ORGANIZATIONAL APPROACHES TO SYSTEMIC DEAI CHANGE IN THE INFORMAL SCIENCE EDUCATION FIELD

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Science Museum *of* **Minnesota**®

Table of Contents

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Abstract

Framing: Broadening participation and achieving equitable outcomes has been a core goal of the science museum field for over two decades. However, how to make progress has proven an intractable problem.

Methods: Focusing on five organizations who officially committed to diversity, equity, access, and inclusion (DEAI) by participating in a national professional development program, the researchers investigate how science museums attempt to enact internally-focused change via a mixed methods case study.

Findings: While these organizations considered a variety of structurally focused change possibilities, the reality of tensions involving power hierarchies, organizational history, and dominant culture workplace norms resulted in change attempts that were limited in scope and constrained impact on museum staff.

Conclusions: These findings reaffirm the need for visions of systemic change in order for DEAI organizational change efforts to take root and flourish. Limitations and needs for future research are discussed.

Introduction

A brief note on capitalization: The authors want to acknowledge that messaging can be conveyed in as simple an act as formatting written words. We have chosen to capitalize both "Black" and "White" in this document when those words are used in reference to racial identity to recognize the socially created concept of racial identity, and disrupt the portrayal of 'White' as the natural and normal state. We recommend Kwame Anthony Appiah's article "[The Case for Capitalizing the B in Black,](#)" (2020) for a discussion of different approaches to this question.

A Call For Attention

Diversity, equity, access, and inclusion (DEAI) is an ongoing concern for informal science institutions (ISI) --particularly museum spaces. Like many sectors in the United States, ISIs wrestle with the seemingly intractable problem of how to enact significant and sustained change. The challenge is not a recently identified one: the American Alliance of Museums officially called for all museums to both "become more inclusive places that welcome diverse audiences," and "reflect our society's pluralism in every aspect of their operations and programs" almost 30 years ago (AAM, 1992). In the decades since this call to action, a dizzying array of workshops, webinars, special journal editions, and fellowships offer professional development opportunities centered on DEAI. Still, progress remains elusive as measurable changes at the organizational level fail to materialize in many cases. Thirty years on, museum professionals across disciplines continue to call for serious field-wide action on DEAI issues ([MASS Action](#), [AAM](#), [Annotated Bibliography of Institutional Call Outs](#)) and conversations continue across social media and blogs.

Leaders across the field have differing visions for how DEAI change in ISIs should take shape, often disagreeing on what to prioritize. Dawson (2014) highlights the lack of empirical and theoretical studies on equity in ISIs. Whereas formal science education benefits from resources like the *Next Generation Science Standards* (National Research Council, 2013; Lee et al, 2015) and a rich corpus of research on classroom practice (Moriarty, 2007; Asowayan et al, 2017; Lochmiller & Cunningham, 2019) and professional development (Cochran-Smith, 2010) to guide impactful and productive change efforts, ISIs have relatively few resources. Investigating descriptions of DEAI work happening at ISIs, Feinstein and Meshoulam's (2014) study of enacted museum DEAI work identified cooperative and client based logics and highlighted the reality that much of this work focused on external audiences.

In contrast, some museum leaders emphasize that an external audience focus should be secondary to internal work on the systems within the organization that maintain the status quo, such as problematizing the reality of who does and does not hold power organizationally (Kinsley, 2016). As articulated by Lonnie Bunch, the founding director of the National Museum of African American History and Culture and current Secretary of the Smithsonian Institution, DEAI work that does not seek to influence organizational structures by addressing diversity in staffing at all levels will "seem more cosmetic than substantive" (Bunch, 2000). Taylor (2017) emphasizes the need for

museums to look inward, focusing change efforts on workplace inclusion practices first in order to develop inclusion as part of organizational culture. Finally, a growing chorus of voices - particularly in the art and history museum sector - are calling for museums to decolonize and reject the field's imperialist history as a step towards righting, and not repeating, the wrongs of the past. Museum-owned collections and how they were acquired have been particular foci of decolonization, but the call also extends into choices made in educational programming and exhibit design (Lonetree, 2012; Grant & Price, 2020; Hochschild, 2020). These valuable but contrasting visions of priority for equity work create a cacophony of advice, all meaningful but overwhelming for individual organizations to determine what to enact and in which order.

What Has Happened So Far

There has been a trend of practical museum-based DEAI work over the last decade, providing some insights regarding which changes ISIs are attempting and how to effectively enact them. Focusing on external audiences, multiple projects explored creating equitable and inclusive exhibition experiences. Specifically, the Exploratorium in San Francisco, California created a framework to guide science exhibition design to improve inclusion of female youth (Dancstep & Sindorf, 2016), and the Science Museum of Minnesota based in Saint Paul, Minnesota co-created maker activities with local communities of color (Bequette et al, 2018). The Association of Science Technology Centers (ASTC) annually supports a fellowship program for museum professionals with marginalized identities, aimed at developing a peer network of emerging leaders (ASTC Diversity and Leadership Program). Field-wide professional development programs such as the Cultural Competence Learning Institute (CCLI), which is still active, and the Noyce Leadership Institute, which has ceased operation, have highlighted enactment of organizational change as a way to "meaningfully connect with new and diverse audiences" and leadership development in order to or "increase the engagement…with their immediate communities" respectively (Garibay & Olson, 2020; Schuster, 2015). MASS Action, a collection of museums across disciplines all working toward DEAI change, pulled together a toolkit to aid other institutions in DEAI change specific to the museum sector (MASS Action, 2017). The professional development program at the heart of this research is another instance of focused work on creating change in ISIs.

Another set of studies investigate how exclusion is produced and maintained in informal science education. A recent report provided a landscape view of the state of museums in terms of organizational dynamics, highlighting the gap between DEAI's status as an organizational priority and the reality of limited or no strategic actions being taken at the organizational level (Garibay & Olson, 2020). In the United Kingdom, Dawson's (2019) recent ethnographic account of exclusion in everyday science practice places museums within the wider ecosystem of STEM experiences and articulates an inclusion framework centered on infrastructure access, literacies, and community acceptance. Multiple studies by Emily Dawson, Louise Archer, and Jennifer DeWitt - all based in the United Kingdom - have highlighted cultural and gender dynamics within science museum visits, often resulting in a reinscribing of disadvantage and dominant narrative of science ability (Archer et al, 2012; Archer et al, 2016a; Archer & DeWitt, 2017; Archer et al, 2016b; Dawson et al, 2019; DeWitt, Nomikou, & Godec, 2019). Addressing internal dynamics, the RACE Forward

project investigated how hosting an exhibition about race impacted staff, identifying three strategies museum leaders intentionally used to leverage the exhibition to sustain meaningful change related to race within the organization while also documenting field-wide dynamics reflecting discomfort with addressing racial exclusion (Jones-Rizzi et al, 2021). Motto (2016) documented how three teenage, female employees of color at a science museum countered deficit narratives of diversity, articulating core structures at that organization, perpetuating inequity. While representing different visions for DEAI change in science museums, collectively these works represent the growing understanding of what needs to change within the reality of science museum organizations.

What Still Needs to Happen

Overcoming the pernicious challenge of inequity in museum spaces requires an in-depth examination of how ISIs try to implement DEAI change to provide insights on why these attempts often (but not always) struggle to achieve their broader goals of change at organizational levels. This research serves to investigate the museum field as a system in which organizations and professionals operate, not critique the individual people or museums themselves. As museum-based researchers, the research team has also engaged in the lived experience of an organization attempting to improve itself in terms of DEAI. Approaching this work, we endeavored to applaud successes and highlight areas where tension stymied change efforts, as we have empathy for the hard work change requires. This study focused on the lived experience of change at organizations who have formally committed time and resources to DEAI initiatives. By focusing our investigation on institutions who have demonstrated commitment to such change, we in effect are looking at best case scenarios; these institutions already committed resources in terms of staff time to DEAI training, demonstrating they already recognize to some extent that DEAI work is important and change is necessary.

Context - The PD Program

This research was conducted in conjunction with an NSF-funded, DEAI-focused professional development (PD) program called iPAGE. Originally developed for the formal education system and transitioned to the informal science education (ISE) field with this project, this PD program focused on three content lenses: identity, examining the nature and culture of STEM, and distributed community leadership. The identity lens emphasized that both learning and identity are social and culturally constructed and specifically included lessons on mindsets (Dweck, 1999), privileging and othering, stereotypes, and intersectionality of race, class, culture, ethnicity, gender, sexual orientation, dis/ability, language, and spiritual beliefs. The PD leaders lead - among other topics - specific lessons related to racism, sexism and the patriarchy, ableism, and socioeconomic discrimination. Examining the nature and culture of STEM challenged the dominant portrayals of STEM and their effect on engagement among learners from underrepresented groups, specifically the notion that science is not neutral (Loucks-Horsley et al, 2003; National Research Council, 2009; Gonzalez et al, 2005). Finally the distributed community leadership lens casts leadership as an emergent property of systems, which arises out of the

relational interactions among individuals and groups (Bradbury & Lichtenstein, 2000). The PD program modeled several techniques as tools for disrupting power hierarchies --such as affinity groups, talking circles and talking sticks (Pranis, 2005), focused conversations (Stanfield, 2000), and active sharing of leadership stories to learn from each other (Ganz, 2008). The PD sessions involved multiple specific lessons related to the three content lenses, and each lesson typically included a didactic phase followed by directed reflections where participants shared thoughts in dyads or small groups with other participants.

Participating institutions were asked to send a team of ISE professionals to participate in the PD program in order to gain knowledge of DEAI practices for application at their respective organizations. Structurally, the PD program implemented a cohort model, with individual cohorts engaging in 4 PD sessions totaling 11 days in a 9 month time span (see Figure 1 for program sequence). Each cohort included around 5 organizations learning together. For small organizations, these teams typically consisted of three staff members, while large organizations involved five or six individuals. Within these teams, the institution identified one person as the Team Captain, who was responsible for logistical needs, and a Champion, who was specifically an organizationally high-ranking staff member with formal influence who could clear barriers to DEAI work, such as staff time to devote to this work.

Figure 1. iPAGE Program Sequence
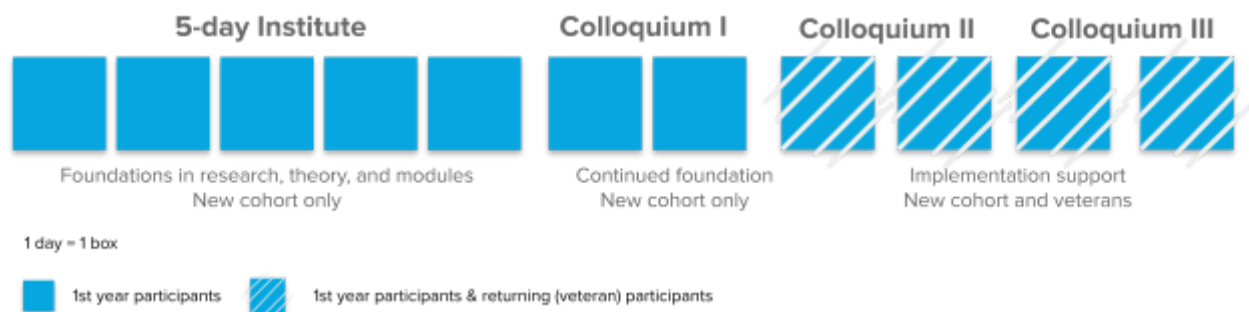
While the PD lessons themselves were framed as providing content and tools related to the three core lenses, the overall program emphasized that each organization would need to adapt these new insights to fit the needs of their unique organizations and communities. In alignment with the structure of the U.S. Department of Agriculture's (USDA), agricultural extension service on which the PD program was modeled, the logic of this approach is that prescriptive applications of new innovations do not meet the needs of local contexts or respond to local conditions, and so they are unlikely to be sustained. The key charge for change agents in an adaptive model is thus to communicate why an innovation works and, in doing so, "recast adaptation as a property of implementation process and fidelity as a property of outcomes" (Dearing, 2008). To support adaptation and change efforts after the core PD sequence, the PD leaders offered sub-grants to financially support work and engaged in 2-day site visits to the participating organizations. Over the course of three years, the grant supported the participation of 3 cohorts and a total of 19 institutions in the PD. A total of 98 staff members experienced the PD sequence. Ten of thirteen

eligible institutions applied and were approved for sub-grants to financially support DEAI change work[1]. The research took place after this PD sequence was completed, seeking to understand what adapted changes were enacted and how the lived experience of change beyond that small, trained team accelerated or stymied these efforts.

Originally, the research effort was intended to investigate how the PD program model changed in the transition from the formal education field to the ISE field. Based on surveying at the PD program, participants reflected tremendous personal growth both in terms of content understanding and feelings of urgency related to DEAI work. Additionally, early insights documented vast differences between the two fields, particularly related to structures of leadership, actual job roles, and perceptions of agency. Given the positive impact of the PD program on the direct participants, the research team shifted focus to understanding how participating organizations attempted to enact DEAI-related organizational change after participation, aiming to identify patterns across focal organizations in order to understand the ISE field generally. This report reflects the research efforts after the shift in focus.

Theoretical Background

Diversity, Equity, Access, and Inclusion

Both the PD program and research at the center of this grant are steeped in DEAI concepts and terminology developed over a century or more of study, reflection, and publication, and its language is used extensively throughout this report, Following is a brief accounting of ideas the research team used as lenses to make sense of our data to describe the ISE field's pathways towards greater internal equity. This discussion is broken into 4 streams: Axes of identity, Privilege and Oppression, Emotional Labor, and White Normative Culture.

The notion that an individual has multiple *axes of social identity* (e.g., race, gender, ability, socioeconomic status) that are at once internally constructed and externally applied is a foundational concept in DEAI theories because they often exist solely to bestow power, benefits, or disadvantages (oneTILT, 2019), and the relationship between identity and power goes hand in hand with *systems of oppression*. The National Museum of African American History & Culture (2017), describes oppression as "a combination of prejudice and institutional power that creates a system that regularly and severely discriminates against some groups." *Privilege* is a flipside to oppression in that it confers particular societal benefits, immunity, and comfort based on identity (Merriam Webster) along with invisible and unearned assets that are often unacknowledged (McIntosh, 2020). Intersectionality, a term coined by legal scholar Kimberlé Crenshaw (1991), can be understood as overlapping oppression or privilege related to the multi-axis nature of social identity.

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[1] Of the 10 organizations whose sub-grant applications were approved, 8 completed their work and received funds. Two organizations were unable to carry out their plans after losing some or all of their institutional teams during the 2019 COVID pandemic.

