



National Leadership Grants for Museums

Sample Application MG-251989-OMS-22

Children's Museum of Pittsburgh

Amount awarded by IMLS:	\$499,959
Amount of cost share:	\$0

Children's Museum of Pittsburgh (CMP) will use a participatory design research approach to identify and reinvent educational practices that hinder a sense of belonging among minoritized visitors and staff. The project will begin with an equity audit of current and historic institutional practices at both CMP and the Madison Children's Museum. Working groups at each site will engage with other partners, using the findings to develop a preliminary framework of learning practices focused on belonging. They then will conduct experiments designed to operationalize the learning practices and use workshops where researchers, educators, and young people swap roles and work together to study, revise, and lead educational activities that enact the learning practices. The project team will disseminate a toolkit of research activities that other sites can use to create collaboratively defined learning practices that help more learners to thrive.

Attached are the following components excerpted from the original application.

- Narrative
- Schedule of Completion
- Data Management Plan

When preparing an application for the next deadline be sure to follow the instructions in the most recent Notice of Funding Opportunity for the grant program and project category (if applicable) to which you are applying.

Narrative

Project Justification

This National Leadership Grants for Museums research project, entitled the *Building Communities of Belonging and Critical Consciousness: A Participatory Design Research Study*, will study two museums’ development of museum-wide, equity-centric learning practices and develop a toolkit that museums of all sizes and disciplines can use to define and integrate their own learning practices that are relevant to their specific context. The project responds to changes in the field of museum education that elucidate the ways education is perpetuating societal inequities by privileging the needs of dominant (white, able bodied, etc.) learners and making unwelcoming environments for many minoritized learners. However, there is great potential for a reinvention of museum education that uplifts liberatory aims to better serve a broader audience. Prior research led by the Children’s Museum of Pittsburgh has demonstrated the power of articulating observable, measurable, and manipulable principles of education (“learning practices”) that become crucial anchors that align the development, evaluation, and daily practice of education. However, this prior research has not critically attended to equity factors. This project will engage museum educators, researchers, and young people in a set of participatory design research (PDR) activities through which each participating museum will develop museum-wide, equity-centric learning practices as we simultaneously build generalizable knowledge about:

1. activities that support the creation of learning practices,
2. how creating learning practices supports a community of belonging for visitors and museum educators, and
3. how the participatory design process influences museum professionals’ critical consciousness (awareness, confidence, and motivation for equity work).

A team with deep expertise in informal learning and research and equity-focused education will lead this work, including partners from two museums (Children’s Museum of Pittsburgh and Madison Children’s Museum), two research sites (the University of Wisconsin, Madison and the Fred Rogers Center for Early Learning and Children’s Media at Saint Vincent College), and a school (Manchester Academic Charter School).

Alignment with National Leadership Grant Goals

By building and disseminating knowledge about how museums can use research to establish learning practices that build critical consciousness (awareness, confidence, and motivation for equity work) and a community of belonging for staff and visitors, this project is aligned with the National Leadership Grants for Museums’ first goal: *advancing the museum field’s ability to empower people of all ages and backgrounds through experiential and cross-disciplinary learning and discovery*. Of particular relevance to this goal, the project involves people of all ages and backgrounds in the research as stakeholders in determining what learning practices support a sense of belonging and our decision to conduct the research in a children’s museum context is based on these museums’ experiential approach to learning that integrates art, play, making, and science. As a research grant, this project will primarily focus on Objective 1.3: *supporting research focusing on the role of museums in engaging learners of all types*. However, through the project’s dissemination plan, we will also share tools that *support the development, implementation, and dissemination of model programs that facilitate adoption by museums across the field* (Objective 1.1). Furthermore, the participatory design research approach and our dissemination plan will *support training and professional development programs, tools, or resources that build the knowledge, skills and abilities of museum staff and/or volunteers in multiple institutions* (Objective 1.2).

Project Summary

This project responds to a need for museums to disrupt educational norms that perpetuate inequities and develop new educational practices that better support minoritized learners.

We hypothesize that museums can use participatory design research to: 1) develop new learning practices, 2) enhance visitors’ and professionals’ sense of belonging, and 3) build staff awareness, confidence, and motivation for equity work.

Our research will test these hypotheses and share our research findings along with a toolkit of activities museums can use to develop their own equitable learning practices.

Addressing a Need for Understanding How to Develop Cohesive, Equity-Minded Learning Practices

Changes in the museum education field are setting the stage for the reinvention of educational practice. In reaction to the shifting social-political environment, awareness of museums' role in systemic inequity, and a clearer sense of the intersectionality of visitor and employee experience, museums are evolving how they design, deliver, and evaluate programs, how they structure jobs, and how they support their employees.

The country's rising awareness of racial and other forms of injustice has deep implications for the museum education field, demanding that museums confront their complicity in structural oppression and commit holistically to equity-forward efforts. As Feinstein (2017) writes, museums "almost certainly make inequities worse" (p. 533). Numerous studies have shown that museums can be unwelcoming or even harmful environments for People of Color (Ash & Lombana, 2013; Dawson, 2014; Feinstein, 2017; Philip & Azevedo, 2017). Museums also contribute to widening opportunity gaps by serving disproportionately white, wealthy, and highly educated visitors (American Alliance of Museums, 2020; Collaboration of Ongoing Visitor Experience Studies [COVES], 2019). There are lasting impacts of this inequitable distribution of museum opportunities. For example, two-thirds of high school achievement gaps can be traced to disparities in access to out-of-school learning opportunities like museums (Alexander et al., 2007). Many museums have recognized the urgent need for diversifying their audiences and providing more equitable learning experiences. In fact, 90% of museum professionals in a recent landscape study indicated that diversity, equity, accessibility, and inclusion were essential or relatively high priority (Garibay & Olson, 2020). Yet, the same study identified an intention-to-action gap: museum professionals value diversity, equity, accessibility, and inclusion but fail to make enough change to disrupt inequities.

