

Autism-Ready Libraries: Early literacy services for autistic children and their families

The University of Washington Information School

Project Summary

Autistic children¹ often struggle with emergent literacy skills and lag behind typically developing peers (Westerveld et al., 2016), placing them among some of the most in need of early literacy library services. Despite being uniquely suited to provide such services to autistic children and their families, libraries have been slow to do so (Schriar, et al., 2016). Current efforts in libraries (e.g., Targeting Autism) are limited to providing autism-specific services, e.g., access to information, assistive technology, and autism awareness training for librarians. These efforts provide needed resources for the autism community and librarians but do not sufficiently address early literacy programming for autistic children or their inclusion within the library context.

Our team brings together an interdisciplinary group of researchers to partner with urban and rural libraries to address the needs of autistic children and their families as well as provide librarians with the tools to serve them. We propose a two-year research project to improve our understanding of autistic children’s early literacy programming needs and best ways to include and serve them and their families. Our project will commence in September 2020 and end in August 2022. In partnership with the Seattle Children’s Autism Center (SCAC), Autism Moms of Seattle Network (AMOS), the Association for Library Services to Children (ALSC), and librarians from The King County Libraries (KCL) and Pierce County Libraries (PCL), ***we aim to improve libraries’ capacity to provide inclusive early literacy programs for autistic children and their families.*** We do so by developing a research-based Autism-Ready Libraries Toolkit (ARLT), which will include autism-specific training materials and inclusive early literacy programming. Our project aligns with the IMLS strategic objective to focus on “continuous learning for families and individuals of diverse cultural and socio-economic backgrounds and needs.”

We draw on previous work on autism inclusion in libraries (e.g., Targeting Autism; Project PALS; Farmer, 2013; Klipper, 2014) to focus on developing and assessing research-based training for librarians interacting with autistic children and their families. We will develop our toolkit based on best practices we identify in our investigation and existing early literacy and autism literature. Our project is ***distinct*** from previous efforts, because ***we address early literacy needs of autistic children and their families.*** Our empirical effort will draw on the perspectives of families and librarians, as well as evidence-based autism practices and early literacy programs for marginalized populations. Our efforts will improve our understanding of the needs of autistic children and their families, guiding the design, development and assessment of an ARLT that will advance the literacy skills of autistic children and reduce the gap between them and their typically developing peers.

Statement of Need

In the United States (U.S.), one in fifty-nine children is diagnosed with autism, and many more autistic children do not have official diagnoses (Wiggins et al., 2019). Studies suggest that autistic children struggle with emergent literacy skills and lag behind typically developing peers (Westerveld et al., 2016), which makes them among some of the most in need of early literacy library services. Out of 3.5 million programs provided by public libraries, 61.5 % were designed for children and their families (Grimes et al., 2013). Unfortunately, very few of these programs are accessible to autistic children and their families (Matoushek et al., 2017; Schriar et al., 2016). The accessibility of free library early literacy programming is especially problematic for low income and underserved families of autistic children. In the US, families of autistic children incur \$1.4 to \$2.4 million in additional costs to raise their child. Low-income families struggle to access resources for their child’s early

¹ Identity-first language is preferred by autistic self-advocates and is supported by new American Psychological Association (APA) bias-free language standards (Robinson, 2019; APA, 2020).

literacy learning, as specialized tutoring and supports are costly. Free and low-cost community-based programs for low-income autistic children are essential to help supplement the child’s learning, and empower families with the necessary skills to encourage their child’s learning.

Currently, librarians lack confidence in their ability to provide inclusive early literacy programming for autistic children despite their knowledge of effective early literacy techniques. In preliminary focus groups and participatory design sessions we conducted (see Appendix A), librarians stated that they desired to support autistic children and their families but lacked enough training to effectively interact with those children and families. Furthermore, librarians identified a need for inclusive programming designed specifically to serve autistic children along their neurotypical peers. With the exception of a few efforts to share best practices for early literacy in libraries (Farmer, 2013; Klipper, 2014), existing research focused on early literacy for autistic children (e.g. Hudson et al., 2017) has not been implemented or assessed in libraries, and librarians have not yet been trained on those best practices.