Oppressed groups experience many harms to health and safety while privileged groups are often protected from such stresses. In ISIs, as well as in many institutions in the United State, the entrance of people outside of the organizational existing norm - such as people of color in an overwhelmingly White institution or transgender or nonbinary individuals in an organization dominated by cisgender staff - results in "complex and emotionally hazardous spaces" that the marginalized staff "must navigate in order to participate in the resources and rewards these institutions offer" (Evans & Moore, 2015). This phenomena reflects harm not as a result of direct aggression or hate, but instead harms that fall under the umbrella of *emotional labor*. Emotional labor was first described by sociologist Arlie Hochschild (1988) as managing emotions to meet the requirements of certain a job, but has been expanded to specifically address the ways an organizational structure characterized by systematic inequity can create a dilemma for non-dominant individuals of either participating in their own subordination (conforming to emotional norms attached to their identity) or face sanctions with the organization (Evans & Moore, 2015).

Examples of harms that often contribute to emotional labor in ISI's are *microaggressions* - brief and everyday slights, insults, indignities, and denigrating messages - and *tokenism* - performative inclusion of individuals to give the appearance of diversity (Grant, 2017). The term racial microaggressions was first proposed by psychiatrist Chester M. Pierce in the 1970s, but psychologists have significantly augmented the concept in recent years to include categorizing some of the types of transgressions made by well-intentioned people with dominant identities who are "unaware of the hidden messages being communicated" as microinsults (subtle rudeness and insensitivity) and microinvalidations (subtle exclusion, negation, or nullification of thoughts, feelings or experiential reality of a person of color) (Sue et al, 2007). Rosabeth Moss Kanter's (1977) work on women in male dominated professions helped illuminate the ways that tokenism is damaging and serves to maintain the illusion that social mobility is available to all when it is not. She specifically outlined three typical experiences of tokenized individuals: *performance pressures* (the bind of an increase in demands to publicly prove their worth despite fear of retaliation if they perform better than dominant colleagues), *boundary heightening (*being compelled to reinforce the validity of the dominant culture by denouncing their own culture), and *role entrapment* (status is assumed based on stereotypes and/or mobility is constrained by caricatured roles ascribed by the dominant culture).

White normative culture occurs when organizations unconsciously use White norms and standards as a way of thinking -- making it difficult, if not impossible, to open the door to other cultural norms and standards. As a result, many organizations, while saying they want to be multicultural, really only allow other people and cultures to come in if they adapt or conform to already existing cultural norms (Okun, 2021). As mentioned above, oppression harms, while privilege protects. However when members of dominant groups who have expectations for racial comfort encounter (willingly or unwillingly) the edges of oppressive systems, they often experience a disproportionate amount of discomfort. Robin DiAngelo named the lowered ability to tolerate racial stress among White people living in North American *White fragility*, noting that it can trigger a range of defensive reactions (anger, fear, guilt) and behaviors (argumentation,
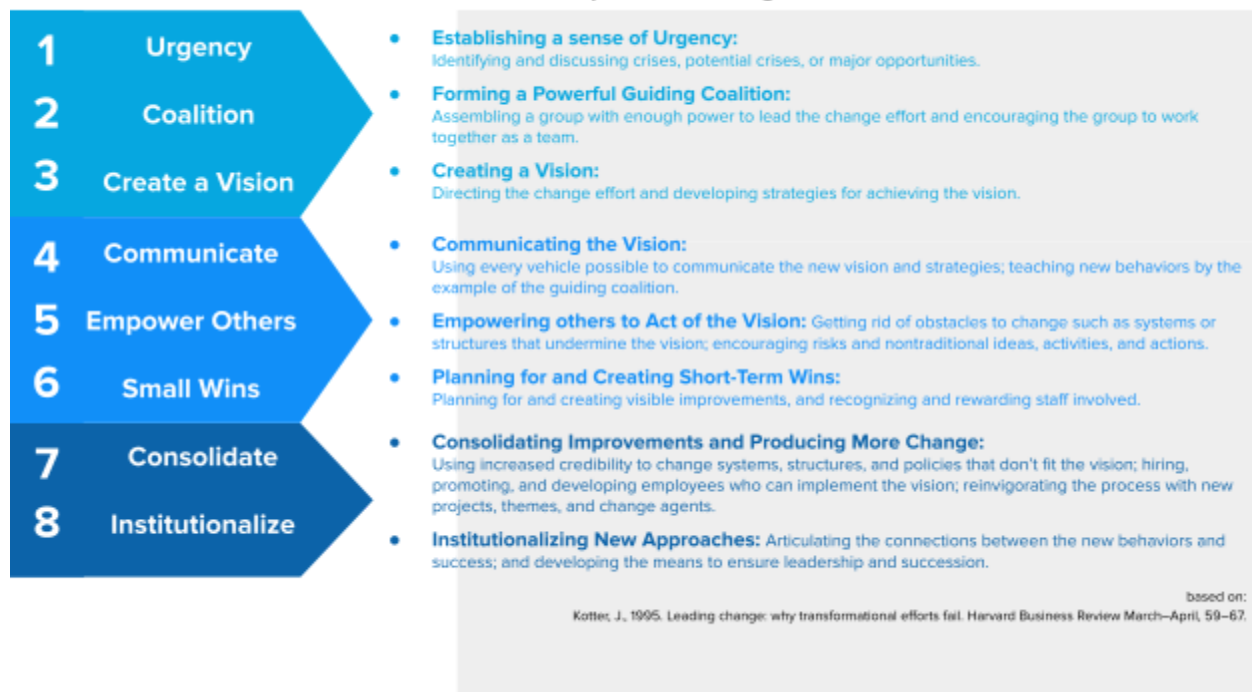
silence, escaping the situation) in an attempt "to reinstate white racial equilibrium" (2018). While most extensively theorized on the racial axis of privilege and oppression, the constructs of *fragility* and *normative culture* can be extended to understand experiences of individuals and DEAI work along many intersecting axes of identity.

Analysis Background

Analysis of the research data diverged from the project background based on data from the initial project years. The research team focused on more generalized organizational change frameworks because they allowed for a more flexible approach to understanding the data, particularly as focal organizations adapted learnings from the PD program. However, organizational change models alone do not attend to the particular power dynamics present in DEAI work. Thus, our analytical frame integrated ideas from narrative power analysis in order to understand and articulate the influence hierarchical power and societal privilege exert in DEAI change initiatives. For our purposes, DEAI initiatives were defined as any organizationally identified work where the primary ends are diversity, equity, access, or inclusion; this operational definition acknowledges the individually adapted visions of DEAI change present at an organization without a priori defining those visions as appropriate or not.

Organizational change has largely been conceptualized as an intentional, managed process, embedded within existing systems of organizational culture. Lewin's (1951) seminal work on the topic highlighted a need to *unfreeze* the status quo, *move* the status quo with intentional alterations, and *refreeze* those changes into a new permanent state. Lewin's theory also emphasized the ideas of different forces pushing for and against a potential change, recognizing a need for underlying forces in the direction of change to outweigh resistance forces prior to change occuring. The 1980s saw an interest in planned change, embodied in Bullock and Batten's (1985) organizational change steps of exploration, planning, action, and integration. Carnall (1990) highlighted that change chiefly involved management of organizational politics and building an organizational culture that allows for creativity, risk-taking, and learning. An eight-step model was articulated by Kotter in 1995, building from his experience as a business consultant and integrating ideas from these previous organizational change models. With the pointed title "Why Organizational Change Efforts Fail", Kotter's prescriptive, linear model emphasizes the necessity of actually doing each step. Kotter's model includes attention to resistance forces (step 1: build urgency), attending to organizational power (step 2: form a powerful guiding coalition), the planning of actions (step 3: create a vision), action (step 6: short term wins), building a culture where staff members are engaged in the change process (step 4: communicate the vision; step 5: empower others to act), and finally refreezing the changes (step 7: consolidate improvements; step 8: institutionalize new approaches). Since its articulation, Kotter's organizational change model has experienced wide-spread acceptance, but has not been validated in a scientific sense (Appelbaum et al, 2012). See Figure 2.

Fig 2. Kotter 8 Step Model for Organizational Transformation

Kotter's 8 Step Model for Organizational Transformation

- **Establishing a sense of Urgency:** Identifying and discussing crises, potential crises, or major opportunities.
- **Forming a Powerful Guiding Coalition:** Assembling a group with enough power to lead the change effort and encouraging the group to work together as a team.
- **Creating a Vision:** Directing the change effort and developing strategies for achieving the vision.
- **Communicating the Vision:** Using every vehicle possible to communicate the new vision and strategies; teaching new behaviors by the example of the guiding coalition.
- **Empowering others to Act of the Vision:** Getting rid of obstacles to change such as systems or structures that undermine the vision; encouraging risks and nontraditional ideas, activities, and actions.
- **Planning for and Creating Short-Term Wins:** Planning for and creating visible improvements, and recognizing and rewarding staff involved.
- **Consolidating Improvements and Producing More Change:** Using increased credibility to change systems, structures, and policies that don't fit the vision; hiring, promoting, and developing employees who can implement the vision; reinvigorating the process with new projects, themes, and change agents.
- **Institutionalizing New Approaches:** Articulating the connections between the new behaviors and success; and developing the means to ensure leadership and succession.

based on:
Kotter, J., 1995. Leading change: why transformational efforts fail. Harvard Business Review March–April, 59–67.

After examining multiple organizational change frameworks in relation to our initial data, the research team decided to utilize Kotter's (1995) eight step model for organizational change for the larger analysis. This selection was made based on the reality that much of the organizations involved in the study were actively in the process of enacting change. Kotter's model provides a nuanced frame to understand change in process, breaking down a larger, amorphous progression into clearly defined steps. Secondly, the steps of Kotter's model were explicitly taught in a museum sector training program for museum leaders (Schnell & Zoffel, 2015) which some participants in the research study had experienced prior, and seemed to have in mind as they were planning their work. Thus, while not a focus on the PD presented here, the influence of the previous training shaped how organizational teams enacted change. Implementing Kotter's organizational change model as a guiding analytic frame therefore was appropriate for understanding this data corpus.

Certain challenges accompanied the use of this framework as an analytic tool. We do not claim to be able to identify exactly which step an organization is on because change is not linear or clear-cut. For example, a senior leader may perceive their organization on step 5 (empowering others to act) in the same moment that another staff member may identify the organization as at step 3 (create a vision for change) because they personally are unaware of the change vision. In this case, the disconnect between two perspectives reflects a potential breakdown in step 4 (communicate the vision for change). Each perspective is accurate to that individual level, and without extensive, longitudinal data collection, an organizational level identification is not possible. Thus, the research team utilized the Kotter framework to identify the work of organizational change and identify points of tension in processes instead of making definitive claims of status.

Studies looking at DEAI specific change in organizations highlight the need to augment general change models with frameworks for understanding power and privilege dynamics. At White dominated organizations, staff identified as racial minorities are likely to experience racial tokenization (Kelly, 2007; Flores, 2011) and persistent microaggressions (Pitcan et al, 2018) in their day-to-day work. In particular, DEAI efforts such as simply increasing staff demographic diversity (Mannix & Neale, 2005; Guillaume et al, 2017), implementing colorblind ideology (Stevens et al, 2008; Block, 2016), and creating a diversity officer role without organizational power (Vican & Pernell-Gallagher, 2013) have consistently failed to create sustained improvement for minoritized staff members. Recent work calls for greater attention to the organizational structures that maintain White supremacy (McCluney, 2020; Scott, 2005) and attending to the organizational "underbelly" of intra-staff power dynamics (Holck, 2016). To this end, the research team sought to intentionally integrate power perspectives into the analysis of organizational change through narrative analysis, extending the insights of race focused DEAI organizational change in the existing literature to understand actions taken concerning multiple axes of oppression.

Narrative analysis investigates stories as a data source rich in information that cannot be accessed through fixed response methods (Maruyama & Ryan, 2014). Culturally, storytelling is a sense-making activity where conflicts, protagonists, antagonists and story arcs are identified and articulated. In narrative analysis with multiple storied versions of a shared event, the goal is not to identify a single truth but understand how different people make meaning from their own experiences. Data collection in this study included multiple stories about organizational history, recent events concerning DEAI change, and visions of organizational future. With a narrative lens, structures of organizational power were located in the stories, particularly in relation to who is identified as having agency to enact DEAI work, who is framed as antagonists either by promoting or resisting change, and intersections between narrative patterns and personal identities.

Ultimately, the dual analytic frame of Kotter's eight step organizational change model and narrative analysis allowed for examination of DEAI change efforts without a priori defining what types of DEAI changes were preferred. As stated earlier, the PD program itself emphasized that organizations would need to adapt what the participants had learned to address local needs, creating a core expectation of divergence and anticipating a wide variety of change efforts. Some organizations may focus on addressing ableism in their internal dynamics while another organization may define their greatest challenge as retention of BIPOC staff. Different challenges require different solutions, so having the Kotter-based analytic framework focused our analysis on how change was enacted, instead of an evaluation of the effectiveness of individual change efforts. In other words, applying a framework of organizational change that remained consistent - regardless of if change focused on racial diversity or physical accessibility, internal or external audiences, etc. - allows for comparisons and contrasts to be made across the variety of change efforts documented. Narrative analysis, while more directly related to local conditions, allowed again for consistent analysis of the felt side of organizational change, calling out power dynamics and their influence on how museum staff broadly interpreted the changes occurring. This study

does not present case studies of individual change, either personally or organizationally, but looks across multiple change efforts to draw conclusions about how the museum field attempts to enact DEAI change broadly.

Method Summary

During the third year of the project, the research team collected 5 case studies in order to inform the following research questions:

(1) In what ways, if any, do institutions change during their participation in iPAGE with respect to the three components of the iPAGE framework for inclusion in informal STEM learning (identity and systems of oppression; examining the nature and culture of STEM in informal STEM education; and leadership in complex systems)?

> (1a) How is change among cohort organizations instigated and maintained during iPAGE?
>
> (1b) What are the actions of Champion participants as their respective organizations shift according to the iPAGE framework, and what role do Champions play in the overall iPAGE model?

Data streams for deep case studies included artifacts from PD participation (including applications for the program and mini grant funding and written reflections) and site visit data including an all staff survey, observation of front-of-house or public and back-of-house staff spaces and meetings, and individual and group interviews with select staff. Two-day site visits were conducted between April and August 2019. These multiple data streams allow for a multifaceted understanding of how DEAI change has been enacted and understood by staff across many levels of the organization. Detailed instruments can be found in Appendix A, B, and C, and consent forms in Appendix D.

Site Selection

The research team began by considering all 19 institutions who participated in the PD as potential deep case studies, and then implemented a selection criteria to identify organizations who experienced a similar program experience, expressed willingness to participate in a deep case study, and collectively represented the overall ISE field.

The research team felt it was important that case study sites have an overall similar programming experience as a starting point for exploring how an institution does or does not change their practice, and have experienced the full set of trainings. For these reasons, the team decided to focus on only organizations who had participated in trainings within a single year (not over a more extended period of time), and had completed the full 11-day training sequence at the time the research was beginning. At the end of this selection phase, 7 sites were contacted to assess willingness to participate.