Museum education is a promising area in which to move from intention to action. As many scholars have argued, the practice of education has been used as a tool of colonization and it often serves to reproduce inequitable societal structures (e.g., Carnevale & Strohl, 2013; Dixon-Roman, 2017; Seawright, 2014). In museums, education often advances dominant norms and understandings as authoritative, sometimes in ways that can be oppressive towards nondominant people and ways of being (Dewhurst & Hendrick, 2017; Fifi & Heller, 2019; Mayer, 2005). Yet, in contrast, museum education has the potential to disrupt these norms and work towards liberatory aims (Dewhurst & Hendrick, 2017; Rolling, 2020). Dawson (2014) draws on a series of studies to argue that interactions with educators can "make or break a visit" in terms of visitors' sense of belonging (p. 226). Educators are able to tailor a museum experience to visitors' needs and interests and interactions and enhance satisfaction and learning (Ash et al., 2012; Brahm & Wardrip, 2014; Gutwill et al., 2015; McGuire et al., 2021; Mulvey et al., 2020; Pattison et al., 2018). However, unpleasant interactions with educators and a perception that educators are unlike visitors can make visitors feel out of place (Archer et al., 2016; Dawson, 2014; McGuire et al., 2021).

In addition to education being a critical factor for visitors, education is a fruitful place for museums to attend to their internal equity concerns; education teams tend to be among the most diverse sectors of museum staffing but often lack support to thrive as key contributors. While museum education still starkly underrepresents People of Color as compared to the overall US population, a national survey of art museum staff found that educators were the most racially diverse segment of museum staff and that the proportion of People of Color has been rising over time (Westermann et al., 2019). At CMP, diversification of education roles is also evident in LGBTQIA and disability status (Children's Museum of Pittsburgh, 2021). Yet, the pandemic treated educators poorly, often widening inequities between management (roles which are more likely to be held by people with dominant racialized, gendered, and other identities) and educators. A survey of 850 museums in the United States showed that education staff were among the most commonly eliminated roles, second only to guest services, and 67% of museums needed to cut back on education, programming, and other public services due to budget shortfalls or staff reductions (American Alliance of Museums and Wilkening Consulting, 2020).

To maintain and enhance the diversification of the education workforce, museums need to attend to factors that make staff feel welcome. Ng and colleagues (2017) and Cuyler (2020) call for museums to challenge the power dynamics that reinscribe disparities among museum staff. Research from other fields supports this idea, as well. Ingersoll and May (2011, 2017) found that, over the last 25 years, teacher recruitment has shown great diversification but there are particularly high rates of minoritized teacher turnover. They identified a positive, collaborative organizational culture and educators' sense of autonomy as the strongest predictors of whether minoritized teachers stayed in their roles--more than salary or professional development. Numerous studies demonstrate how minoritized staff face hostile environments and experience added emotional labor in navigating the workplace (Porter et al., 2018; Ray, 2019; Schueths et al, 2013). On top of this, the layoffs of 2020 and "The Great Resignation" of 2021 brought high rates of job turnover and many people in new roles, with less experience (McLennan, 2021). In many cases, museums' reduced staffing models are continuing

while attendance is still below pre-pandemic averages. To cover organizations’ needs where there used to be specialized roles, museums are asking educators to take on new tasks, sometimes working outside staff members’ areas of expertise (Association of Children’s Museums, 2020).

In summary, we are asking our most diverse teams of employees to do more than ever before, and if we're going to keep them and support them, we need to provide them with autonomy and an organizational culture committed to collaboration and DEAI. This project responds to the changing nature of education, using participatory design research to involve staff and visitors in research-based equity work. It finds ways of supporting educators who are increasingly working across numerous educational contexts. It reinvents educational practices that foster a deep sense of belonging for educators and for visitors. And it builds educators’ awareness, confidence, and motivation to advance social justice in their work.

Focal Audiences

The focal group for this project is museum educators. In defining museum educators, we primarily mean people whose jobs directly interface with members of the public through the interactive facilitation of museum-based learning experiences. However, recognizing that there are many stakeholders in museum education, our project will also include designers of museum-based learning experiences, education managers who oversee educators, and, in the case of CMP, the Head of Cultural Change who works with educators as part of the Museum’s DEAI-focused organizational change strategy. Approximately 20 educators will take part in the research in total. Many of these educators--ranging from a Director of Education to newly-hired, front-line educators--have contributed to this proposal through planning meetings, writing text, and sharing feedback on this narrative.

We hypothesize that supporting museum educators’ practice will contribute to the improvements in experience for museum visitors as the ultimate beneficiaries of this project. More than 100 visitors will take part in the research, and over 1 million will benefit from education infused with new learning practices at the two participating museums during the grant period. More broadly, hundreds of museums--serving over 850 million visitors each year in the U.S. (American Alliance of Museums, 2020)--could use tools and research findings from this project to change their educational practice.