Public Libraries are Uniquely Positioned to Serve Autistic Children and their Families

Public libraries serve as essential community spaces, promoting lifelong learning, information access, and early learning programs (Schriar et al., 2016; Peterson, 2005). Libraries strengthen communities in need and offer a variety of resources and experiences to their patrons (Garmer, 2014). Low-income families, minority groups, and English-language learners often struggle to engage in early literacy learning with their children outside of school (NIL, 2008). Many libraries provide customizable literacy programs, such as Raising A Reader, to serve children and their parents in impacted communities. For example, The Oceano Branch of the San Luis Obispo (SLO) City-County Public Library system provides Raising A Reader for the predominantly Hispanic community surrounding Oceano Elementary School (ALA, 2014).

Existing Early Literacy Programs in Public Libraries

Of particular interest to this proposal is the potential impact of library early literacy programs. Early literacy is a general term used in reference to the precursor skills and conventional literacy skills of children through kindergarten (NIL, 2008). These skills include alphabet knowledge, phonological awareness, rapid automatic naming (RAN) of letters, digits, and objects, decoding, and more. Research suggests that libraries’ early learning services support typically developing children and families in ways that promote these early literacy skills (Albright et al., 2009), providing needed services to families who may be unable to access them elsewhere. The positive impact of libraries’ early literacy services is widespread, with more and more programs incorporating evidence-based practices for early learning (Campana et al., 2016). The most widespread of these programs include storytimes, summer reading programs, and outreach such as book talks.

Storytime programs promote early literacy skills in participating children and encourage parents to participate in their children’s literacy development by providing them the skills to do so (Albright et al., 2009; ALA 2012). Supercharged Storytimes, a pilot training project funded by IMLS and OCLC, provides evidence-based best practices librarians can use in storytime to foster early literacy (Campana et al., 2016). Studies suggest that parents’ level of involvement in early literacy learning greatly impacts literacy performance. When parents are highly involved, the achievement gap in average literacy performance between high and low socioeconomic families shrinks considerably (Dearing et al., 2006). Programs such as Every Child Ready to Read (ECRR), adopted by over 6,000 libraries, proved to significantly increase the engagement of parents in the literacy learning of their children by highlighting five early literacy skills: reading, writing, talking, singing, and playing (Neuman et al., 2017). Libraries also play a significant role in literacy engagement which positively affects literacy skill development. Nearly all libraries and library systems in the United States provide some sort of summer reading program (ALA, 2014), which are especially utilized by underserved communities (Roman et al., 2010).

Suitability of Existing Early Literacy Programs for Autistic Children

Library services continue to be inaccessible to autistic children and their families, leaving a sizeable **service gap** for this community in great need. While a few best practice guides (e.g., Farmer, 2013; Klipper, 2014) exist to inform design of early literacy programming for autistic children, our literature review revealed **no research-based library early literacy programming and services** to adequately serve autistic children and their families. Research-based practices for autistic children developed for formal education may not be effective in public libraries. Furthermore, our preliminary research based on two focus groups with librarians from a library system in the Pacific Northwest suggests that librarians feel they receive **insufficient training** to prepare them to engage effectively with autistic children and their families (please see Appendix A for preliminary findings).

A few examples of libraries that provide early literacy programs for autistic children include Salt Lake City, Baltimore County Public Library, and Iowa City Public Library. The Salt Lake City public library system provides a monthly sensory storytime for children age 3 to 10, which includes specially-designed sensory experiences for autistic children and their families. Baltimore County Public Library also provides sensory storytimes. Iowa City Public Library provide accessible reading and browsing hours in conjunction with sensory storytimes. These efforts, though an important development, were informed by best practices across libraries or by borrowing research from general education. These efforts are void of research specific to libraries and early literacy for autistic children. Currently, librarians rely heavily on social media posts and blogs for ideas and tips for sensory programs (Hickey et al., 2018). Furthermore, most storytimes are primarily designed to accommodate sensory sensitivities and rarely incorporate research-based early literacy practices specifically for autistic children. Sensory storytime programs focus primarily on library awareness and social interactions, not early literacy (Matoushek et al., 2017; Baldassari-Hackstaff et al., 2014). Most sensory storytime programming is assessed through informal feedback with a few programs implementing pre- and post-storytime surveys to assess satisfaction and perceived learning (Baldassari-Hackstaff et al., 2014).