The second criteria for participation was institutional willingness to participate in the research activities. Developing a rich narrative of what was happening at each site would depend on a certain degree of openness to facilitate the full range of research activities, which may expose

sensitive topics. The potential sites were contacted regarding this stage of the research and informed of the potential research activities and honorarium (see Appendix E). Sites who were willing to participate were asked to secure a site administrator letter, which documented that senior leadership was aware of the potential research and supportive of participation. At the end of this selection phase, 6 sites (described in Table 1 below) were considered for participation. All participating organizations have been assigned code names to maintain confidentiality. These names are used in Table 1 and subsequently throughout the report.

Finally, the remaining sites for consideration were examined to assess how well the collection of sites would reflect the diversity of the ISE field. The researchers were cognizant that collecting data from a wider breadth of institutions would create a trade off in terms of depth at which each organization could be understood because of logistical constraints. Thus, the research team determined that a maximum of 5 deep case study sites would be possible and final selection would need to be based on maximum variation within the sample in order to represent the ISE field at large. Specifically, the research team considered geographic location, size of institution, and content focus. Size of the institution was based on the model used by ASTC in the 2018 statistical compilation[2].

Table 1. Site descriptions for final representativeness criteria.

Site	Location	Size	Focus
Science Museum of Sunset Vista	West	Small	Outdoor/Nature
Green Valley Science Center	Midwest	Small	Science Center
Cliffside Science Center	East	Large	Science Center
The Diagonal Science Museum	Midwest	Large	Multi-focal
Foggy Forest Science Center	South	Medium	Science Center
The Acorn Museum of Science	West	Large	Science Center

At this stage, The Acorn Museum of Science was eliminated on the basis that of the large institutions being considered, it was the most duplicative in terms of location and focus to other institutions in the sample. The final 5 sites for deep case studies represented a range of locations, sizes, and institutional foci.

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[2] Data is derived from 2018 ASTC Science Center Statistics, Copyright © Association of Science and Technology Centers, Washington, DC, www.astc.org

Site Visit Data Collection

The research team worked extensively with a site coordinator from each institution in order to plan site visits. The site coordinator was always someone who had participated in the PD program and ultimately was either the official Champion or Team Captain of each site. Because of their positionality as part of the PD team, the site coordinator provided insight to the research team as someone who is explicitly charged with considering DEAI in the organization. The site coordinator acted as the interface between the research team and the local staff. Specifically, the site coordinator was charged with sharing an all staff email from the research team informing staff that this research was occurring and staff may be contacted about participating (see Appendix F) and an all staff email inviting staff to participate in the survey aspect of the research (see Appendix G). Additionally, the site coordinator arranged space for the researchers to conduct private interviews while on site.

Because all staff could not be interviewed during a single, 2-day site visit, the researchers developed and implemented a short DEAI-focused all staff survey at each site prior to the site visit.[3] The survey was adapted from a survey previously developed as part of the NSF-funded RACE Forward project (NSF#1516255) to understand internal DEAI dynamics at an ISI. This survey allowed for all interested staff to share their opinions regarding DEAI and their organization's DEAI culture and also allowed the researchers to have a more holistic understanding of DEAI perceptions at the organization as context for what was observed during the site visit. We collected 257 complete surveys across all five organizations with an estimated combined total of 650 staff, which reflects a response rate of approximately 40% . Aggregate, anonymous survey results were also shared back with institutional leadership for the benefit of their own DEAI work in fall 2019.

Potential interview participants and observations were identified via an intentional sampling method (see Appendix H). The researchers identified 3 categories of potential research participants: a) integrated into DEAI work, b) adjacent to DEAI work, and c) uninvolved and unaware. The site coordinator, as someone tasked with DEAI work, was asked to share names and emails of potential interviewees for each category. A researcher reached out to each potential interviewee individually about participating in the research, scheduling a time during the site visit, and to share the consent form. To maintain anonymity, no one in a participating site, including the site coordinator, was informed of an individual's choice to participate or not. Regardless of the category the site coordinator placed the interviewee in, all interview participants were asked the same questions (see Appendix B). These questions were designed to elucidate the interviewee's personal beliefs regarding DEAI and perception of DEAI work within the institution before and after participation in the PD. A few interviews were conducted as group interviews for logistical necessity. However, in these cases, care was taken to ensure that interviewees were not placed in groups with members of their own department, and interviewees

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[3] One site completed the all staff survey after the site visit.

were given multiple explicit opportunities to opt-out of this type of interview. All interviews were transcribed and coded after collection, detailed below.

Site visits also included observations, specifically of public front-of-house and back-of-house spaces and select meetings. The site coordinator led the front-of-house and back-of-house tours, specifically calling out aspects of these spaces that reflected DEAI in the institution. For example, the front-of-house tour at Sunset Vista allowed the site coordinator to point out labels they identified as promoting inclusion and labels they identified as needing to change for inclusion. Site coordinators also assisted in identifying meetings for observation based on researcher defined criteria (see Appendix I). In a similar format to the interviews, a researcher reached out to each potential meeting observation participant individually about participating in the research and to share the consent form. Consent forms were signed the day of the meeting to ensure that everyone in attendance had the opportunity to revoke consent. Observations were structured by an observation form that attended to if and how DEAI was attended to in the space or meeting (see Appendix C).

Table 2. Total sample sizes for site visit data streams.

Site	All Staff Survey	Individual Interviews	Individuals in Group Interviews	Front-of-House Tour	Back-of-House Tour	Meeting Observations
Science Museum of Sunset Vista	9	8	0	1	1	2
Green Valley Science Center	4	9	0	1	1	0*
Cliffside Science Museum	93	9	2	1	1	3
The Diagonal Science Museum	90	13	3	1	1	2
Foggy Forest Science Center	61	4	12	1	1	3

*No meetings were scheduled during site visit.

Analysis

The research team structured analysis to attend to trustworthiness in qualitative analysis (Lincoln & Guba, 1986). Specifically, the researchers engaged with triangulation across the multiple data streams, frequent peer debriefing while coding and memoing, and member checking findings with research participants. The core analysis documents utilized were structured memos, implemented for individual pieces of data from the site visit such as a single interview, and then consolidated up into a site story and ultimately the findings presented here (see Appendix J for the memo template). The structured memo explicitly highlighted Kotter's organizational change stages and narratives of power in individual pieces of data, consistent with our theoretical foundation. Each researcher coded and memoed data from each site, and the researcher team as

a whole debriefed these memos to identify overarching themes. These overarching themes were then investigated via the all staff survey and program artifacts. Themes with corroborating data across data streams were written into a single "site story" for each of the 5 institutions.

Recognizing our status as outsiders and the snapshot nature of our data streams, the research team emphasized a terminal, formal member check of these site stories with research participants, conducted in October 2020. Member checking allows research participants to identify errors in interpretation, add additional detail to the findings, and call out confidentiality concerns. Member checking is intended to engage a representative sample of stakeholders, so the researchers contacted interview participants and the PD team members at the organization for member checks, both as staff members within their institutions and as the participants who were most directly involved with the research. The lag between data collection (Spring and Summer of 2019) and member checking was exacerbated by the COVID-19 pandemic, when the home institution of the research team temporarily closed and the research was placed on hiatus for several months. As a result, many interview participants were no longer associated with their organization as of the member checks. The research team attempted to contact all interview participants via organizational emails and redirect emails if provided. Ultimately, 9 interview participants engaged in the member checking process. Results from the member checks were integrated into revised versions of the site stories described below and used by the research team as the basis for this report's findings.

The purpose of this research is not only to look at how individual organizations grapple with DEAI organizational change, but also to describe the commonalities across these sites as part of the same field. Thus, the final stage of analysis involved pulling up the themes that were present at multiple sites.

Overview of Sites

Prior to identifying commonalities and pulling out the challenges in their work, it is important to document and highlight the breadth of what was attempted by each of the organizations and professional teams studied in this project as they engaged in challenging DEAI work.

The Science Museum of Sunset Vista

The Science Museum of Sunset Vista is a small organization with only a few dozen paid staff members. Geographically, the organization is situated in a large Spanish-speaking and Native American community, and historically, the organization had engaged in DEAI work related to accessibility, specifically retrofitting spaces to comply with ADA and presenting written labels in both English and Spanish. Initially nominating three members of their education department to participate in the cohort PD experience, they quickly realized that these staff members were not best positioned to enact DEAI organizational change and ultimately reformed their team to include two department heads and the CEO of the organization. For the PD leader's site visit, the team requested training for paid staff and the board of directors, conducted separately but ensuring all core members of the organization received some amount of content. The Science Museum of Sunset Vista also articulated a multipronged vision of change in their sub-grant application, specifically focusing on racial diversification of the board of directors and Spanish language training for dual improvement of internal and external audience experience. Team members worked to diversify their board of directors through intentional recruitment and relaxation of the financial requirements of board membership. They designed the Spanish language training to involve inversion of their organizational power structure, asking front line staff members with Spanish language skills to lead training of other staff members without those skills, including high power staff members. Organizationally, Science Museum of Sunset Vista described tension over the desire to expand the racial diversity of their audience while also catering to the wealthy and White donor base seen as essential for their financial survival. The change process of racial diversification of the board and planning the Spanish language training, along with consternation concerning intersecting racial and socioeconomic divides in external audiences were present and in process at the time of the research site visit.

The Green Valley Science Center

The Green Valley Science Center is located near a large Native American community and employs around a dozen paid staff. Staff at the organization described tension between staff with a long tenure at the organization - referred to here as "veterans" - and the less tenured, typically younger staff members. Historically, DEAI work centered on keeping visitor costs lower for financial accessibility. Veteran staff members, who had been with the organization for multiple decades, highly valued the autonomous work environment established by the museum's previous leaders. Green Valley Science Center intentionally selected one veteran staff member, one newer staff member, and their CEO, who had recently joined the organization, to comprise their PD

team. Prior to completing the full PD sequence, the younger staff member left the organization, resulting in a two person institutional team. Organizational change efforts at Green Valley Science Center initially focused on internal staff dynamics among veteran and newer staff, but eventually shifted to include greater focus on how science content was communicated to the public. At the PD leader site visit, all paid staff attended training sessions concerning interpersonal communication; however, holding additional training sessions after this site visit was a challenge due to financial constraints limiting staffing outside of public hours. Power dynamics between veteran and newer staff was a consistent thread throughout change attempts concerning presentation of science content as well as internal work processes. Despite a veteran staff member and the CEO comprising the institutional team, there was not sufficient buy-in among other veteran staff members to sustain change efforts from altering work processes to integrating Indigenous ways of knowing. Interviews with veteran staff members seem to indicate that change efforts around internal practice and organization felt like a loss of autonomy, and that the CEO's vision for the organization did not align with how veteran staff felt the organization should operate. Immediately prior to the time of the research site visit, the CEO announced they would be leaving Green Valley Science Center, and further DEAI change efforts appear to have ceased.

Cliffside Science Center

Cliffside Science Center is located in a metropolitan area and is part of a larger consortium of museums, meaning some back of house positions such as Human Resources and Finance departments are centrally located and housed at the consortium level. Prior to the PD program, the consortium as a whole engaged in focused efforts concerning physical access for visitors with disabilities, and Cliffside Science Center extended those efforts by creating two DEAI focused internal work groups, one for Accessibility and one concerning Diversity. These historical and ongoing efforts related to Accessibility were widely recognized and respected by institutional staff. The team of staff members who attended the PD program originally included the organization's CEO, a member of the education department, and a member of the marketing team. The staff member from the marketing department left the organization during the PD sequence, and Cliffside Science Center ultimately nominated two more staff members - the leader of one of the working groups and a staff member responsible for visitor experience - for a four person institutional team. Importantly, the institutional team involved with the PD program did not supplant the existing working groups, meaning this organization had 3 teams working specifically on DEAI related efforts as of the research side visit. Cliffside Science Center's institution team's change efforts focused on creating shared understanding of DEAI needs internally. Community Norms, present at the core PD program and adopted by the Cliffside institutional team, were shared across the organization and posted in prominent locations such as conference rooms. With sub-grant financial support, the institutional team formed an optional monthly Learning Series where team members who experienced the core PD program replicated lessons they had experienced. Each topic of the Learning Series was offered at two times to accommodate different staff schedules, and the ultimate intention was to integrate these activities and lessons into general staff onboard training. An initial round of the Learning Series

had concluded prior to the research site visit, and at that time, the institutional team was intended to offer the sequence again for additional participants.

The Diagonal Science Museum

The Diagonal Science Museum is a multifocal museum with natural history, regional history, a children's museum, and more traditional science center content. As their institutional team was participating in the PD program, the Diagonal Science Museum underwent a large scale restoration including redesign of exhibition spaces and intentional efforts to de-silo staff operating structures. Reflecting the very large size of the organization, six staff members attended the core PD program, representing a wide range of departments including education, human resources, visitor experience, and scientific research. Even before the conclusion of the core PD sequence, institution team members reflected personal actions related to DEAI in the organization, including adjusting science content of a planned exhibit to be more inclusive to alternative ways of knowing. After the PD sequence concluded, the institutional team applied for a sub-grant highlighting change related to being inclusive for external audiences, specifically aiming to "grow the number of community members who feel welcome to use its resources." Actions related to that goal focused on content dissemination. For example, the team enacted a poverty simulation intended to help museum staff members understand the difficult socioeconomic circumstances their visitors may be experiencing. Throughout the research site visit, staff members reflected that the organization stated equity as a value but struggled to articulate clear change efforts planned or implemented related to that value.

Foggy Forest Science Center

Finally, Foggy Forest Science Center is located in a metropolitan area of the American South. The five institutional team members included the CEO, two staff working in the Education Department, and two staff from the Human Resources department (one of the Education Department team members left the organization around the time of the research site visit). Historically, DEAI work involved bringing in outside resources to push forward improvements, including two staff surveying initiatives and working with a consultant on inclusive language concerning gender. As a result of participating in the PD program, the core organizational change effort enacted was an all staff training series focused on interpersonal staff dynamics including improving communication. The institutional team described this effort as modeled on the core PD program and aimed at getting the organization ready to address other DEAI work. Additionally, the institutional team worked to shift policies such as relaxing uniform requirements for front line staff.

Summary

At every site, there was a recognizable effort related to DEAI change; all organizational teams completed the core PD sequence and followed up with a plan to apply knowledge from that experience at their home institutions. These change efforts tended to emphasize training related to DEAI broadly, with a majority of staff at each organization reporting they participated in DEAI

related trainings in the last 2 years. Staff members across all levels at each of the five focal organizations described these types of efforts, yet consistently expressed that the organization was essentially unchanged in terms of DEAI when asked if things felt different now (at the point of our site visits) compared to before their institutional team participated in the PD program. Among staff who responded to a brief survey, we saw a majority felt "Some" progress had been made at their organization related to equity and that only a fourth of staff "Strongly Agree" to statements about the urgency of their organization addressing equity practices for their staff and the public audiences. Marginalized staff in particular called out a lack of change in face of dire urgency, highlighting a disconnect between their needs, the intent of change actions, and the actual impact of those actions.