Building on Prior Work to Benefit the Museum Field

This project builds on CMP’s prior IMLS-funded research projects that articulated learning practices. The concept of learning practices draws on a community of practice framework that assumes learners and educators are part of a community (Lave & Wenger, 1991; Wenger, 1998). Learning practices are the characteristics that nurture learning in the social and cultural context of that community (Brahms & Crowley, 2016). Developing shared learning practices, within community, also created a common language with which to discuss, design toward, and evaluate learning. The National Leadership Research Grant, *Family Learning in Museum-Based Maker Spaces* conducted a research study to empirically identify the learning practices that are observable evidence of learners’ engagement in making (Brahms & Crowley, 2016; Brahms & Wardrip, 2014; Wardrip & Brahms, 2015). These learning practices have become an embedded framework that anchors the design, evaluation, and practice of maker education as well as laying a research-based foundation for the field of maker education. For instance, a follow-up project called *Supporting Making in Museum and Library Makerspaces* developed a national framework and resources to build the capacity of museums and libraries to support making as a learning process. The National Leadership Grant project *Making Observations: Building an Evaluation Tool for Making as a Learning Process* further built on the learning practices to develop a suite of valid and reliable observation tools for identifying, documenting, and evaluating learners’ engagement in making.

These past efforts have been highly successful in both generating knowledge and informing practice, but they have two key limitations. First, this prior work has focused on education within a single exhibit (e.g., CMP’s MAKESHOP® and Studio). Yet, many museum educators now work across numerous educational contexts and museums can benefit from strategic alignment across their experiences. Second, while the prior work was effective at elevating educators’ perspectives in an asset-based way, it lacked accountability to equity and social justice, potentially perpetuating

Learning practices are observable and manipulable features of learning interactions that museums can use as a framework to design, implement, and evaluate educational practice.

This project takes an equity-centric approach to disrupting harmful educational practices and enacting new learning practices that foster belonging for minoritized visitors and staff.

educators’ biases through the practice. The proposed research addresses these limitations by engaging educators, researchers, and visitors to identify learning practices that span across a museum and center DEAI in museum education.

Project Work Plan

Overview of Research Questions, Methods, Relevance, and Theoretical Framing

The theoretical basis of this project positions research and education as liberatory human rights. In many cases, education has been used to reproduce structural inequities and conduct epistemicide against nondominant ways of knowing (e.g., Hall & Tandon, 2017; Patel, 2015). Similarly, researchers have done harm by exploiting minoritized people and creating and defending racist and other oppressive categories (e.g., Dixon-Román, 2017; Roberts, 2011; Zuberi & Bonilla-Silva, 2008). Despite this, both education and research can also be tools for disrupting the same forms of oppression they have supported. Freire (2005) argued that education could become a form of liberation when, rather than focusing on the acquisition of knowledge, education promoted critical thinking and dialogue. He wrote, “For apart from inquiry, apart from the praxis, individuals cannot be truly human. Knowledge emerges only through invention and re-invention, through the restless, impatient, continuing, hopeful inquiry human beings pursue in the world, with the world, and with each other” (Freire, 2005, p. 72). This form of learning is akin to theoretical perspectives of transformative research that can unearth and disrupt oppressive structures, building socially just alternatives through the process of inquiry-based learning (Mertens, 2007, 2010). The argument for education as a right for all people is well documented, including statements from the United Nations (2001). Definitions about who can conduct research have traditionally been more rigid. However, growing recognition of the power of research and the need for diverse perspectives within it has led to the argument that all people should have the right to investigate research questions that impact their lives (Appadurai, 2006). It is in this context that we situate this project.

Our research will take a participatory design research (PDR) approach. Similar to design-based research, PDR focuses on the intersections of research and practice, distilling knowledge (research findings) while creating products (in this case, learning practices). PDR builds on design-based research approaches with an intentional focus on equity and justice, challenging traditional power differentials of research. In this approach, the roles of researcher and subject are blurred, which in our case will mean that researchers, educators, and young people will all take turns leading educational interactions, contributing and gathering data, and collaboratively interpreting the data and applying insights through the development of learning practices. PDR focuses not just on developing products and knowledge but also provides a framework to study the process of partnership, including the interrogation of a project’s critical historicity (historical factors that contribute to current forms of liberation and oppression), power, and the relational dynamics of collaboration. As Bang and Vossoughi (2016) wrote, “The domain of the ‘researched’ in a given project is expanded to include the relational, pedagogical, and design-based activity of researchers themselves” (p. 174). Ultimately, as shown in the figure to the right, we hypothesize that PDR can contribute to the development of museums’ learning practices and that the implementation of learning

practices will contribute to a sense of belonging for both educators and museum visitors. Based on the transformative power of PDR partnerships, we also hypothesize that engaging in PDR will build team members’ critical consciousness. The research questions that will guide this project are based on the three arrows in the diagram above:



1. What PDR tools and routines support the development of equitable learning practices?
2. How can learning practices support a community of belonging?
3. How do PDR activities influence critical consciousness among PDR participants?

To address these questions, we will use a suite of research methods, as summarized in the table below and described on the following pages. Ensuring that the research follows the highest standards of ethical practice for human subjects, we will work with the University of Wisconsin’s Institutional Review Board (IRB) to secure all needed coverage and maintain appropriate practices.