Despite the fact that there is more research investigating literacy practices in the education and autism fields, little library programming is informed by these early studies. For example, studies suggest that phonological awareness and dialogic reading early literacy interventions are more effective at increasing early literacy skills for autistic preschoolers (Hudson et al., 2017). Since these methods are used in typical library storytimes by librarians across the country, it suggests that librarians may already possess skills needed to provide relevant early literacy programs to autistic children. However, our preliminary participatory design session with several librarians suggest that librarians lack the necessary training and therefore the confidence to work with autistic children. Furthermore, these findings indicate that librarians need assistance in translating important research contributions into specific programming and practices. Our design session and focus groups suggest that with systemic support and research-based program designs, librarians will be well positioned to provide early literacy programming for autistic children and services to support their families.

Libraries' Readiness to Welcome and Serve Autistic Children and their Families

Autistic children's reactions to public spaces may include heightened anxiety, social stress, sensory stress, and difficulty communicating (Baron, 2006). Many of these reactions are due to overwhelming sensory stimulus, including fluorescent lighting and echoing open spaces. Central Auditory Processing Disorder (CAPD) is common in autistic children and can make rooms with significant background noise difficult for communication and interaction (Kern et al., 2006). For parents of autistic children, how their children react to certain settings greatly impacts their ability to access resources (Bagby, Dickie, & Baranek, 2012). During our preliminary interviews, parents shared that they often have difficulty entering and utilizing the library with their child due to their child's

behaviors, exacerbated by the library environment. They explained that they are not always met with understanding from librarians, creating feelings of exclusion that limit families' access to much needed library services (see Appendix A). Much of the stress parents reported regarding visiting libraries during our interviews was due to interactions with library staff. Staff social interactions are an important aspect of informal learning (Coombs et al., 1973; Falk, 2001).

There are several current autism-specific efforts in libraries funded by IMLS. These projects focus on increasing information access for the autism community (e.g. Targeting Autism; University of North Carolina at Chapel Hill), and assistive technology efforts to support the autism community (e.g. Spectra kits). Two groundbreaking efforts relevant to autism awareness in libraries are Targeting Autism and Project PALS. Targeting Autism explored how the library experience can be improved to better serve autistic individuals and their families (Schriar et al., 2016). The project outcomes included a much-needed comprehensive online autism training module including autism awareness training, sensory audits, community partnerships, and library support opportunities (Small, Schriar, & Kelly, 2019). Project PALS focused on librarian training to serve rural autistic patrons with particular focus on information services (Anderson & Everhart, 2015). Project outcomes include online training modules including autism awareness training, sensory audits, and communication with autistic patrons (Anderson & Everhart, 2015). In both projects the efficacy of training materials was assessed through informal feedback and not empirically.

Project PALS and Targeting Autism focus on overall autism awareness and are not specific to early literacy needs or awareness of the needs of families of autistic children. There is very little research to inform early literacy programming and training for librarians specific to interacting and relationship building with autistic children their families. The efforts outlined above focus on autism awareness more broadly. In the recent preliminary focus groups and a design workshop we conducted, librarians reported that despite their desire to serve the autism community, they were not sufficiently trained to do so. Targeting Autism and Project PALS outcomes will inform our research, but they are not adequate to address the early literacy needs of a growing number of autistic children. Furthermore, more empirical work is needed to develop and assess autism-specific early literacy programming and autism awareness training for librarians nationwide.

Project Objectives

Our project aims to address this gap in the literature with **empirical evidence to improve our understanding of the early literacy needs of autistic children and their families** that libraries are in a unique position to provide. Our efforts will inform the development of the Autism-Ready Libraries Toolkit (ARLT), similar to the PI's Autism at Work Playbook developed for industry (Annabi et al. 2019). The ARLT will build capacity in libraries to provide much needed early literacy programming for autistic children and create a more welcoming and inclusive environment for them and their families when they visit our libraries. Our aim aligns with the IMLS strategic plan's focus on continuous learning for families in need and building the capacity of libraries. More specifically this study has three key objectives:

OBJECTIVE 1: Identify barriers that impact the ability of families with autistic children to access library services and resources

OBJECTIVE 2: Identify the needs of and best practices for libraries serving autistic children and their families

OBJECTIVE 3: Build the capacity of public libraries to meet the early literacy needs of autistic children and their families

To achieve our objectives, we propose a ***research in the service of practice study*** that will investigate the following **research questions:**

1. What barriers do families with autistic children experience that limit their inclusion in early literacy activities in public libraries?

