tradition of working alongside them in past endeavors.

b) Initial design thinking training and design implementation for information needs assessment. This training will begin in September and should conclude by mid-November. Participants will be LIS students, faculty and public and academic librarians. We might include community residents depending on their availability and the consideration of other organizational commitments.

c) As part of the training, the team will design and implement an innovative approach to information needs assessment applying the design thinking strategies. To this end, the team will be collectively visiting the communities as part of the training experience and sharing the result of their on-site observations and data gathering at team meetings. This will be occurring during November and December. The team led by the PI and the design-thinking specialist by January will conduct the analysis of the data gathered. LIS graduate students selected for the project will also participate in this task.

d) Completion of the information needs assessment process is scheduled for February 2021. At this stage we will begin the information resources development stage. Also, storytelling training for participants will commence on March and will extend through

April. This stage of the process will extend through late April in order that we can have time to present the resources to the relevant communities by the end of May.

e) Selecting the information resources to develop to address the needs identified using narratives applying storytelling techniques. During this process, the appropriate outlets to be employed and information resources format will be determined. Evaluation process of materials developed will be scheduled.

f) Design an internet portal to disseminate information resources developed. Pilot materials will be designed, developed and formatively evaluated. Usability tests will also be a part of the portal developing process.

g) Write project report and disseminate findings in Puerto Rico and abroad, including professional and academic conferences. The project deliverables will be completed in the summer (June-July 2021).

Experienced professionals able to train others in design thinking and storytelling will assist in the implementation of design thinking in performing information needs assessment research. This strategy has not been used much in general and no record has been found that it have been applied in Puerto Rico. Described as "a discipline that uses the designers' sensibility and methods to match peoples' needs with what is technically feasible and what business strategy can convert into customer value and market opportunities"(Brown, 2008, p. 1) we consider it to be a perfect match in the tasks this project demands. Although this definition was developed in the context of new product and services in the business sector it is applicable to the LIS environment. The aim of design thinking "is all about understanding people's needs." (De Paula, Ewald, Menning & Cormican, 2018). Clark and Bell (2018) approaches the integration of design thinking to the LIS education. They focus on the difference between the purpose of science vis-à-vis that of design. They raise an interesting point, given that science deals with the purpose to understand, explain and predict, while design seeks the "how to" in the technology side of the information landscape. They make the case that design thinking should be included in LIS education so as to provide our students and future professionals with a powerful tool to approach complex problems. This project seeks to explore this further than as a mere theoretical construct. This will be put to practice in communities with complex problems. In so doing, we will also impact the LIS education of our graduate students.

It is our aim to gather data on site in the identified communities to document and categorize information needs around issues that affect living conditions or have the potential to change those conditions in the near future. Data gathered through design thinking strategies will be analyzed with a qualitative approach, much in the tradition of Wolcott's (2008) three stage approach of description, analysis and interpretation since it will be composed mainly of data gathered through interviews and observations in the iterative process of design thinking. A combination of design thinking approach with proven methods in information science will allow the team to identify other than obvious information needs that can provide an innovative solution for the issues raised.

As stated, we will identify the appropriate platforms to provide dynamic means of relaying information resources designed to address the gap of understanding on the issues identified. Students from our Master's in Information Science will participate in these efforts. Along with

them, public librarians will conduct interviews, administer surveys and participate in town meetings within the local communities. Participating students will have the opportunity to undertake valuable practice in their chosen future profession as they implement librarianship knowledge. They will be conducting user information needs assessment in an authentic environment using an innovative approach. The students will explore novel ways in which to communicate complex information in understandable ways. The capacity to share knowledge on complex scientific, financial and health issues and concepts with fellow citizens will contribute to creating a more knowledgeable society in themes of direct impact to their well-being.

This project, although a planning grant, is ambitious in its scope. However, the risk of not accomplishing our goals is not significant. We have designed the project in such a way that its scope is attainable with the resources the grant will provide and the time allotted to it. We have limited the areas and communities that will be impacted while maintaining different scenarios similar to others where we can extend the project once the planning grant is completed. In terms of participants' there is no risk of endangering their well-being or their communities.