	RQ1: What PDR tools and routines support the development of equitable learning practices?		RQ2: How can learning practices support a community of belonging?	RQ3: How do PDR activities influence critical consciousness among PDR participants?
	Tools & Routines	Ways of Assessing Tools & Routines		
Interviews and focus groups (staff & visitor)				
Surveys (staff & visitor)				
Observations, video analysis (staff & visitor)				
Journaling (staff)				
Advisor review				
Historical document analysis (staff)				
Equity audits of current practice (staff)				
Design experiments (staff)				
Co-Research, Co- Design, Co-Educate workshops (staff & visitor)				

PDR Tools and Routines that Form the Basis for the Research

The “design” aspect of our participatory design research will be about each museum site developing its own set of learning practices. This design process forms the foundation for our three research questions. The following paragraphs describe our proposed design process, and the next sections outline our approach for each of our three research questions. Our design process consists of two phases: 1) internal learning and reflection about past and current practice and 2) working with visitors to explore new ways educators can enact a community of belonging through their practice. In terms of the “participatory” aspect of the participatory design research, the design process will be led by two working groups. One working group will focus on each location (Children’s Museum of Pittsburgh and Madison Children’s Museum). The working group at Children’s Museum of Pittsburgh will involve educators, education managers, researchers, and partners from the Manchester Academic Charter School, which shares a campus with the Children’s Museum of Pittsburgh. In Madison, the working group will consist of museum educators and researchers from the University of Wisconsin. Throughout the project timeline, working group members will meet weekly and engage in research activities between meetings to advance the work towards the development of equitable learning practices. Separate from the working groups, Fred Rogers Center will support cross-site learning and coordination. Additional details about the project partners are in the Project Management and Risk section, below.

In Phase 1, participants will examine current and historical influences of their educational practice and articulate preliminary learning practices that can support thriving for minoritized people. Phase 1 will begin with an equity audit that reviews current practice and its historical influences, drawing on the PDR approach to critical historicity (Bang & Vossoughi, 2016). Team members will gather three types of data that they will analyze as part of the equity audit. First, the teams will collect historical documents about their museums and regions (critical histories of the region, museum mission statements, annual reports, visitation data, etc.). Second, the groups will gather artifacts of educational practice both from their own museums (educator training materials, goals, curriculum, etc.). Third, each museum site will engage with partners to provide free educational experiences through

Design process overview

Phase 1: Learning about our histories, reflecting on current practices, and identifying promising practices.

Phase 2: Working with visitors to enact new learning practices that foster a community of belonging .

which people who have been marginalized by past museum experiences can share their insights about how the museums could provide more welcoming educational interactions. Although we will work with the partners to develop approaches that are culturally supportive, these interactions might involve focus groups, photo voice activities, or other storytelling approaches. Team members will then analyze these three types of data (historical documents, educational artifacts, and visitor feedback) using a version of the Seed the Way (2020) Equity Audit tool which we will adapt for our context (the tool was originally developed to focus on school curriculum). This tool prompts considerations such as, “How are people marginalized by social/structural inequity depicted?” and, “To what extent are we presenting conflicting perspectives and providing opportunities to engage in critical thinking and analysis about them?” (p. 1-2). Throughout these research tasks, we will reflect on not only inequities that arise but also promising practices and values that connect across the museums' educational work. We will learn from trainings with our advisors, reviews of existing frameworks (Universal Design for Learning, Culturally Sustaining Pedagogy, American Alliance of Museums' LGBT Welcoming Guidelines, Exhibit Design for Girls' Engagement), and ideation and collaborative analysis activities in weekly meetings will move us towards drafting preliminary learning practices that we will refine in Phase 2.

Phase 2 will focus on operationalizing the preliminary ideas into actionable learning practices. To begin, PDR participants will conduct design experiments through which they will enact and assess new ways of carrying out the learning practices. Design experiments are a process through which educators can test conjectures about a particular learning practice (Cobb, 2000; Simon, 2000; Wardrip et al., 2019). For each learning practice, museum educators will try different ways of implementing the learning practices and document the resulting engagement through photos, descriptive observation, video, and visitor feedback. For example, an educator might conduct a design experiment by setting up a hands-on art exhibition with different numbers of activities and gathering visitor feedback to discover how the setup affects perceived belonging (perhaps having everyone together in one group fosters more belonging, or maybe belonging is driven by having more options that connect to different visitors' interests). Research shows that this process can be particularly effective and engaging for educators (Bryk et al., 2017). In addition, the use of authentic video collected during design experiments can provide an “artifact of practice” that educators can reflect on and analyze with their community of peers (Borko et al., 2008, p. 418; Seidel et al. 2011). This may contribute to a sense of belonging with other participants. As the design experiments take shape, Phase 2 will involve a series of Co-Research, Co-Design, Co-Educate Workshops through which educators, visitors (invited based on audiences the museums have identified that they are underserving), and researchers will all practice: 1) collecting and analyzing data about learning practices, 2) designing new ways to improve the implementation of the learning practices, and 3) leading activities according to the revised learning practice. Participants will then reflect on the experience of being in these different roles. As these activities take place, project meetings will move towards solidifying the ways the learning practices can be implemented through tangible educational practice.

Approach for Research Question 1: What PDR tools and routines support the development of equitable learning practices?