Why did intentional work for the purpose of DEAI change - bolstered by institutional support, grant funding for activities, and direction in the form of the PD sequence - result in what many staff described as a continued status quo? Why do best case scenarios - organizations actively committing staff time and resources to DEAI change - also struggle to move? What are ISIs doing, or not doing, to take on the "wicked problem" of systemic inequities at ISIs, and how can specific examples help illustrate the challenges faced by many organizations?

Findings

This research project was intended to describe how organizations approach the wicked problems of systemic inequities at ISIs. Our findings uncovered a pattern of small successes overwhelmed by a number of persistent tensions that acted as impediments to DEAI implementation. We have organized these findings into two overarching themes: 1) museums as dominant culture normative organizations, and 2) lived experiences of change. Museums as dominant culture normative organizations highlight the structural elements frequently seen in our case study sites which acted to resist DEAI change. Lived experiences of change concerns topics that arose from narratives of how change felt.

Museums as Dominant Culture Normative Organizations

ISIs (and museums in general as products of the dominant culture) stand on a legacy of inequity and oppression that informs the values and assumptions baked into the structures and systems. Originally established to display the "cabinets of curiosity" of wealthy Europeans (MacGregor, 2007; Simmons, 2016), museums continually struggle against their founding narratives of education, assimilation, and othering of non-Western cultures and people outside of the dominant ableist, sexist, and heteronormative culture (Witcomb, 2003; Tseliou, 2013; Reich, 2014; Baldwin & Ackerson, 2017; Callihan & Feldman, 2018; Rieger & Strickfaden, 2018). From this foundation arises structures and institutions that continually reproduce and cater to a profession and audience reflecting and privileging dominant culture. This section presents findings concerning tensions in DEAI work that reflects museums as dominant culture normative organizations, specifically through the museum as a rigid system, the role of mission, and the vision of STEM. White normative organizations are those in which Whiteness is treated as natural, normal, and right via the organization level cultural norms, practices, and preferences (Ward, 2008; Ferguson, 2004; Muñoz, 1999). We argue that museums are not only White normative organizations, but also engage in normative practices on multiple axes of privilege in the larger dominant culture, resulting in normative organizations in terms of race and ethnicity, socioeconomics, ability, gender identity, and sexual orientation, to name a few.

Training as a Pattern

Since ISIs start from a place of inequity (Gontan, 2020), rather than having strayed from the equitable path into it, it follows that the systems and structures that emerged from that legacy are as much roadblocks to DEAI change as something like access to financial resources. Our case site visits revealed preexisting structures and expectations that severely limit the scope of sociological imagination for DEAI change, hamper implementation of change that is imagined, and plague both large and small organizations - albeit showing up in different ways.

Training as Default

All of the organizations in this study relied on training -- with a goal of individual personal transformations -- as the route to affect desired internal DEAI changes. Readily apparent from End

of Day reflections and comments made during the initial PD programming, PD participants had very meaningful experiences during the institute and colloquiums that triggered extensive mindset shifts in some (this is not something that was asked about specifically). These types of comments originated from participants who identified as White, cisgender, and privileged in terms of their leadership roles, but it is also worth noting that overall, substantially fewer BIPOC individuals participated in original programming. The PD program was not designed to be a "train-the-trainer" model, instead asking participants to apply what they learned by adapting and creating local strategies for change to address context-specific DEAI needs. However, when returning to their home institutions, teams appeared to default to a theory of change with training at the center. Why was training adopted as the primary mode of organizational change despite this not being a desired outcome of the original PD program? The experience at these organizations suggest that shared systems of organizational pressures across the ISE field reproduce training-based organizational change efforts.

The "Training/Education" model as seen at these research sites was reported by research participants to be the status quo for handling all concerns and change attempts at ISIs. As one staff member at Cliffside Science Museum explained, *"That's just a thing that we've always done here was trainings. If there's ever a topic that needs to be covered, training is the way that CSM deals with it."* Green Valley Science Center staff frequently commented on the inability to host all staff trainings as a major impediment to organizational change. When asked why they opted to design change based on training, institutional teams frequently reflected that they had implemented other small change actions (such as relaxing uniform codes or posting Community Norms) but had not considered alternatives in terms of enacting widespread change. Training felt like the "right thing" to do or something they could confidently "be successful" implementing. But "training" used in the colloquial sense can be used to describe a wide range of PD activities, some structures being more effective than others (Garet et al, 2001; Guskey & Yoon, 2009). Training intended to be one time dissemination of knowledge without strong connection to organizational priorities or existing work tends to be ineffective, regardless of the skill of the PD teacher. Additionally, even an exceptional training does not actively change systems or structures; a training-only model hopes that individuals who experience the training will do those other types of change work on their own.

Within our research sites, the trainings that organization-specific teams implemented tended to focus on recreating the original PD program experience with additional emphasis on knowledge content dissemination as a way to generate widespread organizational urgency or share knowledge for individual practice change. These trainings were frequently multi-session, available to all staff, and optional. Building collective urgency around a particular change area is the first step of organizational change in Kotter's model. However, what the researchers noticed about the utilization of training was that all five sites centered their DEAI work on training implementation. This was true no matter what they identified as the focus of their work, the existing urgency or DEAI work in the organization, or ideas about next steps after establishing urgency.

Across these five organizations, what structures made training seem like the most logical practice? We observed two patterns that likely pressure ISIs to accept training as a default organizational change mechanism: the impact of staff turnover, and siloed departmental structures.

Frequent staff turnover creates an ongoing need to onboard new hires, and could serve as a way to establish DEAI norms as they enter the organization. However, if existing staff --likely the majority-- are not similarly exposed to these norms, new staff may find themselves in conflict with the established systems and ways of getting things done in the organization and abandon their onboarding training in order to assimilate into the dominant culture. In contrast, all-staff training that does not attend to onboarding procedures or continuous improvement risks knowledge loss and stagnation as staff turnover occurs. Cliffside Science Museum intentionally addressed the staff turnover dynamic when designing their training by offering training for existing staff with the intention of consolidating successful training pieces into their organization-wide onboarding process.

Many museums possess rigid organizational structures, characterized by siloed departments working relatively autonomously (ASTC, 2020; Schauble et al, 2002). Despite each organization having at least some manner of guiding coalition in the form of the institutional team, in many cases the positionality of those on the team resulted in a coalition that was not powerful enough to require systematic change across departments and divisions (this phenomenon is discussed in greater detail below). When the guiding coalition cannot require systematic change, an alternative is attempting a bottom up approach- change enough hearts and minds (we noted above that trainings tended to focus on individual mindset shifts for collective urgency, reflecting a focus on step 1 of Kotter's organizational change model) to generate lots of changes in individual loci of control to produce an observable organizational change. This is a very slow way to change organizations, more akin to evolution than restructuring.

Staff Turnover

Frequent staff turnover has become a status quo in the ISE field. Transitions in and out of the organization among leadership and management is a regular occurrence, but this pattern is even more striking among hourly/front of house staff (e.g., visitor facing staff, custodial, food service, seasonal program staff) who often have extremely short tenure (Erdman et al, 2017) and tend to include a larger proportion of societally underprivileged staff (Farrell & Medvedeva, 2010). In our five research sites alone, every site experienced at least one member of the institutional team involved with the PD program leaving the organization within three years of beginning the PD sequence-- and these are typically staff with acknowledged leadership and authority within their ISIs. Accepting high attrition among a large portion of staff as a "normal" part of Museum culture does not just create the conditions for constant onboarding, it also fails to appropriately problematize the issue of why so many staff leave in the first place, and shifts attention to hiring rather than retention within DEAI change initiatives.

These intersecting dynamics played out in our case study sites where staff homogeneity was often noted as a concern. HR Policies and practices designed to support "hiring for diversity" were frequently described all while acknowledging that underprivileged staff - particularly BIPOC staff - continue to depart in alarming numbers. Yet, no organization addressed this in their core DEAI change efforts. A staff member at the Diagonal Science Museum described their BIPOC staff retention issue as "a plague", and other staff members commented that despite organizational statements emphasizing the need for racial diversity, the organization continued to be persistently White-dominated. At Cliffside Science Center, for a few years, there was appointed leadership who oversaw diversity initiatives at the museum consortium level, resulting in events dedicated to DEAI topics and challenges. One staff member reflected on how, while this was progress, "*I'm not sure that we're a different organization now and a more aware and inclusive organization than we were ten years ago.*"

Despite being able to name the general problem, sites in this study consistently struggled to identify a specific issue for focused efforts, which ultimately left unclear who would then be responsible for solutions. Concerns about homogeneity of staff were raised during the core PD programming, and at that time, brainstormed solutions landed on the Human Resource systems or organizations. For large organizations, ideas centered on policy changes to hiring and onboarding practices, which may or may not interrogate assumptions about who is qualified for a position or the broader ways that underprivileged staff experience their roles. Furthermore, the idea that Human Resources controls the hiring process entirely is a fallacy at these sites. For instance, a department head responsible for some hiring decisions at Diagonal Science Center spoke at length about how they do not consider DEAI when promoting available positions or considering candidates, reflecting colorblind ideology. The smaller organizations tended to have very homogenous staff, and perceived their primary barrier to attracting a diverse staff lay in their smaller budgets and lower salaries. Real or perceived immovability of salaries made attraction of diverse staff a perceived impossibility.

While comprehensive HR policy changes around hiring do address issues at the systems level by disrupting biases that limit creating a diverse staff, they fall short of addressing the systems at play that impact how an individual experiences their role once they have joined the organization because that aspect was treated as the responsibility of individuals, not the organization.

Routes not Taken: Alternative Visions to Training

In narratives about historical DEAI work at the focal organizations, research participants articulated a multitude of models for DEAI change in their past work and experiences. These models for DEAI work in narratives of previous initiatives included changes to physical infrastructure and building equity into funding structures, changes to systems and structures of the organization highly focused on external audiences. These stories of past successes rarely mentioned training. For example, the Science Museum of Sunset Vista had previously worked to improve accessibility of their museum spaces in terms of physical accessibility and language accessibility and the inclusiveness of exhibitions by presenting Native authored text labels.

Interestingly, the organization was fundraising to develop a new permanent exhibition at the time of the core PD program and research site visit, yet continuation or expansion of that existing DEAI work particularly related to language accessibility and inclusion of Indigenous ways of knowing was not present in planning the new space. Additionally, the Science Museum of Sunset Vista institutional team did not engage in the exhibition planning process as a site of organizational change.

In another example, most of the research sites had some amount of financial support or admission relief for supporting visitors living with lower socioeconomic status access, but these programs were rarely cited as ongoing DEAI work. Past successes (or perceptions of success) could have been leveraged to push for additional change or envision change beyond training. However, they at times serve as a barrier in its own right, as some staff pointed to these successes as evidence that further change was unnecessary. This research project cannot speculate on whether non-training based approaches to internal changes would have produced different outcomes because they represent routes not taken at the time of case study site visits. The reality that these models were present at the organizations and not considered in the larger conversation about how to enact organizational change is further evidence of the default status training holds in the museum field.

A particularly pointed example is Cliffside Science Museum, who possessed an immediate and ongoing example of DEAI change related to physical accessibility and supporting neurological diversity. Previous work related to ADA at the consortium level had generated a collective sense of urgency related to accessibility for external audiences, corresponding with Kotter's first step. The Accessibility working group acted as a coalition (step 2) that enacted focused changes (step 6) such as supplying sensory support kits for front line staff; a vision for change may have been present but was not articulated to the researchers (step 3 and 4). At the time of the research visit, two staff members received recognition at an all staff meeting for exemplary support of visitors with physical disabilities in order to engage with the museum experiences and a different staff member met with the Accessibility working group to discuss how to improve the physical accessibility of a special event (step 6). During research interviews, staff members across the organization named this accessibility work as the core example of how their organization was addressing DEAI, and some staff actively stated a desire for other aspects of DEAI to be treated with the urgency and priority that physical accessibility had received. Yet, at no point did staff inform the researchers of training related to accessibility. Physical accessibility work at Cliffside Science Museum acted as a point of pride, but that experience was not utilized in imagining other types of DEAI change work.

Mission Compatibility with Equity Mindset

While each organization has a unique mission statement, these also reflect dominant cultural norms in the field that are used by museums to direct their work. Overarching organizational mission statements are intended to provide a core goal for all staff members, but in the case of DEAI change in the organizations we visited, they served as a source of tension because they did

not explicitly center equity work as essential to delivering on the stated mission. A core step in Kotter's organizational change model is creating a vision for change (step 3) and communicating that vision broadly to staff (step 4). Tension arose when the vision for change was perceived as incompatible with the organizational mission statement. Diverting staff attention and organizational funds to DEAI work conflicted with existing distribution, a distribution previously justified in part by the mission statement. DEAI work seemed to feel like an added responsibility to currently overburdened staff, or possibly seemed outside of their job description. Drawing explicit connections between the existing mission statement and the vision for change might have ameliorated some of this tension, centering DEAI work as achievement of the mission instead of a "bonus" impact. However, how change leaders connect the vision for change and mission statement has implications for what types of change become accepted. Thus, careful attention to how the change vision and mission are constructed was paramount.

Returning to the change efforts at Cliffside Science Museum, both historical and recent DEAI work has highlighted how improving experiences for marginalized populations forwards the larger institutional mission of serving the public. The "service" value was an existing, formal pillar of the organizational mission, and DEAI work related to providing a service to external audiences - such as purchasing and providing sensory support tools for neurodiverse visitors - were readily taken up. In contrast, a Cliffside Science Museum staff member relayed a recent story of a youth with a predominantly White school group drawing a hate symbol at an exhibition interactive. The front line staff member who found the image informed their supervisor in order for the school's chaperones to be informed, potentially creating an educational moment for the students regarding the impact of their actions. Instead, the supervisor declined to inform the chaperones citing, "We don't need to make it a bigger deal than it needs to be". While this successfully avoided discomfort and conflict among the school visitors (external audience), it was achieved at the expense of marginalized staff (internal audience), who understood it as perpetuation of race based cultural oppression. In this way, the organization's Service value implicitly prioritized service for external audiences and resulted in decisions that limited which DEAI actions were taken, particularly dismissing the impact on internal audiences such as staff of color. Thus, the anchors connecting institutional mission and DEAI organizational change visions both create support for changes and constrain what changes are deemed possible.