2. What autism-specific accommodations, professional practices, and programming are currently utilized by libraries to serve autistic children and their families’ early literacy needs?
3. What autism-specific professional development tools and resources are needed to enable libraries to include autistic children and their families in early literacy programming and library services?

Our project is distinct from existing efforts regarding autism inclusion in libraries in its focus on early literacy programming for autistic children. Our approach is novel in three ways: 1) we utilize interviews with families of autistic children to identify needs, 2) integrate research from the autism field and early education to develop library early literacy programming that engages autistic children with their neurotypical peers, 3) engage both librarians and families in participatory design sessions to design literacy programming, resources, and training for librarians, and 4) assess the early literacy programs and the ARLT using questionnaires and focus groups with families of autistic children and librarians nationwide. This research has prior Institutional Review Board (IRB) approval, which will be updated at the time of funding.

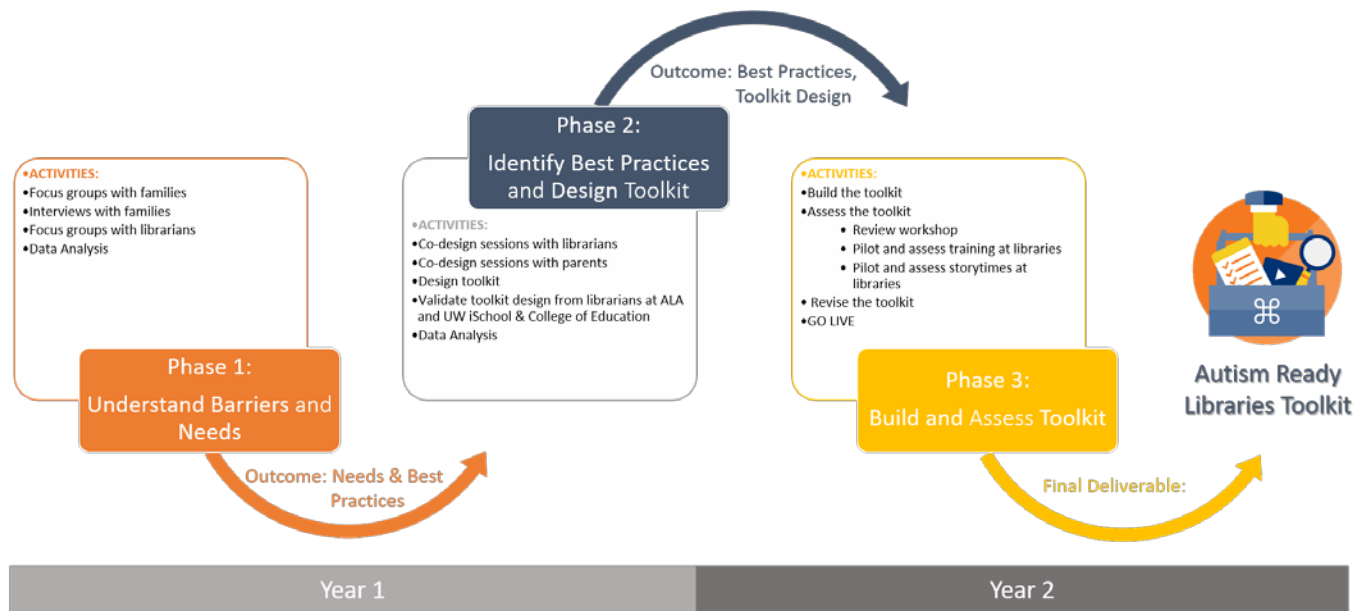


Figure 1. Overall Study Design

Overall Study Design

Our study will be carried out in three phases over a two-year period (see figure 1). In **Phase 1** we will identify the barriers families with autistic children face and best practices they experience in libraries. We will do so by including both families who are library patrons and those who are not to understand each perspective. Also in **phase 1** we will identify the needs of *the needs of and best practices for libraries serving autistic children and their families*. Our understanding of the needs, barriers, and best practices in Phase 1 will inform **Phase 2** when we design the ARLT. To design the toolkit we will conduct participatory design sessions with librarians and families who have autistic children. Participatory design sessions’ findings, along with evidence from existing literature on early literacy and inclusion of autistic children, will inform the design of the ARLT. To enhance ARLT generalizability, we will conduct modified PD sessions with librarians nationwide. Our project will culminate in **Phase 3** when we revise our design, develop, and deploy the toolkit and assess its effectiveness in addressing the needs of families and librarians. Below we outline the detailed activities within each phase and objective.