The first research question is about the PDR process. With a focus on learning from our PDR work such that we can share successful activities through our dissemination toolkit, we will explore this research question by gathering a suite of mixed-methods data throughout the project about the value of different project activities and how they could be improved. On an ongoing basis, we will take field notes and collect artifacts (sticky notes from brainstorming sessions, etc.) from our meetings and other project activities. PDR participants will respond to weekly journaling prompts which will rate activities on a quantitative scale and provide open-ended descriptions of the ratings. Emphasizing the role re-mediations that are characteristic of PDR (Gutiérrez and Vossoughi, 2010), educators and researchers will interview one another annually. On a quarterly basis, we will also engage in a reflective focus group about what we have done, what was effective, and how we should share activities via the toolkit. During these focus groups, we will engage in a power mapping activity based on Littman et al.'s (2021) approach, through which participants will rank how the different activities have supported or opposed the goal of articulating learning practices and how resource-intensive they were. Finally, our advisors will review our research plans and data quarterly and provide guidance about our tools and routines, with particular attention to how our process can be accessible and culturally responsive to a wide range of potential participants. We will analyze quantitative data with descriptive statistics. For qualitative data, we will use a group-based process of inductively coding qualitative data to look for themes (Saldaña, 2017). In addition to looking for common patterns that can elevate majority opinion, we will attend to variation and consider how the tools and routines may function differently for different learners (Hinnant-Crawford, 2020).

Approach for Research Question 2: How can learning practices support a community of belonging?

The second research question explores the ways educational practice contributes to one's sense of belonging, situating education and belonging. We anticipate that findings about this question will build on existing research showing that interactions with educators contribute to visitors' sense of belonging, adding new insights about *how* educators can foster belonging for learners with diverse learning interests. The findings will also explore the ways consistent learning approaches may influence educators' sense of belonging within their professional context. To investigate this question, we will use self-report measures (surveys, interviews, and focus groups) to prompt educators, researchers, and young people to reflect on their sense of belonging during educational interactions and what aspects of the interactions contribute to their sense of belonging. For the surveys, we will draw on Akiva et al.'s (2013) measure of belongingness, for which participants use a 4-point Likert scale to rank their agreement with two items about respondents' sense that they matter and belong in an informal education context. To provide qualitative insights about these survey ratings, we will ask for an open-ended explanation (either in writing on the survey or verbally via an interview or focus groups) of why the respondent felt that way and what about the educational interaction contributed to their rating. We will gather these survey data and open-ended responses frequently throughout the project timeline, including at the beginning and end of each phase as well as in response to project activities such as the document analysis, equity audit, and design experiments. Through interviews with project team members, we will engage in a process of dialogic member checking through which team members will reflect on their data over time and make meaning of it through conversation (Koelsch, 2013; Murphey & Falout, 2010; Weitzman et al., 2021). Team members' journals will also investigate their sense of belonging and the ways their educational practice supports their own needs and interests. In addition to these self-report measures, field notes and meeting artifacts will provide contextual information that helps characterize the ways the learning practices provide educational coherence across a museum. The analysis approach for question 2 will use descriptive statistics and inductive qualitative analysis to focus on identifying and exploring trajectories in belonging to illuminate trends in activities that are particularly influential in supporting or hindering belonging.

Approach for Research Question 3: How do PDR activities influence critical consciousness among PDR participants?

Aligned with our perspective that research and education can be transformative for participants, this research question investigates the ways involvement with PDR contributes to critical consciousness. Freire (1970) coined the concept of critical consciousness as involving the ability to identify oppression and privilege and take action to address it. Based on recent empirical work, our approach will focus on three aspects of critical consciousness: 1) awareness of inequities, power, and privilege; 2) self-efficacy in one's ability to take action to address inequities; and 3) motivation to take on such actions (e.g., Schneider, 2019; Watts et al., 2011). We will take a qualitative approach to studying critical consciousness over time for the museum staff involved in the PDR process. Our data sources will include weekly journaling, annual interviews, and quarterly focus groups. For each data source, we will gather information about the three aspects of critical consciousness listed above (awareness, self-efficacy, and motivation). Similar to our exploration of RQ2, we will use dialogic member-checking to foster conversations about the evolution of critical consciousness over time, collaboratively identifying trajectories and illuminating influential PDR activities that contribute to changes in critical consciousness.

Project Activities and Sequence

The project activities will be organized in three phases. The primary aim of Phase 1, which will span the first nine months, will be for each museum to *develop preliminary learning practices based on a review of current and historical educational practices*. At each museum, a working group of museum educators and researchers will collectively work towards this aim, meeting weekly and engaging in project activities between meetings. Monthly, the working group members from both sites will meet to share insights and reflect on trends across the two locations. As described in the "Approach for Research Question 1" section above, the working groups will conduct a document analysis to explore the critical histories of each museum; complete an equity audit of current practice based on observations, video analysis, review of curriculum and training materials; and learn with visitors through surveys, interviews, or focus groups about how museum education contributes to their sense of belonging. Interviews, focus groups, and journaling for working group members, as well as discussions in weekly meetings, will distill insights about the three research questions and identify shared educational values that will form the basis of the learning practices. Throughout Phase 1, the project team will also document project activities so they can be shared as toolkit items for other sites that might wish to use them. Additionally, the team will work with its educational partners and advisors to gather feedback about the project activities.

These partners will also contribute their expertise to the toolkit development, through resources such as recorded videos, activities, or suggested readings and reflection questions. For example, Dr. Rappolt-Schlichtmann might work with the project team to develop a module about how the Universal Design for Learning framework could be applied through museum education. Project dissemination will begin towards the end of Phase 1, when team members will present at a museum conference to share about the toolkit development and the insights the Phase 1 activities generate.