ISI missions tend to focus on external audiences, so organizations that successfully made connections between DEAI change initiatives and organizational mission also tended to emphasize change for external benefit. Focusing on external audiences often couples with a spotlight on frontline staff who have the most day to day contact with them. However, are frontline staff the people best positioned to create structural change?

Approach to Nature and Culture of STEM

One pillar of the PD program experience framework was to help participants see how culture is present in Western Science and STEM, and the ways those values and beliefs privilege some identities and ways of being. This lens on DEAI was intended to lay groundwork for broader

participation in STEM by encouraging ISI's to integrate multiple stories showing different visions and versions of science.

While most participants reported a mindset shift in that they were able to see culture in STEM after the program (Bequette et al, 2019; Chatman et al, 2019), this was an area where we saw very little evidence of implementation towards organizational change at the sites visited. Nature and Culture of STEM is largely absent from site visit narratives, perhaps because it is not something that PD teams attempted to influence. It is unclear if this is related to mission immutability and what it would mean to an organization's identity to question what it presents as "Science," the fact that museum staff who do not have authority over science content decisions feel that STEM is separate from the responsibility of their daily role, or simply that participants were not given concrete tactics or practices related to bring back and implement for an internal change.

Green Valley Science Center provides a vivid example of how ingrained Western notions of Science and STEM can be in ISIs. While the nearby Native American community has been part of the organization's intended audience base since the Science Center was established, the organization's founders were motivated by a drive to "bring Science" to the Native community. This narrative established an assimilationist mission by assuming that 1) Native ways of knowing are not Science, 2) the Native community is in need of Western Science, and 3) outsiders are necessary to bring Science to the community. The veteran staff --many hired at or near the founding of the organization-- held staunchly to this mission narrative, describing to researchers DEAI "successes" reflective of White savior mentalities. One newer staff member described reactions to diversifying the narrative of Science:

> "Particularly when it comes to kind of the Indigenous stuff, I tend to be sort of the advocate in the staff as far as trying to not tell that single European version of science, which honestly has at times put me at odds with some of the other staff."

When it came to active change efforts related to presenting Indigenous knowledge in the ISE exhibitions, the institutional team was able to add indigenous terms for local animals in natural history displays, but could not overcome resistance from veteran staff in terms of presenting other ways of knowing. Thus, just as the narrative connecting DEAI with Service mission constrained change activities at Cliffside Science Center, the organizational narrative concerning Science mission at Green Valley Science Center prevented shifting from the dominant culture's ways of knowing (i.e., Western approaches to Science).

One organization in our case study did successfully enact an externally focused change regarding the Nature and Culture of STEM. Specifically, an institutional team member was able to redirect an exhibition's development away from a single story narrative of Science ("the friendly scientist" voice to tell the audience the "facts") to more actively embrace multiple ways of knowing (asking the audience to observe and explore the objects in the exhibit to make their own meaning). This change was possible because the institutional team included a scientist curator, who had formal responsibility for decision making regarding science communication.

Additionally, the PD programming related to Nature and Culture of STEM happened to coincide with a key point in exhibition development, giving the scientist curator an opportunity to intervene based on their new insights. In this case, the intersection of opportunity and agency based on team composition allowed a STEM-related change to be successfully enacted. This particular institutional team member was able to enact a particular change because science communication is part of their formal responsibilities and the opportunity was present. It appears unlikely that this change action would have been possible if either aspect of the scenario were altered. The other four organizations we visited did not appear to focus on exhibit development or revision as an arena for DEAI change around Nature and Culture of STEM as a response to the PD program, nor did researchers see or hear evidence that there were considerations of including non-scientists participation in science communication venues.

From a Kotter perspective, the change action described above was not part of *organizational* change -- involving only individual urgency, power, vision, and enactment. Researchers have no evidence that this action was more than a one-time event; the specific exhibition trajectory was altered but the sentiment underlying the change was not institutionalized into content creation policy. We highlight this example to demonstrate that addressing Nature and Culture of STEM was not a complete impossibility for DEAI organizational change in ISIs, even if institutional teams largely chose not to focus on it.

Lived Experience of Change

The previous findings section focused on the legacy from which ISIs need to emerge and how organizations in our case study engaged in that struggle. The following section presents findings about interstaff tensions that surfaced -- often along axes of power and privilege -- as teams attempted to implement DEAI change. By examining the structures that underlie how staff relate to one another in both the course of their day to day work and as they pursue DEAI change activities, narrative analysis provides additional depth to more traditional organizational change processes and highlights the particular challenges associated with status and agency when implementing DEAI change at a systems level.

"Low-Hanging Fruit"

Organizations in our case study often described tackling what one respondent called the "low hanging fruit" among equity issues as a place to start building their skills in preparation to take on more complex and thorny problems inherent in a museum's systems/structures. Usually, this manifested as working on establishing norms and facilitated communication skills for meetings, gender identifying pronouns, bathroom signage, relaxing frontline uniform requirements, and physical ADA accessibility. The preferred medium for much of this work had been formal training to disseminate content and replicate individual experiences from the original PD experiences among a broad swath of staff at all levels of the organization, as described above. Much of previous DEAI work and success had been linked to providing a better experience for the public, up to, and including being a rationalization of the internal work as well. While these changes are

positive in their own right, how they were positioned as part of larger change efforts revealed a major tension. Specifically, while the small steps were envisioned as a beginning to systematic change (in line with Kotter's step 6), the organizations studied did not have articulated plans for continued work (step 7) or consolidating gains into permanent structures (step 8), creating the perception that the organizational change effort ended with the small changes.

For example, physical accessibility in the form of ADA compliance was frequently mentioned as an example of DEAI work that has happened in the organization prior to participating in the core PD team sequence. ADA compliance and ensuring physical access are essential. However, physical access - particularly envisioned as solely ADA compliance - is a narrow interpretation of how ableism appears - and thus can be addressed - in museum environments. Additionally, organizations may tackle these first because changes are highly visible with concrete results and numerous resources and guides outlining what should be done to meet the standards that already exist. In part because there are concrete guidelines to meeting the ADA standards, organizations are not challenged to engage with the community or ask for and act on the perspectives of people with different abilities, either internal staff or reaching out to external advisors. Physical access and ADA compliance alone do not ensure that a learning experience is accessible to people with disabilities, meaning an organization can be ADA compliant yet still ableist in terms of access, design, content, and pedagogy. When ADA compliance is treated as the goal instead of the bare minimum, an organization is enacting "low hanging fruit" without a plan for systemic or ongoing change in terms of physical accessibility. This reflects a "checkbox" approach to DEAI work.

Staff in decision-making roles (in terms of deciding what content, ideas, and practices are prioritized for DEAI work -- often team members who participated in the PD program) frequently said they chose to start with the "easy" things first. At Foggy Forest Science Center, leadership talked about getting the organization "ready" for DEAI change. At Sunset Vista Science Center, staff acknowledged that organizational effort leaned more on appeasing donors than expanding audiences. "Easy" might mean the ideas that were less likely to generate a dramatic response from staff/donors/the current audience, or involve cooperation and buy-in from multiple levels within the organization (i.e. they could do it themselves and no coalition required). Changes that rely on individuals to adjust their mindsets and behavior with each other and are implemented through trainings (a medium that is familiar), rather than examining and disrupting/dismantling aspects of the organization that are problematic on the systemic side: pay, meeting culture, commonly held assumptions about who can do what job, or even the museum's purpose for engaging the community. The risk aversion tied to the choice to center resources on a bottom up approach to changing individual mindsets and behaviors may be related to fear of failure or the perception that failure means money wasted, rather than experience gained.

We see these dynamics play out at the Diagonal Science Center, where socioeconomic oppression was a focal issue. The institutional change team addressed socioeconomic oppression via a poverty simulation (facilitated by an external group) as a staff training as part of their change initiatives, but framed the conversation around empathy for external audiences who

are experiencing poverty --failing to recognize that staff in lower hierarchical positions are similarly oppressed. For these staff, who consistently highlighted concerns about internal wage equity during interviews, the poverty simulation reflected a larger organizational disconnect between the existing wage structure that placed some employees in poverty and the inability to retain staff. This event came across as tone-deaf to many. Bringing in an "easier" small win of an already designed PD opportunity without establishing next steps for addressing the systematic side of an issue - coupled with the focus on external instead of internal audiences - backfired, generating less confidence in the change effort among staff.

Leadership and Empowerment

When looking at museum DEAI change from a Kotter organizational change model, we consistently heard stories of tension related to who was empowered to enact DEAI change and how that empowerment intersected with existing hierarchical power structures. Three steps in the Kotter model were particularly vulnerable to these dynamics: 1) lack of power with the guiding coalition (step 2), 2) confusing communication concerning the vision for change (step 4), and 3) structural risk aversion that undercuts empowerment of employees to act (step 5).

For example, Foggy Forest Science Center implemented all staff training soon after completion of the PD sequence with a focus on generating "readiness" for further DEAI work. The institutional team focused these trainings on interpersonal staff communication, replicating lessons related to distributed leadership from the core PD, with the logic that improving internal dynamics and communication were the necessary foundation. As a staff member explained, *"If we're going to shift the culture in any way then we have to kind of learn how to see and navigate each other as individuals, and if we don't do that then it's going to blow up before we even try anything else."* At the time of the research site visit, an impressive 95% of staff who completed the all staff survey reported having participated in DEAI related organizational activities, and 81% reporting having changed something about their work practices as a result. Additionally, a majority of staff agreed or strongly agreed that equity practices related to both engaging the public and that impact staff are urgently needed. However, outside of the team who organized the training, the purpose of the training was lost. Staff members reflected challenges seeing the connection between workshops focused on interpersonal communication and the larger organizational aim of being more inclusive. Other staff articulated that they felt DEAI work was important and the workshops were valuable but a desire for more specific goals concerning DEAI to guide the training and workshops.

The experience at Foggy Forest Science Center can be interpreted two ways. First, from the perspective of an extension service model, which the core PD program was originally inspired by, the institutional team operated as extension service agents, bringing what they had learned about distributed leadership to a wide group of people who could change their own practices. 81% of staff reported a change in their practice as a result of the trainings (successful uptake within the context of an extension service model), but still articulated dissatisfaction with and confusion about those same trainings. From a Kotter organizational change perspective, the

guiding coalition intended for trainings to build organizational urgency and "readiness" to do additional DEAI work, while staff interpreted trainings as more akin to step 6, initial action toward a larger change goal. By asking for goals and explicit connection between training and goal, the staff members were reflecting a desire for vision, which is created in step 3 and communicated in step 4 from Kotter's model. The institutional team who attended the core PD training were already acting as a coalition (step 2) in designing and implementing the training as DEAI work. Looking at this experience from a Kotter perspective, framing the trainings as urgency building (step 1) created greater confusion because the organization was past that step in their organizational change.

Foggy Forest Science Center's outcomes were emblematic of trainings seen at the research sites. Cliffside Science Center enacted a training series focused on replicating lessons from the core PD program. While they had a plan to ultimately integrate lessons into the onboarding process (an action which would ultimately be more consistent with Kotter's 8th step), the immediate vision for the training was to offer training opportunities again, reflecting an orientation toward knowledge dissemination instead of an intentional organizational change process. During site visits, we saw little evidence that a coherent vision --to facilitate codification of personal norms and mindset shifts from training into organization's systems-- had been communicated to staff. The lack of vision communication was largely a result of understanding the goal of trainings as knowledge dissemination to generate urgency as a change outcome instead of one thread within an entire change initiative. Knowledge dissemination, shared group norms, and urgency are key assets for tackling the challenge of DEAI work. However, the reliance on training to the exclusion of other options, as seen at our research sites, reflects the field's tendency to apply familiar, targeted solutions to complex problems when more comprehensive approaches are called for.

We did see evidence of training that included goals beyond dissemination of information at one of the smaller organizations. Specifically, the Science Museum of Sunset Vista designed a training to increase Spanish language skills of staff. The training was not a replication of an existing core PD lesson and it involved explicit articulation of connection between training content and larger DEAI change vision concerning serving Spanish-speaking audiences (Kotter's step 3 and 4). Furthermore, the structure of the training challenged existing museum hierarchy, asking staff with lower organizational power status and existing Spanish language skills to share their knowledge with other staff, including high organizational power staff. The teachers of this training would not be members of the core change coalition represented by the institutional team, meaning this change action may reflect an organization beginning to operate at Kotter's step 5, inviting and empowering others to enact the change process. In this way, the training was designed to attend to two lenses from the core PD - *distributed leadership* and *identity and axes of oppression* - in a way that was truly adapted to the local contexts and needs and reflected a coherent bedrock of organizational change steps. We call out this example to reaffirm that training in itself can be part of appropriate change work and be effective from a Kotter organizational change perspective. With fewer staff, a small ISI may be better situated to augment training models, connecting it back to organizational structure and mission because accomplishing "full staff" dissemination of

knowledge occurs faster. However, because the Science Museum of Sunset Vista's training was in the planning stages at the time of the research site visit, no conclusions about its effectiveness can be made at this point.

Power Dynamics in Coalition Building

Accountability is foundational to all organizational change processes and is associated with step 2 in Kotter's organizational change model - creation of a *powerful* coalition to lead change. This step comprises two core ideas: 1) creating a group responsible for change work, and 2) imbuing this group with organizational power. Organizational power can be achieved both through bestowing formal authority upon the group and selecting individuals in existing roles with hierarchical power for the coalition. Sites in our study experienced a variety of challenges situated in these intertwining aspects of a powerful coalition, and some sites were able to identify and overcome the challenge.

At Cliffside Science Museum, three different coalitions existed to lead the work, but they were not powerful enough organizationally to enact changes or hold the organization accountable. Of all of the sites studied, Cliffside displayed the most infrastructure for change, with two change groups focused on specific types of DEAI work established prior to involvement with the PD and adding the institutional team as the third change group. Interviews with change group members revealed, the groups had been constituted out of genuine good will for DEAI change work, but lack of explicit leadership buy-in and resulting authority meant structural and systematic change was out of reach. As one member of a change group described, *"It's kind of a waste of time…It's really an important thing to be a part of but it doesn't go anywhere."* These groups created change dependent on voluntary individual actions, such as an event planning staff consulting with a change group for improvements or a member of the institutional team overhauling a training that was already in their sphere of influence. As described in the training section, when change relies on actions within individual locus of control, the change fails to be systematic. Establishment of a coalition is insufficient without organizational power to push a change process.

Alternatively, the Science Museum of Sunset Vista actively changed their institutional team while in the core PD sequence in order to ensure the final team composition had appropriate organizational power. Initially, the organization had 3 staff members all from the education department attending the PD program. After the first 5 day course, the organization elected to bring in the head of development as champion, diversifying the positionalities of their institutional team. Later, the organization decided that to enact this work, their President and CEO needed to be explicitly part of the work, and they brought them on as the official team champion. These changes in institutional team composition ultimately resulted in a guiding change coalition of 2 department directors and the head of the organization, a very powerful group that could both envision and enact a systemic, multi-pronged change vision.