Diversity Plan

Residents and NGO members will be invited as part of the process of designing and assessing information needs. The projects and communities that will be invited to participate have been identified and will be contacted early in the process so that we can have their input from the beginning. National organizations such as the Sierra Club, local NGO´s such as *Espacios Abiertos* and IDEBAJO that address similar concerns to those here addressed and community health groups will also take part of our initiative. Communities serviced will include the San Juan metropolitan area, municipalities in the southern coast of the island, and one of the island municipalities, Vieques. Participating communities have differences as well as similarities in regard to economic, education, health issues as well as exposure and vulnerability to natural events. Municipalities being considered for this project are San Juan, Salinas and Vieques. Salinas, located in the southern coast of the Island has the higher rate of people not in the labor force of the three municipalities being considered with over 60%. It has been traditionally an economically depressed area with 28, 633 general population according to the last Community Survey conducted on 2019, consisting of 52% female and 48% male and about 25% of which are 60 years or older. Vieques, the largest of the two island municipalities off the eastern coast of Puerto Rico and which suffered over 40 years of live target practices by the US Navy have a population of 8,771with 51% female and 49 % male distribution. 26% of them are over 60 years old. In the case of San Juan, the Capital city, we find a population of 344, 606 with 54% vs 46% ratio between females and males. As you see the similarities, we also find labor force in San Juan to be 48% while in Salinas and Vieques we find participation of 62% and 58% respectively. As can be gathered from this brief description, the populations of the three cities are similar but also have distinct problems. It has been documented by NGO´s in Vieques the disproportionate percentage of cancer prevalence as compared to Puerto Rico. A study by Puerto Rico's Department of Health found that residents of the island municipality have a 27% higher chance of developing cancer than their fellow citizens in Puerto Rico. Besides these shared problems, the issues this project seeks to pursue are also common. Coastal erosion, a continuing problem, is also common in all coastal regions of the island. It is because of these realities we pursue this project.

Broad Impact

 At the end of the planning period, we will have identified and prioritized the information needs of the afore-mentioned communities regarding the issues identified, as well as implementing the appropriate strategies to address them.

This planning grant will determine user information needs and the most appropriate platform to provide reliable information to the public. By applying innovative approaches to traditional information science tasks, we expect to build new resources and test novel ways to conduct information needs assessment in communities in Puerto Rico with the expectations of transferring this experience to other contexts in Puerto Rico and abroad. We will strengthen sound and proven librarianship practices and renew the consciousness of the importance of libraries within our communities. Many of the problems identified are common to other contexts and communities and this can become a model to be implemented island-wide and abroad. We will share our experiences through various means. We will also be attending conferences, writing articles in academic and professional journals and infusing the knowledge created in library science curricula in Puerto Rico. We will make use of open access outlets on the web by which we will be able to share the information resources we develop.

In a longer timeframe, we expect this work to also benefit the Hispanic and Latino community in the mainland United States, since through our dissemination efforts they will be able to make accessible our information resources online. It is well documented that Puerto Ricans who have left the island continue to hold strong ties to their communities in the island. We will contact REFORMA, who are dedicated to the library science of Latinos, since Hispanic communities in the continental United States can also take advantage of the process and results of our project, experiences and the materials developed. We will also seek collaboration with the Center for Puerto Rican Studies in Hunter College, NY, with whom we have a close relationship. We will propose an exploration of the possibility to implement this methodology in mainland contexts where Hispanic communities have a strong presence and the experiences of the project could prove to be useful in their contexts.

This project can strengthen the tradition of the information science field in participating in efforts to better the living and survival conditions of diverse and excluded communities. For years they have been unable to deal with challenges that their inherited geography lays on them as well as decisions they have not been a part of. We will employ information science and innovations in the service of justice, inclusion and the possibility of a better life for all our citizens.

Schedule of completion

Activities	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July
a) Community and participants identification (communities, NGO's, LIS students, public and academic librarians). Team selection.	──	──										
b) Initial design thinking training and design implementation for information needs assessment. Trainees will be LIS students, faculty and public and academic librarians.			──	──								
c) Design an innovative approach to information needs assessment through design thinking strategies. Visiting community sites.				──	──	──						
d) Completion of the information needs assessment and writing findings report.						──	──					
e) Storytelling training for participants (communities, NGO's, LIS students, public and academic librarians).							──	──	──			
f) Designing activities and information resources to address the needs identified using narratives applying storytelling techniques.									──	──	──	
g) During this process, appropriate media outlets and information resources format will be decided.										──	──	──
h) Pilot materials designed and developed and proceed with its evaluation.										──	──	──
i) Write project report.											──	──

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.

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.

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.

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.

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.

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.

Workflow and Asset Maintenance/Preservation

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

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).

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).

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

C.3 Explain what metadata sharing and/or other strategies you will use to facilitate widespread discovery and use of 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).

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).

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.

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.

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.

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.

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

Access and Use

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

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

Name of publicly accessible source code repository:

URL:

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.

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?

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.

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.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?

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

A.7 Identify where you will deposit the data:

Name of repository:

URL:

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