The second phase of the grant (18 months) will take the preliminary themes and engage in a series of activities to *refine the themes and operationalize them as actionable learning practices*. This stage will last 18 months. As in Phase 1, working group members will meet weekly and do project activities in between; monthly, the two working groups will gather to consider cross-site trends; and, we will meet quarterly with advisors and monthly with the educational partners. Throughout Phase 2, working group members will continue to participate in annual interviews, quarterly focus groups, and weekly journaling through which they will reflect on how the project activities are contributing to learning practices (RQ1) and their sense of belonging (RQ2) and critical consciousness (RQ3). Although many of these structures will stay constant, Phase 2 moves into a new set of research activities. First, much of Phase 2 will be devoted to design experiments through which working group members enact and assess new educational approaches. Additionally, Co-Research, Co-Design, Co-Educate Workshops will involve young people in collaborating with working group members to collect and analyze data about the different components of the learning practices; refine the ways the learning practices get operationalized; and practice leading educational experiences that apply those new approaches. These workshops will be spaced out across Phase 2 so they can iteratively build on one another and address different aspects of the learning practices. Through these activities and the weekly project meetings, the working groups will continuously refine their learning practices until they become complete and shareable products by the end of Phase 2. As in Phase 1, working group members will continue to document the process for the Phase 2 activities, developing toolkit items along the way. These toolkit items will be shared at museum conferences (ex. Association of Children's Museum Interactivity).

In the third phase of the project, lasting 9 months, working group members will turn their attention to *analysis and dissemination*. This will involve reviewing data from across the project that address the three research questions, identifying themes and key variations. We will begin with targeted analysis of RQ1 to identify the tools and routines that are most valuable to document in the toolkit; the findings will influence the completion of the toolkit. The toolkit will be designed in an adaptable, modular fashion such that each activity can stand alone. Sites will be able to use the toolkit similar to a menu, selecting activities that suit each site's needs and logistical constraints. Activities will range from things that can be done in a single hour-long meeting to extended projects and will draw on the CMP's successful approaches for activity-based dissemination including card games and group activities as well as podcasts, videos, and other resources designed to support a wide range of learners' needs and interests. Accessibility of resources will be a priority, extending the Museum's longstanding commitment to Universal Design. The toolkit will be organized in three sections: 1) tools for reviewing a museum's current and historical practice and identify shared values (Phase 1), 2) tools for operationalizing values in actionable educational practices (Phase 2), and 3) guidance for embedding learning practices in museum's daily work. Once finished, we will share the toolkit in PDF form on the CMP and University of Wisconsin websites and on the informal.science.org repository. A 3-part online workshop series in spring 2025 will share the toolkit and research findings with museums and other educational contexts. The first workshop will focus on tools from Phases 1 and 2; the second will share research findings about how learning practices contribute to belongingness and critical consciousness; and the third will discuss ways other sites can use the toolkit and how their resulting learning practices can improve their work. The workshop series will be free and we will advertise it through list serves and message boards for museum groups such as the Association of Children's Museums, the American Alliance of Museums, the Association of Science-Technology Centers, and Visitor Studies Association. In addition to the toolkit, each working group participant will review their own data (journals, surveys, etc.) across the course of the project and develop a preliminary, auto-ethnographic case study that describes the ways their sense of belonging (RQ2) and critical consciousness (RQ3) have changed over time. Then, participants will share these case studies with the broader group and the team will characterize similarities and differences at the collective level. As these insights solidify, working group members will write journal articles (one about the process and RQ1 and one about the outcomes of RQ2 and RQ3) and present findings and toolkit resources at conferences.

Project and Risk Management

Project management can be organized in three main categories: activities at the Children's Museum of Pittsburgh, activities at the Madison Children's Museum, and cross-site research activities. The work plan for each of these categories

was developed to include a range of expertise and lived experiences and to develop project deliverables that will be widely applicable to a range of museums.

At CMP, a team of three people will lead the planning and implementation. Katie Todd, Director of Learning and Research, will serve as Project Director and will be responsible for overall project management as well as leading the PDR activities at CMP. Mónica Mendez, Director of Cultural Change, will ensure that the project aligns with the Museum's approach to DEAI work and supports the strategic vision of organizational change. Kristi Werkheiser, Education Manager, will represent the education team and contribute to the design of project activities such that they optimally support integration into sustainable practice. To facilitate partnership and coordination across the CMP campus and to center the interests of primarily Black children, a team of four Manchester Academic Charter School staff, led by Principal Phylissa Thomas, will meet monthly with the CMP team, lending expertise in culturally sustaining pedagogy and contributing to planning the involvement of MACS students in PDR activities. Beyond this leadership team, the CMP working group will include Katie Koffler, Director of Education, the Sr. Director of Education, Learning, and Research (yet to be hired), and 10 museum educators. CMP has extensive research, partnership, and educational experience to lead this work. With generous support from Institute for Museum and Library Sciences (IMLS), CMP has become a leader in the maker movement on both a local and national level by defining the Learning Practices of Making and by clearly defining the process through which it defined learning practices that support its approach to facilitation and ideal outcomes of informal learning. CMP has led several national research projects supporting organizations as they define learning practices. CMP has also published research supporting the importance of facilitation (e.g., Brahm & Wardrip, 2016; Grabman et al., 2019; Wardrip et al., 2016) and it has become a leading provider of professional development for educators working in informal learning spaces. The work around facilitation that began in MAKESHOP® has now expanded across Museum departments to include Exhibits, Early Childhood and the Art Studio. Additionally, CMP has prior experience partnering with University of Wisconsin, Madison, Fred Rogers Center, and the Manchester Academic Charter School. This project is a direct continuation of a past IMLS grant focused on building an ongoing research to practice partnership between the School and the Museum. Project Director Katie Todd also has a strong record of conducting participatory and design-based research that supports DEAI-focused research-to-practice integration, including in exhibit design that attends to intersectionalities of race, gender, and ability; museums' organizational change related to antiracism; Universal Design for Learning; broadening participation in science; and building mutually beneficial community partnerships to expand museums' reach.