Power Dynamics in Change Vision

Without a shared understanding of a change vision, staff members develop widely different understandings of change actions. Kotter's step 3 and 4 prescribe creating and communicating an overarching vision for change; sites in our study frequently struggled in disseminating a shared vision, resulting in a communication vacuum into which other staff members contributed their own meanings. These meanings often reflected the money and time based logics, specifically that leadership or staff do not have enough time or money to enact big change. As mentioned earlier, lacking a change vision, staff not involved in change coalitions tended to interpret change actions as being the end of the process, unsure of any future steps or ultimate goals.

Returning to Cliffside Science Museum, table 3 shows narrative descriptions of what the monthly training series was intended to do from a variety of staff voices. Despite all attending the same training series, no two people articulated the same understanding of why the museum was employing the training.

Table 3. Descriptions of the Learning Series at Cliffside Science Museum.

Source	Quote, emphasis added	Interpretation
Mini-grant application for Learning Series	*"Level the playing field across all departments in terms of equity, inclusion, and access"* *"Provide a safe space in which to build a community of learning"* *"Demonstrating the value and expertise all employees bring to our ISI."*	Education/content learning Community building Assumption of knowledgeable staff Internal focus
Interview, non-iPAGE team member, attended Learning Series	*"When you're in a meeting or when you're in a conversation, it doesn't have to be 'here's your talking stick' and back and forth…you become so much more aware. 'All right, I've talked for some time, I'm stopping'…I at least employed that in my meetings for sure."*	Communication techniques/awareness Connected to work Internal focus
Interview, non-iPAGE team member, attended Learning Series	*"One of the things that was really stressed to us in the iPAGE training was take all of these lessons and actively think about how you can apply them to your day-to-day…I don't know necessarily how much I've seen in terms of like broader museum wide changes."*	Education/content learning Connected to work No wider goal
Interview, non-iPAGE team member, attended Learning Series	*"Generally speaking I feel like they didn't really relate it back directly to the science center or to our jobs at the science center"* *"I just felt like a lot of it was very sugarcoated to fit the majority of the room which, yes, I get, but we were having these trainings to make people more aware of the minorities in the room…. "*	Not connected to work Personal growth for privileged people Internal focus

In looking at actual change initiatives in museum environments, we have seen leadership and empowerment more as a duality than different steps in a linear process. Formally identified leadership - including CEOs, VPs, education directors, etc. - are seen as necessary for spearheading DEAI initiatives, particularly because they have power over organizational prioritization and policies. Staff members across the organization look to their formal leadership's direct and indirect communication to understand what actions and change will be supported. This gaze on leadership sometimes differs from the expectations leaders formally have in terms of job role. Whereas many high-level leaders are responsible for fundraising, board interaction, and being the public face of the organization, staff members look to them to understand what is important, how decisions are made, and what efforts will be rewarded. In the absence of clear communication and specificity about these things, staff members fill in the blanks with the indirect communication of formally identified leaders.

In DEAI focused change, museum staff members focused their gaze on leadership to signal the priority of these changes and articulate the ultimate goals for the organization. For example, staff not involved in planning DEAI trainings were acutely aware of the presence or absence of senior leadership at the trainings. At every organization that hosted trainings, both voluntary and required, staff noted in interviews if leadership including the CEO, department directors, or their boss were in attendance and actively engaged--interpreting this as evidence of leadership prioritization (or lack thereof if they were not present). Sharing what goes through their mind when they observe the absence of leadership, a staff member explained *"when you don't see that a priority for leadership, you think, 'Why am I spending my time on this? Why am I going to really be here and invested...right now when I look around and key members of senior leadership are missing and they're not here?'"* At another organization, a senior leader explained their decision to not attend trainings as based in concern for creating safety for staff members; *"as the director of the museum, people would be less likely to share when the boss is in the room, so I felt that it made more sense for me to not be there."* The same staff who pointed out the absence of leadership went on to acknowledge at their institution, *"there were sessions that I missed or that I had to step out...so I understand that happens, but you like to see that same investment [of participation] across the board at all levels to give you a sense of, 'All right, now I need to walk out of here and have some action items and some next steps.'"* Concluding that senior leaders need to be visible in DEAI work is understandable, however, people can't always be physically present -- people get sick, have conflicts, go on vacation or, as articulated in the quote from a senior leader, have legitimate concerns about the influence of their presence. Instead, these examples can serve to illustrate the meanings created in absence of clear communication of vision. Hypothetically, if senior leadership promotes a particular vision of change and articulates their reasons for not participating in particular aspects of that change, then staff would have less incentive to seek alternative meanings to their actions.

Power Dynamics in Actions for Change

Staff within ISIs who were not directly involved in the iPAGE team or in a formal leadership role often stated that they did not feel they had the authority to enact changes beyond their individual locus of control. Additionally, many expressed that there was not a clear or a robust process for communicating up the hierarchy things that felt like urgent issues to be addressed as part of system-wide change. Many of these individuals simultaneously expressed deep personal urgency and vision for the DEAI work. As a Foggy Forest Science Center staff member explained, *"I feel like I can [lead change] with my staff that report to me....[but with overall DEAI] feel like I'd be overstepping my bounds if I tried to do something beyond just using the tools that they use."* Where authority is not distributed, individuals feel that they do not have permission or agency to act in ways they know best support DEAI. Many of these stories reflect a gatekeeping model of hierarchy within Museum organizations.
Similar to other issues of power dynamics undermining DEAI change processes, people in positions of organizational power did not intend to disempower other staff. The CEO of one of our focal organizations articulated their intended stance on hearing from all staff members;

"Everyone's insight and viewpoint is important, and we want to hear it, and don't be quiet. I might make the decisions at the end of the day, but my idea is no better than your idea. If you're making $9.00 an hour, I still want to hear what you have to say." In contrast, a lower hierarchical staff member described a lack of recognition of staff ideas; *"It doesn't seem like our ideas really get listened to. It doesn't feel like the suggestions from team members get heard or put into action. So I feel like if floor staff says, 'hey, we should do this' it probably won't lead to change."* The unintended result of the system was feelings of disempowerment.

Returning to the earlier story of the hate symbol drawn at an interactive exhibit provides a vivid example of how gatekeeping produced disempowerment with DEAI change initiatives. The interview participant specifically described how they felt after what happened:

> *"Not that I want to be this big uproar and all in the news or anything like that, but she knew the group who did it and I don't understand why no one thought it was important to alert the chaperone or alert our customer service earlier so they could talk to the chaperone."*

This story exemplifies how feelings of disempowerment are generated in day-to-day enactments of DEAI work. Each instance of immediate change opportunity not taken up reinforces the status quo of the organization, undermining the organizational change process.

Intentions and Impact

Throughout the previous sections of this report, a consistent ebb and flow of organizational intent and experienced impact has been present. Diagonal Science Center intended their poverty simulation to engender empathy for people experiencing poverty, yet staff in poverty or near poverty felt erased. Individuals in formal leadership positions did not attend trainings for reasons such as to allow for open dialogue, yet their absence could be interpreted as signaling lack of leadership buy-in. Green Valley Science Center intended to expand their narratives of ways of knowing, yet veteran staff saw those actions as devaluing their previous efforts. Sometimes these disconnects impact staff with societal or organizational privilege. However, more often, negative impacts are shouldered by historically and/or organizationally marginalized staff. This section acknowledges and centers the voices of those staff while calling out the practice of slow, ad hoc DEAI change as being incredibly damaging to both the organization and the "invisible" staff experiencing daily oppression.

Our original research design did not explicitly set out to solicit these stories, but in the course of our case study research, we cultivated a sufficient level of trust that staff were willing to risk emotional injury and professional consequences by describing the emotional labor of navigating upsetting experiences in White normative institutional spaces (Evans and Moore, 2015). We recognize the need to uplift these stories. Additionally, we extend the concept of emotional labor to include individuals who experience the struggle of navigating a dominant culture normative organization because of any axis of oppression. By ameliorating these missing narratives in the field, we hope to amplify the contributions of underprivileged staff, part-time staff, minimum-wage

and entry-level staff, and staff who are not in leadership positions (to name just a few) as well as examine the factors that create invisibility and provide suggestions for what can be done to address these barriers to DEAI in the organization.

Invisibility of Existing Labor

We describe these marginalized staff as "invisible" in this context because they are doing DEAI work without recognition for their critical efforts, either because of how what counts as work is recognized in their organization and/or their experiences are not considered and attended to throughout the process of carrying out DEAI work. They remain invisible because they do not have agency to change the systems that are affecting themselves and their colleagues even though they are working from a deep well of personal urgency for change, fueled by their lived experiences as marginalized individuals. As one staff member put it, *"when you look around it's important, especially when you're young, to see people who look like you. And I always say, 'I love my job here and I love what I do, I love the little kids. I love [being] an informal educator' but I also feel like I have this bigger civil duty to pave a way for people who look like me and would love to be here."*

Many times, these staff experience dual oppression where they not only endure marginalized experiences but they are also the ones responsible for calling it out --at once the oppressed and the agitator, tasked (not by choice) with taking on the oppression, as described by one single parent who worked in community outreach at one of our research sites and struggled with the realities of wage inequity when trying to encourage individuals from marginalized groups to apply for staff positions at the Museum: *"I'm one of less than 10 --maybe even less than five-- single parents who work here. [...]how do we have people who have a lower income because they only have one income, agree to come and work for us?"*

From interviews across organizations, staff shared stories of this heavy, exhausting, and unofficial emotional labor that they absorb to support their colleagues who also find themselves invisible. A poignant example arose concerning a woman of color who, in her official role, made concerted efforts regarding diversification of hiring. Additionally, she was known among other staff of color as a confidante, a sounding board for their struggles and an advocate for their needs. However, the emotional labor of this specific employee only arose in the interviews with staff of color or staff in less powerful positions in the organization; organizational leadership and DEAI change leaders interviewed in this organization rarely mentioned the work of this employee or named her as someone doing DEAI work. In contrast, organizational leadership focused on new DEAI work, predominantly led by White staff who mostly did not identify themselves as leading the change. Additionally, the employee herself described feeling the need to obscure her own work out of concern that other employees would see her calls for change as self-serving; "*I don't need to be at the front of it because otherwise it comes across sometimes as tokenism...Because I am Black. I am female. I am a boomer. And it comes across sometimes as well, she's doing this because it benefits her. So my work is better behind the scenes.*" The divergent visions of *who does* and *who can do* DEAI work between organizational leaders and staff of color at this organization

reveals how emotional labor and official labor of marginalized staff is lost or unseen in official narratives of what DEAI work is.

Across all organizations, marginalized staff described feeling and being discouraged from enacting DEAI changes. One staff member shared how their concerns were brushed off more than once, leading them to conclude, *"I feel like when things...are brought up they just do the best to kind of pacify you and then hope it just kind of passes."* Some staff told stories of proposing DEAI related actions within their work area, only to be denied because of the resources necessary to enact those actions. For example, a woman of color responsible for public facing events described her ongoing idea around hosting celebratory events during holiday seasons other than Christmas in order to be more inclusive of the many local cultural communities, including the holiday seasons she culturally identified with. Having been denied on numerous occasions, she observed in her interview, *"Very few of us could speak to cultural diversity here and because it's so few, I think it doesn't get heard as much. I think it would be cool to be heard and to be allowed to progress with some of the ideas that we have."* This statement invokes that the organization is generally homogenous ("very few of us") in terms of cultural diversity, meaning ideas relevant to cultural inclusion do not arise frequently ("doesn't get heard as much"). When they are brought up by people who identify as non-dominant culture ("ideas that we have"), they are either not really heard ("it would be cool to be heard") or denied ("allowed to progress"). This process, generated at the intersection of organizational power and societal privilege, results in a continuation of the status quo, despite the opportunity for DEAI related alternatives.

A persistent organizational narrative in the ISE field is uncertainty about what are possible DEAI changes or how to enact them. The two stories above exemplify the ways this type of narrative is obscuring the efforts of marginalized staff, both in terms of work they are doing and work they proposed that was denied. The ISE field is stuck in a cycle (identifying the DEAI crisis, feeling unready to address it, and ultimately perpetuating the status quo) that was well described by an employee talking about their organization's racial homogeneity: *"I was talking to a coworker at my other job. I was like, "When I first started working at the museum, I was like, 'It's really White. It's really White.' The frustrating thing is that it's really White, and White people who are the kind of people who believe that there should be more diversity, equity, and inclusion and have the power to do so and, yet, it is still very White."*

Impact of "Low Hanging Fruit" and Training Default

As the ISIs in our study enacted official DEAI work, we saw a pattern of starting slowly with the intention of building up speed. In one interview, an institutional team member described this as an intentional strategy by their group and referred to it as tackling "the low hanging fruit" -- starting easy with "nonthreatening" ideas like communication norms-- where they knew they could be successful, along with pushing out content through trainings. This is not to say that there was no hard work involved. What makes these efforts the easy place the start is they can be accomplished with minimal disruption; they don't involve a lot of changes, the loci of control is

largely on the individual (you can do most of these things without having to acknowledge systemic injustices or trigger change in other arenas), and typically tied to the experience of external audiences. Other examples include the use of gender-affirming pronouns and changing bathroom signage to address the fluid nature of gender/sexuality, lowering admission costs to encourage broader participation, including racial representation in marketing materials, translating certain materials into languages other than English (the default is usually Spanish), tending to physical accessibility in spaces, and using concepts like neurodiversity to explain how various people experience and make up society. Changes that centered on internal staff experience tend to focus on improving interpersonal communication and acceptance of "behavioral norms" for conducting meetings. There was a hesitancy to confront and take on more complex changes that center those who are invisible and call on ISIs to interrupt the oppressive power dynamics that reproduce privilege and power. Confronting low wages, confronting a single story presentation of STEM, confronting and resolving the conflict between equity and mission, and re-norming professionalism are drastic systems changes that go beyond abstract liberalist ideology (Bonilla-Silva, 2010) .

However, those more complex changes were at the center of marginalized staff's descriptions of necessary DEAI changes at their organizations. One individual acknowledged that while wage equity is not a problem unique to museums, "...*as a cultural institution, in a lot of ways, we want to be a leader, and right now we're falling behind. [...]where I haven't heard that conversation [about wage equity] is in the white-collared jobs."* Across our five focal organizations, marginalized staff echoed feelings of dismay that the effort being put into the "small steps" and "low hanging fruit" directed attention and resources away from the more complex systemic work. Specifically, marginalized staff called out organizational issues concerning microaggressions and tokenism in organizational culture and policy issues related to pay equity and staff retention - particularly for marginalized staff. The palpable frustration from our interviews with marginalized staff across organizations is evident in how they describe what they perceived was prioritized in lieu of critical systemic internal DEAI concerns --external audience experiences and "sugarcoated" trainings to appease majority identity staff.