PHASE 1: UNDERSTAND BARRIERS AND NEEDS

In Phase 1 we will focus on objectives 1 and 2 of this study.

Objective 1: Identify barriers that impact the ability of families with autistic children to access library services and resources in order to support the lifelong learning of autistic children and the needs of their families.

Method 1: We will use an interpretive approach and employ qualitative methods, such as focus groups and interviews with family members of autistic children, to understand their experiences with public libraries and early literacy programming. We will identify the barriers that keep them from—as well as the best practices that enable them to—access libraries and programs. Our understanding of barriers and best practices will inform the programs and librarian training we develop and the specific techniques and practices included in the toolkit. We will conduct four focus groups using Barbour’s (2007) practices with families of autistic children. Two focus groups will be recruited from our two partner libraries to explore barriers and enablers in their context. We will also conduct two focus groups recruited from the autism community from King and Pierce counties at large. We will recruit families through Seattle Children’s Autism Center (SCAC), Autism Moms of Seattle Network (AMOS) in order to understand the perspective of families who may not be patrons of the libraries (see Letters of Support). In addition to focus groups, we will conduct 20-30 individual interviews with family members to elicit more detailed accounts of barriers and best practices families have experienced. We will use interviews and critical incident techniques (Byrne, 2001).

Why Method 1: There is very limited research to explain the needs of, and challenges facing, families who have autistic children in relation to libraries and early literacy programs. Therefore, interpretive exploratory methods are most appropriate to meet objective 1 as they will allow us to develop a holistic understanding of the needs of autistic children and their families. Focus groups and semi-structured interviews that include critical incident segments will enable the research team to identify barriers and best practices in the context of libraries.

Outcome 1: The research activities outlined above will result in a theoretical understanding of barriers and best practices from the perspective of families. The research may also identify best practices families experienced in libraries and early literacy programs that could be incorporated into our toolkit.

Objective 2: Identify the needs of and best practices for libraries serving autistic children and their families in order to develop effective library early literacy programming and librarian training.

Method 2: We will use focus groups with children and youth librarians to gain a greater understanding of the challenges they face, their needs, as well as to identify best practices they currently use to serve autistic children and their families. We will also elicit information regarding library services generally and early literacy programming more specifically. We will conduct 4 focus groups with librarians using Barbour’s (2007) practices. Focus group participants will be recruited from our two partner libraries to explore barriers and enablers in their context. Furthermore, our focus groups will conclude by brainstorming best practices librarians use or know of. We will conclude using nominal group technique to identify the relative importance of needs and degree of challenges identified.

Why Method 2: There is very limited research to explain the perspective and needs of librarians in relation to serving autistic children and their families. In a previous study the PI conducted to investigate community organizations’ readiness to serve persons with intellectual, behavioral, and social differences (including autism), two focus groups with librarians suggested that libraries have a great desire to serve the autism community but lack the knowledge and resources to do so (see Appendix A). Our preliminary findings also suggested that some librarians have identified effective practices to serve this community. Therefore, we will use interpretive exploratory focus groups to further develop our understanding of the challenges and needs of librarians.

Outcome 2: The research activities outlined above will result in a theoretical understanding of challenges librarians face and what they need to address the challenges. These activities will also produce best practices that librarians may have in place or have learned about. These findings will inform our toolkit.

Data analysis in phase 1: Focus groups and interviews will be transcribed and analyzed using Miles and Huberman’s (1994) interactive model of content analysis employing inductive and deductive coding. To ensure the reliability and validity of the content analysis, we will conduct inter-coder reliability tests across four coders (including two doctoral students and 2 undergraduate students) on a sample of interviews and focus groups until coders reach acceptable inter-coder agreement per Baker-Brown et al. (1990).