Madison Children's Museum (MCM) will provide a counterexample to CMP by allowing us to experiment with PDR approaches that can be successfully implemented in museums with smaller teams. Madison Children's Museum serves families in South Central Wisconsin, connecting children with their families to their communities through discovery learning and creative play. Prior to the pandemic, the museum served 200,000 visitors annually. Dr. Peter Wardrip, Assistant Professor at the University of Wisconsin, Madison, will lead the PDR activities at the Madison Children's Museum, with the assistance of a graduate student. On the museum side, Kia Karlen, Director of Education, Brenda Baker, and an additional educator will make up the working group. Both the University of Wisconsin, Madison and Madison Children's Museum have strong backgrounds in leading applied research and development projects, and the Key Personnel from each site have experience managing numerous federal awards for this sort of work. Furthermore, Dr. Wardrip and Kia Karlen have successfully led prior collaborative efforts together, which will form a strong foundation for this project. Dr. Wardrip (a former employee of Children's Museum of Pittsburgh) has also been one of the lead researchers building up the research portfolio about defining learning practices in museums; he will share and extend this expertise through this project.

The Fred Rogers Center for Early Learning and Children's Media at Saint Vincent College will lead the coordination of cross-site analysis, in collaboration with the partners at each site. The Fred Rogers Center is home to internationally-recognized initiatives that encourage and empower adults in their support of the healthy development of children and families, including extensive expertise working with informal educators to improve daily interactions with children, youth, families, and one another. The Fred Roger Center's approach to research aligns planning, design, implementation, and impact towards a common purpose. Dr. Annie White, Sr. Research Associate at the Fred Rogers Center, will lead the investigation of the research questions in ways that span across sites, drawing on her expertise studying the ways educators' interpersonal interactions influence inclusion and belonging and cultural considerations that may differentiate different learners' experiences within such interpersonal interactions. A graduate student will also support the cross-site research coordination. Both Dr. White and the graduate student will be embedded within the two museums' PDR efforts including active, reciprocal engagement through regular touchpoints and collaborative work.

To support these cross-site and place-based research activities, the project will work with a team of advisors who will support the project as critical friends through quarterly involvement. Dr. Gabrielle Rappolt-Schlichtmann, Executive Director of EdTogether, will bring deep experience with Universal Design for Learning in museums. Michelle King, Independent Consultant, will share her deep background in liberatory education practices. Alex Lussenhop, Sr. Research & Evaluation Associate at the Museum of Science, Boston will bring experience as chair of the American Alliance of Museums' LGBTQ+ Alliance. Eric Reyes is Digital Media Coordinator for YOUmedia, a teen learning program in Chicago. In addition to designing and supporting innovative learning experiences for youth across the city, he advocates for policy to support equitable learning as a board member of Raise Your Hand, an educational policy and action group.

The resources that these sites and team members will need to carry out the work are primarily time and the grant funds to support that time. Although students at MACS are not old enough to receive payment, we will provide meals as a way to thank them for their participation in the research. Additional resources include the museums' exhibit spaces and educational materials that each site maintains. Our budget justification provides additional details about the resources needed to carry out project activities.

To track progress throughout the project, we will have weekly project management meetings with team leaders during which we will review the Schedule of Completion, address any needs for adjustment, troubleshoot any concerns that arise, and document challenges and successes. To promote transparency, we will develop and share a project timeline with all participants. The quarterly touchpoints with advisors will also provide accountability mechanisms through which these partners will assess progress and provide guidance about how the project can most fruitfully move forward.

Although this project is grounded in prior research and the project team has extensive experience leading similar projects, there are inherent risks in undertaking this work. One is that DEAI work can be difficult and politicized. To mitigate this challenge, we will introduce the project by stating that it may be challenging or emotional and normalizing the struggle as a necessary part of disrupting inequities. At the beginning of Phase 1, each site will develop shared norms for engaging in the research and we will emphasize equity over consensus in the development of these norms. This might result in having different options about how people participate in the research or allowing for small group conversations among people with shared identities if that facilitates enhanced safety. A second potential risk is that the project aims to find cohesive practices but we may find that people disagree or that different educational practices differentially influence people's sense of belonging. In these cases we will look to find areas of interest convergence where adjustments might better serve a broader audience. If there are direct conflicts, we will again take an equity-driven approach that considers the ultimate goal of disrupting museums' history of prioritizing the needs of dominant learners.