The usual approach to addressing DEAI, whether reaching for low-hanging fruit or as a way to start working on the harder issues, was through training. Training was discussed in an earlier finding that described it in terms of the structural rut where the ISE field has found itself stuck. Here, the ramifications of relying on individual transformations alone (without clarity of vision for deeper systems change) are discussed in terms of impacts on marginalized staff. Generally, the intention of training was to generate urgency for DEAI issues and improve organizational "readiness" for DEAI change. However, these trainings were designed as a single structure, meaning those attending the training - frontline staff to organizational leaders, individuals with societal privilege and individuals experiencing intersecting axes of oppression - experienced the exact same programming. Underlying assumptions of a uniform training design, intended to foster a mindset shift, is that all participants are mentally dominant culture (White, able, cis, heterosexual, male, wealthy, etc.) and everyone needs the same degree of aid in generation of urgency, when in fact different audiences have different needs. For example, one staff person

described feeling like trainings didn't go far enough in tackling difficult issues because of the identities in the room: *"Some topics we talk about. You kind of got a taste of what they were really trying to get at. We didn't quite get to that extreme discomfort level which personally kind of wished we did being that I live that life."* One institutional team member voiced their belief that *"nobody has ever even thought about systems thinking"* prior to offering trainings at their organization --something they positioned as necessary for organizational readiness. At another organization, the training focus on communication tools as the de facto internal DEAI change was justified with *"if we're going to shift the culture in any way then we have to kind of learn how to see and navigate each other as individuals."* In each of these cases, the intention is noble; starting difficult conversations, understanding systems thinking, and helping staff see each other as individuals are positive things within an organization. The problematic aspect is not acknowledging the diversity of experiences and knowledge within the existing workforce by assuming everyone is starting at the same place -lacking the knowledge, skills, and urgency necessary in DEAI work.

In their interviews, some marginalized staff described feeling that the focus on training as a medium for sustained DEAI change had not sufficiently addressed equity in organizational culture. Training topics and tools centered more on individuals' behaviors. Based on earlier findings about the role of leadership, vision, and coalitions, this meant staff experiencing the training walked away more often with a sense of limited, if any, ability to contribute to changing broader organizational policies necessary to disrupt harmful systems.

> *"Sometimes, I get frustrated with the 'now what,' which is out of my control. Like, 'Are we gonna make a committee?' or, 'What's our next plan for the next year?' That stuff is out of my control, which can be frustrating, but I realize it's not my thing to do right now."*

One interviewee at a large organization stated: *"I feel like it's more of a personal groundswell if the training moves you and encourages you, there is movement happening. Not necessarily coordinated top down but definitely from individual experience affecting how different people do their jobs."* And a similar sense can be gleaned from staff at one of the smaller sites we visited: *"I mean to be honest [change] hasn't really been institutional, it's been individual. [For example] my coworker can be kind of pushy and all these other things, and after the training he sort of flipped; he became helpful, he became thoughtful. You could tell he would think before he spoke or reacted. So it isn't like an institutional change, but I do think it changed the way he at least processed and the way he acted around people. Institutionally I don't know if we really had much – I don't feel it yet."*

Comments reflected that ISIs typically managed sharing knowledge through training and seemed to view DEAI change work as built on the same method of disseminating content. One staff person related: *"It's a very top of the pond type of thing where we identify that there are these different things. There are safety trainings that we need to do. There are equity and inclusion trainings that we need to do and onboarding training that we need to do."* As discussed earlier, content dissemination is not well aligned with reflection or seeking deeper understanding

inherent in DEAI work, and is further illustrated as the same staffer continued, *"It's all surface type of trainings. I don't feel we ever get deep into how things work or how people work."* Additionally, above we described that ISIs typically used trainings to achieve specific DEAI impacts regarding external audiences, which is often perceived as easier with less conflict than addressing issues that arise from organizational culture. This risks overshadowing or erasing internal issues, as described by staff at one of the smaller research sites that considered, then did not tackle gender dynamics: *"internal's gonna be [hard] because we're so small, it's gonna be a little more painful. It's gonna be more obvious, if people get called [out]."*

What are the consequences of reaching first for the low hanging fruit, waiting to be better prepared for more complicated issues, or looking to training alone as the answer? Despite the positive intentions and general goodness of working on better interpersonal communication, more expansive gender pronouns, and even norms designed to disrupt typical power and status dynamics --all still had the result of centering change in the experience of those who are already privileged by the tacit logic of dominant culture supremacy like the tokenism described by a volunteer coordinator whose organization had committed to "doubling down" on accessibility yet balked when faced with possible discomfort:

> *"Okay, this person has a need. They would be a fantastic volunteer or staff person. They can do 98 percent of the job. This two percent right here, they're going to need an accommodation. Okay, well, if it's a simple ordinary accommodation, we're all for it. But, if something's a little different, then there's been pushback, which I found to be unexpected and frustrating. Because I'm like, we have this training and we have us, and we're all double downing on this. We're all about it now. Oh, you're afraid that she is going to do something, and if she does that, then the public's going to be concerned, and it's going to, like, scare children."*

Where official organizational change did not address the priorities of marginalized staff, their own emotional labor filled the gap, producing continual dual oppression. This is not just about moving slowly and with intention, but what ISIs choose to focus on. What is chosen to be focused on can be perceived as moving slowly and failing to truly see or acknowledge that there are staff who have to figure out how to survive both inside and out of the organization. This sentiment is clearly articulated in one staff person's comments about how it felt as an individual with multiple minority identities watching their organization try to balance institutional comfort with needed actions: *"that's good that we're even having these conversations and we're talking about it, that's great, but I still exist and like we still should be changing things now, because continuing to ask marginalized people to wait for people to catch up and feel good about it is still oppressive."*

Intentional or not, this overall lack of acknowledgement causes damage to individuals and the organization as it navigates change beyond the issues of dual oppression. When an ISI doesn't address riskier themes, it puts the burden on certain types of people to exist in the status quo even though it is harmful to their very existence.

Recommendations

This research revealed that both the actions taken at sites following their PD experience, to do training and focus on content dissemination, and the challenges faced during implementation were relatively consistent across the 5 focal sites; but overall it does not appear to be for lack of resources or options. The core PD program explicitly instructed participating organizations to identify their unique DEAI needs and tailor change efforts to match. Each organization had the benefit of additional financial support from the grant and had formally dedicated their own resources, particularly staff time, to support DEAI work. The consistent patterns of tensions, attempted change actions, and mismatched intent and impact speaks to these as field-wide realities, not the product of individual organizations or individuals at organizations. Each organization investigated took concerted, difficult actions in attempting change at their organizations, and their experiences of difficulty can and should inform others who seek to do this work.

Our research highlights tensions that arise and impede change efforts when organizations are intentionally tackling DEAI issues. Specifically, we highlight tensions that arise from existing organizational structures that are shared across the majority of the ISE field. Normative structures of hierarchy and staffing produced a reliance on staff training despite the presence in organizational history of alternative visions for DEAI change. Existing organizational mission statements do not explicitly emphasize DEAI work, requiring deliberate communication connecting the two. Discomfort with pushing beyond culturally dominant knowledge systems in STEM hampered discussion within organizations to interrogate the nature and culture of STEM even though this tension extends beyond the walls of ISIs. ISIs will be in a better position to plan and manage future DEAI organizational change with these structural challenges in mind.

The lived experience of organizational change also revealed a set of tensions related to enacted change. Risk aversion embodied as concerns about getting DEAI work "right" resulted in decision-making about "low hanging fruit" being the focus on DEAI change without a plan for consolidating and extending those small wins into more thorny, system-level changes. Hierarchical power dynamics charted challenges at multiple levels of change, from defining who is responsible to signalling how important DEAI "actually" is. The lived experience of change can be particularly harmful to marginalized staff who carry the additional emotional labor of navigating within the system level changes the organization is not taking yet.

From this research, a few recommendations arise for ISIs intending to generate organizational change related to DEAI. Specifically, we raise 4 guiding questions related to change processes: what progress have you made, where do you want to be, how are you getting there, and who is doing the work.

What Progress Have You Made?

Take time to pause and reflect before making decisions about DEAI change. By looking back at (and seeking out) what your organization has already accomplished, and by whom, you are able to recognize where change has already happened (and may still be happening) and think about what else can be done to continue building on and amplifying progress that is happening across your institution. As you reflect on your institution, take a step back to see the bigger picture and reflect on the current state of DEAI within the field. Zooming out and linking your institution's progress to what is happening in the field can also help you pay attention to things that might impact your institution's DEAI changes and allow you to place your organization's progress within it. With this clarity and understanding, you can set a vision that makes sense for your organization's needs.

Reflecting on successes (and even challenges during those successes) can also help build momentum and support learning for future work. There are many ways to capture the big picture, such as through measurement or with storytelling. A few examples of areas you might look at or pay attention to when reflecting about what has already happened are: how your organization has or paid attention to a particular axis of oppression, interrogating organizational policy, or reaching out for a wider variety of perspectives on organizational need.

Where Do You Want To Be?

Actively and continually (re)define, and keep communicating, a change vision during planning and during implementation. A vision for the change acts as a guiding star, providing direction for the primary change coalition and other organization staff about how to be part of the change. The vision should be specific and include a direct tie back to the larger organization mission statement. Organizational leadership must develop or actively amplify - meaning full support and repeated pronouncement in lieu of authorship - the change vision in order to communicate it as an organizational priority. Identifying and including clear, perhaps measurable[4] outcomes as part of the change vision can help an organization be accountable to its own change goals. Language used should be straightforward, so that any one in the organization is able to explain it back to themselves or to each other.

Developing a change vision may involve focusing on a particular axis of oppression. Start by looking for signals of crisis that may have been previously overlooked. For example, if staff of color have faster turnover, that could be the unstated voice of a crisis which can be the vision of change. At all times, avoid placing sole responsibility on marginalized staff to identify issues, which can perpetuate dual oppression and cause other unintended consequences that derail DEAI progress.

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[4] Measurable goals can help organizations agree on key efforts and track their progress. But also: not all changes that are important are measurable or should be measured. For instance, reducing microaggressions on minoritized staff is a great goal, but asking staff about these could double the negative impact on staff who experience them.

How Are You Getting There?

The ISE field needs to disrupt the default to training mentality for the complex work of DEAI change. Training can be an important piece of enacting organizational change, but is not necessarily the most effective means of achieving that goal--especially when used alone. The apparent default status of training in the ISE field means that change coalitions need to think critically about if, where, and how it is being used. Before pursuing unilateral staff training, and if you haven't considered this already during your reflections of your organization's progress, revisit your desired outcomes, audience, and past or ongoing DEAI work. Will a training approach meet your desired goals? Does a training match with your pedagogical assumptions overall (for museum visitors, for instance)? What do museum staff (paid or unpaid) already know and bring with them to the training? Will staff be able to enact the change you envision? Are you using training as dissemination or sustained work?

Beyond trainings, consider a variety of change tools in relation to an overarching change vision either to supplement or replace knowledge dissemination, such as: implementing a DEAI inventory to account for and acknowledge the work (and the staff doing it) that is already underway; mapping specific organizational culture or policies to the oppression they perpetuate; developing a system to gather internal feedback about what staff feel are the most urgent priorities and check in on progress along the way; setting goals for diversifying board composition and reassessing requirements for joining the board; reporting to all staff on equity work and progress; and developing and organizational structure and procedures to review grievances and complaints from marginalized staff.

Who Is Doing The Work?

As you engage in DEAI work, attend to and promptly address staff positionality and leadership as it comes up. The CTLT Indigenous Initiatives describes positionality as "how differences in social position and power shape identities and access in society." In carrying out DEAI work at ISIs, this means recognizing that while all staff have a part in the change, involvement does not look the same for everyone because of their positionality. Disrupt default responsibilities by discussing expectations (assumed and unassumed) of staff in advancing DEAI in the organization, even if it causes discomfort for staff who may identify with dominant culture norms. Many times, as noted in our research, staff with marginalized identities are already doing a lot because of their own sense of personal urgency for social change. Start by asking yourself, who is usually expected to be the one(s) caring about DEAI in the organization and why? How can this change, or not? What factors may shape someone's agency/ability to do this work at your organization? What can be done to share more of the responsibility for DEAI change?

Organizational leadership support for staff needs to be vocally official and visibly present. Pay attention and note how staff participation takes place--who is bringing up DEAI in strategic meetings? Who gets to give input on change ideas? And when? Who might not be engaging and why? Are staff putting themselves at risk in any way by choosing or not choosing to participate?

As this work is about dismantling systems of oppression, make a commitment to engage in perspective taking often to recognize how staff with marginalized identities may understand and respond to DEAI because of their lived experiences. Questions that can support this kind of critical inquiry, while taking care to not put the onus on these staff to provide the answer, include: whose voice is missing? What efforts are not being acknowledged or even dismissed? Which ideas and feelings are being centered in this moment?

Limitations

In carrying out this research, there were limitations that we acknowledge.

In order to dive deeper into our research, only 5 sites were selected for research case studies. While this did allow us more depth in understanding what DEAI efforts at ISIs can look like, we know that these sites do not represent the overall and totality of experience for all sites who participated in the PD program and their organizational DEAI work. Additionally, as described earlier in this report, the criteria that we applied to sites for eligibility in the study narrowed the pool to participants in cohorts 1 and 2. We acknowledge that the PD program adapted based on what was learned from one cohort to the next to adjust programming developed for teachers and school administrators to better suit ISI staff and organizations. As a result, participants from latter cohorts responded and shifted in ways that are not fully captured here. Yet, we still find that the research presented is relevant for and reflective of where many organizations and museum professionals find themselves in the ISE field.

While we were able to collect data from a variety of sources and individuals during our two-day site visits, the duration of our time onsite represents only a fraction of the life of an organization, as such our data constitutes a snapshot of each institution in the midst of ongoing work. In addition, the staff interviewed at each site did not include or represent the entire institution due to practical scheduling and budget limitations of this project; a longitudinal study with ethnographic data would have provided a more complete picture of DEAI work and change at each institution that participated, including different perspectives of tensions and successes.

As we prepared to share parts of our research with sites through member checking in the early spring of 2020, we were forced to pause this work due to the Coronavirus pandemic when our institution along with each of the institutions who participated in site visits closed to the public and/or reduced operations in March 2020. As a result, member checking was delayed by more than six months. During this hiatus, many institutions experienced significant staff reductions (on top of the usual rate of staff turn over) due to financial hardships. This meant that many staff who participated in interviews during the site visits (especially those in public-facing and part-time roles) no longer worked at these institutions and could not be reached by the research team for their feedback and perspectives when we were able to resume member checking in Fall 2020.