PHASE 2: IDENTIFY BEST PRACTICES AND DESIGN TOOLKIT

Informed by the findings from Phase 1, Phase 2 will focus on the design of the toolkit related to objective 3.

Objective 3: Build the capacity of public libraries to meet the early literacy needs of autistic children and their families.

Method 3: Informed by the outcomes of phase 1, our previous work (see Appendix A), and autism-specific and education literature, we will conduct six participatory design (PD) sessions; four with librarians and two with families of autistic children. The overall PD framework proceeds through three stages: critiquing the present; envisioning the future; and implementing – moving from the present to the future. “These three activities involve participants in new perspectives on their work and help to develop new concepts and new initiatives” (Muller, 2002). This approach will help us co-design a robust Toolkit informed by the perspectives of librarians and families. The PD sessions will inform the design of the ARLT. To ensure generalizability of findings, we will conduct two modified PD sessions at ALA, and one PD at UW with MLIS students to present our initial findings and elicit further needs, challenges, best practices, and assess the design of our ARLT.

Why Method 3: As indicated in our literature review, there are limited resources and research to provide research-based early literacy programming in libraries for autistic children. Participatory design methods can be used to develop resources for practitioners by working directly with them and families of autistic children. Informed by the outcomes of objectives 1 and 2 and the autism and education literature, the research team will design PD sessions to generate and test multiple ideas with participants, solicit ongoing feedback, and iterate on the design of the Toolkit (Kensing & Blomberg, 1998). Initial design of the ARLT will be assessed by librarians from across the US at ALA to ensure generalizability of toolkit.

Outcome 3: The outcome of the PD sessions in Phase 3 is the design of an Autism-Ready Libraries Toolkit (ARLT). Guided by the PI’s expertise in developing guidebooks (Annabi et al., 2019), the literature, and one preliminary PD session (see Appendix A), we identified broad categories of ARLT that will include but will not be limited to: 1) autism awareness multimedia training (online videos and animations) to improve understanding of autism, autism culture, and the needs of the autism community; 2) in-person workshop training (at partner libraries, national and regional conferences such as ALA) on best practices for interacting with and providing programming for autistic children and their families; 3) templates for autism-specific early literacy programs for autistic children that librarians can use and adapt to fit their context to improve lifelong learning; and 4) checklists and templates for promotion and outreach initiatives to reach autistic children and their families. ARLT components are listed in Table 1.

Data analysis in phase 2: Discussion during PD sessions will be transcribed and analyzed using Miles and Huberman’s (1994) interactive model of content analysis employing inductive and deductive coding. Artifacts generated during PD sessions will be coded utilizing inductive thematic analysis; to support qualitative analysis, written notes in artifacts will be transcribed, and visuals such as drawings will be described in words and transcribed. To ensure the reliability and validity of the content analysis, we will conduct inter-coder reliability tests across four coders until coders reach acceptable inter-coder agreement per Baker-Brown et al. (1990).

Table 1. Autism-Ready Library Toolkit

| | |
|---|---|
| Librarian Training ✓ Autism Awareness and Autism Culture Training ✓ Communication Best Practices ✓ Accommodation Best Practices | Early Literacy Program Development ✓ Early Literacy Program Design guideline ✓ Early Literacy Program Templates ✓ Early Literacy Program Kit |
| Family Engagement Practices ✓ Training module on family engagement ✓ Training module to teach family members to use literacy development techniques | Outreach & Community Engagement ✓ Promotion and outreach plan ✓ Promotion material templates ✓ List of outlets |

PHASE 3: BUILD AND ASSESS TOOLKIT

Phase three will focus on the development and assessment of our Toolkit. The research team, in collaboration with a graphic designer, will develop the components of the toolkit. To assess the efficacy of the toolkit we will conduct three types of assessments, outlined below. Assessments will inform revisions to the Toolkit before public deployment.