Project Results

This project will produce three types of results. First, our research findings will add to the museum field's understanding of how research can support museums in articulating cohesive, museum-wide, equity-focused learning practices (RQ1), how learning practices contribute to communities of belonging for staff and visitors (RQ2), and how participation in the research process influences museum staff's critical consciousness (RQ3). Second, the project will develop a toolkit of easily usable and adaptable practices that other museums can use to build their own learning practices and integrate them into their regular work. Our selection of two contrasting sites and our team of partners will help ensure that our toolkit and research findings are broadly adaptable and usable by a wide range of other sites. Third, as RQ2 and RQ3 will examine, the project has the potential to bring benefit to the people participating in the research, providing the societal benefit of making museums feel like places where people who have historically been excluded can feel a sense of ownership and belonging (both as visitors and as staff), and where people who participate in the research build their capacities to contribute to a more just museum and society. Our dissemination plan will spread awareness of these results and tools across the museum field, including lasting artifacts such as the toolkit and journal articles. Additionally, the tools will be integrated into the participating organizations' existing structures. For instance, the learning practices can form a grounding resource for curriculum development and evaluation. CMP will continue to use the tools and routines in its bi-weekly research to practice meetings and will integrate toolkit activities into the Museum's ongoing professional development programming where it can be adapted for organizations beyond museums, as well. Ultimately, museums have a choice: continue to exacerbate society's inequities with educational practices that make minoritized learners feel unwelcome or commit to reinventing our interactions with visitors so our educational approach equitably builds new audiences' sense of belonging. This project builds knowledge and develops tools for museums who are ready to envision a new, liberatory future of museum education.

Children's Museum of Pittsburgh: <i>Building Communities of Belonging and Critical Consciousness: A Participatory Design Research Study</i>													
Schedule of Completion													
Year 1													
Activity	9/2022	10/2022	11/2022	12/2022	1/2023	2/2023	3/2023	4/2023	5/2023	6/2023	7/2023	8/2023	
<i>Phase 1</i>													
Equity Audit	X	X	X	X	X								
Weekly working group meetings and journaling (site-specific)	X	X	X	X	X	X	X	X	X				
Monthly working group meetings, both sites	X	X	X	X	X	X	X	X	X				
Quarterly Focus Group meetings and meetings with advisors and educational partners	X			X			X						
Documentation and artifact collection	X	X	X	X	X	X	X	X	X				
Research participation with public visitors					X	X	X	X					
Dissemination of Phase 1 findings at a conference									X				
<i>Phase 2</i>													
Maintain weekly, monthly, and quarterly meeting schedule, as established										X	X	X	
Design experiments										X	X	X	
Documentation and artifact collection										X	X	X	

Year 3		9/2024	10/2024	11/2024	12/2024	1/2025	2/2025	3/2025	4/2025	5/2025	6/2025	7/2025	8/2025
Activity													
<i>Phase 2, continued</i>													
	Maintain weekly, monthly, and quarterly meeting schedule, as established	X	X	X									
	Design experiments	X	X	X									
	Documentation and artifact collection	X	X	X									
	Dissemination of Phase 2 findings at a conference		X										
<i>Phase 3</i>													
	Final analysis				X	X	X	X	X	X	X	X	X
	3-part workshop series								X	X			
	Conference presentations									X			

Children’s Museum of Pittsburgh
Building Communities of Belonging and Critical Consciousness: A Participatory
Design Research Study
Data Management Plan

As organizations that regularly engage in research, the Children’s Museum of Pittsburgh (CMP), the University of Wisconsin (UW) and the Wisconsin Center for Educational Research (WCER), and Fred Rogers Center carry out policies and procedures that protect the privacy rights of the people participating in our research as well as their confidentiality. We will make sure that our research documents, protocols, and procedures all follow IMLS regulations governing the appropriate and suitable protection of security, confidentiality and privacy for human subjects research. The UW team will be responsible for managing the shared data of the project.

The management of the data generated from this project will be guided by three key principles. First, we will follow the IMLS regulations governing data collected during research on human subjects. Second, we will employ effective and current standards for the format and content of data. Third, we will use technology to ensure privacy, confidentiality, security and the long-term preservation of the collected data.

Description of data

The research project proposed here will generate the following types of original data:

Data from adult professionals:

- Audio and video recordings, transcripts, and field notes from interviews, focus groups, and meetings
- Survey responses
- Audio and video recordings and observational field notes of educators during educational interactions in the Museums
- Artifacts generated from meetings, design experiments, and staff journals

Data from museum visitors, including both adults and children:

- Audio and video recordings and observational field notes of visitors during educational interactions in the museums
- Survey responses
- Interview responses
- Audio recordings and transcripts from focus groups
- Artifacts generated from workshops and educational interactions in the museums

Data storage

Paper data will be stored in a locked file cabinet in UW’s research office or CMP’s Learning & Research Office. Electronic data will be stored in password protected folders on the research team’s encrypted BOX cloud-based folder, which is supported by UW. Only the project team will have the passwords. Data will contain identifying information, but the data used for research analyses will be stored in a de-identified form. Data will only be collected from participants who have provided consent.

Metadata

Metadata produced in the project will follow standard conventions and includes: data collection protocols for surveys, interviews, focus groups and observation forms; descriptive information for sample, and psychometric information for scales; qualitative analytic codebook; and meeting and workshop agendas.

Access, sharing, and archiving data

De-identified research data will be accessible to researchers external from the project by request. Original data collected during the project will be kept for 7 years. Following APA conventions, we will retain data for at least 5 years after acceptance of publications. It is our goal to keep the archived, anonymized data indefinitely for future analytic activities.