- a. We will conduct two modified PD sessions to review and assess the design of Toolkit components and templates. The workshop will include reviewing the initial findings and components and facilitating a guided discussion regarding the completeness of the Toolkit, the accessibility of materials, and the appropriateness of the activities across different libraries. We will invite 25 participants to the workshop, including librarians from partner libraries, UW iSchool Master in Library Science (MLIS) students, and graduate students from the UW College of Education.
- b. We will also pilot our early literacy programs in a sample of 6-8 of our partner libraries to elicit feedback from librarians and families of autistic children. We will elicit qualitative and quantitative feedback in focus groups and questionnaires to assess the effectiveness of our proposed literacy activities. We will utilize pre- and post-storytime surveys to elicit specific feedback from attendees regarding each program.
- c. We will deploy three pilot training sessions - one for each of our partner libraries, and one for a sample of MLIS students at the University of Washington. We will elicit perceived effectiveness of the training and feedback regarding training delivery and materials. We will also assess the effectiveness of the training for librarians using a simple pre- and post-training autism knowledge and attitudes assessment questionnaire. The questionnaire will measure changes in attitudes and knowledge about autism and intention to serve autistic children and their families. We will follow standard procedure (Kaplan, 1972) and adapt six question stems (Ajzen & Sheikh, 2013) to assess attitudes about autism on a seven-point bipolar adjective scale. The exact question stems will be informed by phases I and II. For example, scales will allow respondents to rate experiences working with autistic children as extremely unpleasant to extremely pleasant and as extremely difficult to extremely easy. The mean score across all items will constitute our measure of attitudes about autism. Finally, to measure intentions we will follow standard procedure using three items (e.g., “I intend to accommodate autistic children and their families in the next two weeks”). The scaled response options will range from 1 to 7, where 1 = strongly disagree and 7 = strongly agree. Participants will complete three items to measure their intentions to serve autistic children and their families.

Data analysis methods in Phase 3: Toolkit evaluation qualitative data will be analyzed utilizing Miles and Huberman’s (1994) interactive model of content analysis using inductive and deductive coding. To ensure the reliability and validity of the content analysis, we will conduct inter-coder reliability tests on a sample of interviews and focus groups until coders reach acceptable inter-coder agreement per Baker-Brown et al. (1990). Visual products of participatory design sessions will also be qualitatively content analyzed. To analyze quantitative training assessment data we will first describe all variables using summary statistics; we will

examine the distribution of and correlations among variables to understand the nuances of the data; we will plot relationships to screen for errors and examine distributional form and time trends; we will conduct separate repeated measures analysis of covariance models for: 1) knowledge about autism; and 2) attitudes about autism pre- and post-training controlling for demographic information.

Toolkit Sustainability

The toolkit will be publicly available on our Autism-Ready Library website. This website will be hosted by the University of Washington and will go live upon the start of the IMLS award. The toolkit will be released under a Creative Commons Attribution-Non-Commercial 4.0 International (CC BY-NC 4.0). We have chosen this form of intellectual property to reduce barriers for librarians from all communities to use and adapt the toolkit. Our goal is to allow a broad range of libraries and researchers to use our toolkit and adapt its components to their local context and share it on their channels. Our partner libraries will be encouraged to make the toolkit publicly available on their websites as well. The research team will be responsible for the upkeep and continuous development of the toolkit. Utilizing the UW Information School resources, we will maintain the project website and ARLT. Lastly, we also hope to create learning modules for UW MLIS students to be delivered in our curriculum. We will also promote these modules to MLIS programs across the country through presentations at the iConference. We are confident that the ARLT will attract a large audience given the number of libraries and library systems eager to provide services to autistic children and their families.

National Impact

Autism-Ready Libraries will have the following broad outcomes and national impacts:

1. Expand both library and autism literature, addressing the role of libraries in promoting early literacy programming and providing resources for the underserved autistic children and their families.
2. Build the capacity of public libraries nationwide to welcome and include autistic children and their families by providing autism awareness training specific to the public library context.
3. Develop library early literacy programs specific for autistic children drawing on Supercharged Storytimes, and literacy engagement programs drawing on Dr. Martin's Camp Read-a-Rama. Such programs will enable libraries to provide equitable access to resources that support lifelong learning for autistic children.
4. Develop a publicly available open-sourced toolkit for libraries across the nation, especially low-resourced libraries, to improve the lifelong learning of autistic children.

Dissemination Plan

We will raise public awareness of the Autism-Ready Libraries research effort through ALSC and UW local and national communication and media efforts in order to maximize participation of the autism community. The Autism-Ready Libraries Toolkit will be deployed in partner libraries and will be publicly accessible to libraries nationwide via our website and ALSC. To raise awareness of our research and encourage adoption of the toolkit by libraries nationwide, we will leverage social media outlets such as Facebook and LinkedIn. Recently, the PI Dr. Annabi released a guide to start autism employment programs called "The Autism @ Work Playbook" and leveraged her network and the network of her partners to do so (Annabi et al., 2019). The Playbook was viewed 4,600 times on her LinkedIn profile in the span of three weeks. We will also work closely with partner libraries to help them promote the toolkit and their experiences on their websites and to their professional networks. We will also promote librarian training modules to be included in MLIS curricula across programs nationwide through ALA conferences and the iConference. Research results and outcomes will be disseminated through library conferences (e.g., ALA; ASIST, ALISE) and publications (e.g., JASIST; Library Quarterly). We will also conduct in-person training and workshops at ALA conferences for national impact.

Project Personnel

Our team includes an interdisciplinary and diverse group of faculty and two doctoral students with expertise to study and develop early literacy programs for an organizational context inclusive of autistic children and their families. Dr. Hala Annabi is an expert in investigating and developing autism-specific training and hiring programs for organizations. Dr. Michelle Martin specializes in early literacy programming for underserved populations. Dr. Jill Locke specializes in evidence-based interventions for the autism community in schools. Ms. Emily Romeijn-Stout is a doctoral student and children’s librarian experienced in participatory design methods. Ms. Christine Moeller is a doctoral student and academic librarian experienced in professional development.

Partner Libraries

We have secured a partnership with both Pierce County Library and King County Library systems. These two county library systems, chosen for their size and the diversity of their patrons, are the most populous counties in Washington State, and consist of urban, suburban, and rural branches serving socio-economically and ethnically diverse populations. Together these library systems consist of nearly 70 libraries. Additionally, we have chosen local libraries to allow for deeper engagement and analysis, only available through the community connections and rapport of these systems. Furthermore, both library systems offer a range of early literacy programs and resources that we can leverage to develop and promote autism-inclusive literacy programs. We can leverage Pierce County Libraries Early Literacy Newsletter to promote our program to families of autistic children. We can also leverage both systems’ websites to share relevant toolkit components for families along with the many offerings the two systems already provide online. Our engagement with librarians at ALA aims to improve generalizability of the ARLT nationwide. Please refer to supplemental documents for letters of support from these libraries and information on both library systems.

Diversity Plan

As indicated in our statement of need, families who have autistic children incur significant financial obligations to provide their children the needed supports. Our project is committed to serving the underserved autism community. We chose to partner with Pierce County and King County Library Systems because they serve diverse urban and rural communities (see supplemental documents for library support demographic data), and large autism communities in particular. The two library systems serve populations across a wide spectrum of socio-economic status, ethnic backgrounds, abilities, and age groups. We will work with both partner systems, SCAC, and AMOS to recruit patrons from the autism community from various ethnic and socio-economic backgrounds. We will use interpretive techniques in our focus groups and interviews to provide these communities ways to voice their needs and concerns. We will also use participatory design workshops to provide our underserved community the means to influence the design of the toolkit. Including the voice of this diverse autism community will enhance the applicability of the toolkit components to their needs and preferences. The toolkit resources we develop will be replicable and generalizable nationwide as it will draw on diverse populations and provide guidelines for modifications to meet the needs of different autism communities. Our dissemination efforts within the state of WA will target libraries in traditionally underserved communities, where early literacy learning for autistic children is limited.

Budget

The estimated project costs: \$476,568 and includes: direct costs \$328,962, F&A \$147,606. Costs include salaries and benefits for PI’s and key personnel (\$69,447), salaries, tuition, and benefits for students (\$209,949), participant compensation (\$8,000), payments to human subjects (\$10,000), contractual services (toolkit production, conference fees, training workshop costs, and transcription services) (\$16,000), Conference travel (\$12,300), travel to/from libraries and families (\$1,666), and research supplies and materials (\$1,600).



DIGITAL PRODUCT FORM

Introduction

The Institute of Museum and Library Services (IMLS) is committed to expanding public access to federally funded digital products (e.g., 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. 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

All applications must include a Digital Product Form.

- 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.

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.

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 the format(s) you will use.

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.

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).

B. 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 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).

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).

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).

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).

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.

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 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).

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.

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).

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

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

Name of repository:

URL:

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