Conclusion

Museum practitioners have spent the past three decades elevating the need for DEAI change in the field. As a result, the value and necessity of this work in ISIs has been recognized more broadly, and many organizations have taken steps to prioritize and address DEAI issues. What was known going into (and was further confirmed by) this study is despite the groundswell of support for the goals of DEAI work, success is elusive because the work is complex and has had relatively little scaffolding on which to build. Like much of the field, past and present, the organizations we highlight in this project are carving a path to greater equity by actively figuring things out on their own as well as with guidance and support from experts. It is essential that the field approach the experiences we've documented through this research as learning opportunities on which to build future DEAI change initiatives. We are profoundly grateful to all of the participant sites for their willingness to share their stories in a way that can provide insights for other ISI's as well as they chart their own DEAI paths as well as contribute to a better understanding of the ISE field.

It is key to remember that this project began with the premise that a professional development program that had proven popular with and shown promise in supporting sustainable system-level DEAI changes in school settings could be adapted to produce similar outcomes in museum and ISE settings. This study was not designed to be a direct comparison of what occurred in informal education settings compared to formal. Rather, our initial intent was to focus on the features of those settings that contribute to making the work easier or harder in order to inform program adaptations. It comes as no surprise that DEAI work is hard in either setting, but our early work revealed that even with adaptations, outcomes at ISI's look different on account of the ways they differ from schools in terms of structural organization, mission, professional preparation, and audiences.

Our work shifted to focus on documenting those outcomes specific to ISE settings and describing the experiences at each organization that lead to those results. In describing ways that a diverse group of ISIs --each committed to and invested in DEAI work-- did and did not change, we bring to light common assumptions and challenges across the field. This work offers the recommendations above to museum staff and leaders who want to undertake, improve, or refine their own DEAI work.

We see the findings from this research as a key step in developing an understanding, across the ISE field, about reasonable expectations for change, but there is a great deal more that we don't understand. The research and practitioner communities should partner to build on this work. In particular: understanding what happens in organizations that are *less* committed than these (which might be particularly hard, since those organizations might not want to participate), and understanding what happens in organizations that explore options beyond training or have moved past the steps described in the recommendations. Further opportunities for research include understanding why training is the default/why it has such prevalence in the ISE field, an

ethnographic perspective of how the Kotter model for change is/could be used to understand DEAI efforts, what makes change in museums easier compared to schools or municipalities, what factors contribute to the DEAI outcomes from watershed moments in organizations, and what else beyond this study's PD programming contributed to DEAI success at ISIs (things we heard about during our site visits but had to set aside because it was outside the scope of this research).

Positionality

As qualitative researchers, the research team recognizes the importance of revealing potential sources of bias, particularly bias entered into the research project because of the researchers' identities and experiences. The research team brought their individual and collective positionality to this project, and these individual and collective backgrounds inevitably influence the research. To begin, all four researchers are housed at a science museum; while this allows for greater understanding of the culture of the museum field as we are participants in it, we also have experienced DEAI change attempts ourselves enacted by our institution. Our own lived experience of DEAI change in a museum setting creates empathy for the experiences of our participants. At the same time, being aware of what is imagined for museum DEAI, there are high aspirations concerning what museums can do. Approaching this work, we endeavored to applaud successes as well as identify areas where challenges stymied change efforts. We recognize that these are sometimes contradictory impulses. However, both small wins and small misses are important. Individually, we were all drawn to this work through our own experiences as educational practitioners, youth development professionals, and generally people who see the disparities in educational outcomes and opportunities as a crisis in our society. These positionalities inherently inform the research setting, questions, methods, and conclusions, and by naming them, we seek to document their influence and our tactics for reducing the bias.

Appendices

Appendix A: Site Visit Interview Protocols

Staff Interview

1. **Please tell me a little bit about yourself as staff at [ORGANIZATION]**
    This is a brief question. Less than 5 minutes. Just need overall context
    - How long have you worked here?
    - What is your role here?
    - What does your work look like?

2. **Can you describe what it feels like for you to work at [ORGANIZATION]?**
    - How does work get done?
    - What is a one word description of your experience here (e.g., busy, joyous, invigorating, draining)?
    - What is rewarded here?
    - Is relationship-building valued?
    - How would you characterize leadership here?
    - Do you feel safe taking risks? Is it safe to fail?
    - In what ways do you feel like you are able to contribute to [Organization's] mission?
    - How, if at all has that changed since you started working here?

3. **What kind of DEI work has [ORGANIZATION] done during the past 5-10 years? (it's okay if you aren't aware of any)**
    This is more of listing of what the respondent knows and we don't need to dwell or extract copious amounts of information. Plan to spend to spend about 2-3 minutes on this question
    - What were the results?

4. **Are you aware of any larger scale things going on at [Organization] that started out as iPAGE team ideas? What kinds of changes or shifts is [Organization] trying to make as a way to be a more inclusive/equitable place? I'm interested to hear about things that have been successful or not, easy or hard, safe or risky, etc.**
    - Where: Is it HR? Exhibits? General Org culture
    - How: Does it involve policy changes? Norms? Trainings? Sharing content?
    - What: Which lens?
    - Experience: Was it easy or hard?
    - What was the organizational response to the change/activity?

5. **Why do you think the team chose to focus on those things?**
    This question is all about how D&I work (and options) gets prioritized. Trying to understand why do some changes happen while others never take off.

- What was the intended outcome?
- How has change been prioritized?
- What is seen as urgent?
- Where have priorities been in conflict?
- What do you think the [Organization] should be addressing?

6. **Let's focus on one of those things/changes/initiatives where you feel [Organization] is really making progress. Can you describe how it developed?**
     - Who has been involved?
     - Who instigated the change/effort?
     - What resources have been necessary?
     - What was hard?
     - What was surprising?
     - Where has it been taken up?
     - Where have you been aware of resistance?
     - Risks? What have you learned?
     - What structures/systems have helped/hindered?

7. **Now let's shift to talking about one of the things/changes/initiatives that has been very tricky, complicated, slow to get off the ground or maybe even fizzled out. Can you provide some more context about that effort?**
     - Who has been involved?
     - Who instigated the change/effort?
     - What resources have been necessary?
     - What was hard?
     - What was surprising?
     - Where has it been taken up?
     - Where have you been aware of resistance?
     - What risks have been involved?
     - What have you learned?
     - What structures/systems have helped/hindered

8. **What, if any, smaller scale (e.g., individual, group, department) things has the iPAGE team (or members of the team or you) focused on doing to change or shift [Organization].**
     Also make sure to get enough detail to understand what the efforts are focused on
     - Where: Is it HR? Exhibits? General Org culture
     - How: Does it involve policy changes? Norms? Trainings? Sharing content?
     - What: Which lens?
     - Experience: Was it easy or hard?
     - If they give two hard things, ask if they can think of something that was relatively easy. If they give to easy things, ask if they can think of something that has been hard.

9. **Who at [Organization] comes to mind when you think about who is leading this kind of work?**
     - What kinds of things have they done to make that happen?
     - How did they get involved?
     - How would you describe their leadership style or the <u>way</u> they lead?

10. *(If they haven't brought up Champion organically)* **[Champion name] is part of the iPAGE team and has been identified as someone who champions this work for organizational change around DEI. What has been your experience/impression of their activities?**
- What are some of the things you are aware of that they have done connected to DEI?
- How would you describe their leadership style or the way they leads?

11. Do you feel like you are able to lead change in regards to equity? Why/why not?
- Do you see yourself as a leader?
- Do you think others see you as a leader?

12. What do you see as the purpose/goal of science museums/ISEs in general?
This question is about identifying priorities for change among staff.
- What do you think [Organization]'s goals are for presenting STEM?
- How would you describe an ideally operated ISI?
- How close does [Organization] come to meeting that ideal?

Team Champion Interview

Research Question 1b
What are the actions of Champion participants as their respective organizations shift according to the iPAGE framework, and what role do Champions play in the overall iPAGE model?

*Purpose of this interview
- To hear a Champion <u>describe their vision</u> for organizational change
- To understand how a Champion <u>conceptualizes agency</u> in doing equity-focused work
- To discover the Champion's <u>approach to mobilizing</u> staff/resources towards organizational change within the field of informal science education (ISE)

The iPAGE program has been described as a program designed to prepare *institutional teams of change agents* to shift institutional culture with respect to inclusion, diversity, equity, access and leadership. Efforts toward this end are grounded in the iPAGE Framework for equity and access which focuses on Systems of Oppression, Belief Systems within STEM and Informal STEM Education, and Leadership for Complex Systems.

All of the ideas mentioned above can be grouped into the broad term of "equity and inclusion" but we realize that there are many specific concepts that are captured under that term.

This interview will focus on understanding your vision for organizational change in doing STEM equity work. In particular, you will get an opportunity to share what a change agent means to you, reflect on how you are a change agent as an iPAGE Champion at your organization, and share your particular strategies when it comes to leading and creating equity-focused change within an organization.

1. Characteristics: Background, Beliefs/Values, Experience
What comes to mind when you think of a "change agent?"
- What would you say are the qualities of a change agent? How does a change agent take action? What are some beliefs or values that a change agent would embody?

- Is there someone in particular who comes to mind when you think about who a change agent is or might be? (this can be someone within organization or external)
  - What is it about him/her/them that makes you think of them as a change agent?
  - What kinds of things does s/he/they do that makes them a change agent?
  - What kind of knowledge do you think she/he/they have that makes them a change agent?

Thinking about your role as an iPAGE Champion at [organization], how much do you think of yourself as a change agent, in the ways you've described, when it comes to shifting internal organizational culture?
- What are some stories or examples of how you have been a change agent with your leadership? Make sure to emphasize that the focus is on internal organizational culture, not external audiences or stakeholders.
- Has your understanding of yourself as a change agent within your organization changed at all before iPAGE to now?
  - If yes, what part of iPAGE contributed to any changes. If no, why is that?
- What additional support, if any, would you have liked to receive from the iPAGE program that would be useful in carrying out this change agent role, especially as a Champion?

2. Approach/Pedagogy To Creating Change
What, if any, expectations exist for you to lead change in doing STEM equity work, in particular? By whom?
- What do you expect of yourself in leading this kind of change?
  - How does that align with what is expected of you?
- What do you expect of others in doing this kind of change?
  - What are the main messages you communicate to staff to express these expectations? (e.g. equity is everyone's job, the nature and culture of STEM is inherently biased so we are called upon to change it)
- When considering your internal organizational culture, how would you describe your approach to motivating staff to think of themselves as change agents, i.e. they are able to bring about organizational change?
  - What are some stories or examples you can think of to illustrate the things you've described in your approach?
  - Besides what you've learned in iPAGE, are there any particular strategies you use, philosophy/theory/ideas you pull from, authors you reference, etc. to inform your approach?
- What/where are the places of support in/at [organization] to move STEM equity work forward? Where are the places of struggle? Who is alongside you in this process?
  - If they have only focused on external stakeholders/audiences and visitors, prompt them to also consider the internal organizational culture and how it relates to overall STEM equity work.

3. Closing
- Do you have other insights to share about the STEM equity work happening at [organization]?
- Do you have other insights or feedback about what you've gained from participating in the iPAGE program?

Appendix B: Observation Protocols

Meeting Observations

Focus:
- ❏ iPAGE
- ❏ Non-iPAGE

Meeting Goals: *Key issues and themes*
Agenda: *How is it communicated?*
Facilitation: *How is it handled? Who moves things along?*
General characterization of the space: *Furnishings, technology, windows, aesthetic, decor*
General characteristics of the meeting: *How did it feel? Are people paying attention? Do people ask questions? What seems to be "the norm?"*
Outcomes or decisions

Reflection Questions:
1. **Describe any interactions related to status**
2. **Describe if (and how) participants exhibited leadership behaviors (facilitating, delegating).**
3. **How did things get done?** *Did there seem to be articulated/unspoken norms that structured how people were expected to respond?*
4. **How, if at all, might this group be challenging underlying beliefs, values, assumptions, or norms? (This can be on multiple levels, e.g., personal, organizational, field-wide.)**
5. **How, if at all, did equity come up?**

Participants:

Name/Role/Demos	Language	Behavior	Quotes

Unstructured Observations: Public Spaces

Date:
Time:
Location:

1. **General characterization of the space.** *How does it make you feel? Is it noisy/quiet, warm/cold, austere/colorful, cheerful/blah?*
2. **How is the space are arranged and set up?** What are assumptions that might be made by organization? *What might the physical space communicate to different groups visiting?*
3. **How does the public use the space?**
4. **What do you notice or experience when you first walk into the building/campus? How is the lobby set up and way-findinging provided?**
5. **How is STEM articulated and presented?**
6. **How is mission/vision manifested?**

Unstructured Observations: Non-Public Spaces

Date:
Time:
Location:

1. **How are non-public spaces are arranged and set up? What does it feel like in the space?** *(From interview or casual conversation -- how do people explain the reality of their work environment? Why do they believe or think it's set up the way it is?)*
   a. **Floor plan - generally -- same as with public spaces. What do you notice or experience when you first walk into a space?**
   b. **Who sits where? Both in the immediate area and in the building overall**
   c. **How easy or hard is it to get from one place to another?**
   d. **Is it easier for some people to work together than others?**
2. **How do staff exist in the space?**
   a. **Hallway conversations?**
   b. **Are there doors to close?**
   c. **Do staff talk about feeling siloed?**
   d. **Do people work independently or in groups?**
   e. **Do all work spaces have a similar feel? Do people have thoughts or explanations for that?**

Appendix C: All Staff Online Survey

Thank you for your willingness to participate in this survey!

The purposes of this survey are to:
1. Support strategic work at your organization concerning institutional equity;
2. Engage all staff working at your organization to share their varied perspectives on their work and experiences with equity initiatives;
3. Inform the iPAGE research project – a project that examines how Informal Science Education organizations implement and sustain institutional change as a result of participating in the iPAGE professional development program;

This survey will not judge or assess where staff are at in terms of equity, we are asking staff to reflect on how equity influences and impacts their work at your organization.

What you should know about this survey:
- This survey is optional --you can stop or skip questions at any time;
- Your responses will not be recorded until you click the "Submit" button on the final page of the survey;
- There are no right or wrong answers --Your honest answers are essential to the equity work of the organization;
- The survey takes less than 3 minutes to complete, on average;
- We will share a summary of the results from the survey with leadership at your organization and work together with them to interpret and make meaning of the findings.
- Your responses will be anonymous, and anonymity will be ensured through the following means:
    1. The raw survey data will not be available in any form to any employee of your organization;
    2. The data will be analyzed, aggregated, and stored by the Science Museum of Minnesota; and
    3. For the analysis and sharing of survey data, there will be no groupings of data by identifying characteristics (racial identity, gender, years of service, etc.) of less than 30 individual responses.
- Neither participation or lack of participation in this survey will affect your job evaluation -- there will be no way to track who completes the survey;
- There is minimal risk of harm in taking this survey. There is the potential for individual open-ended responses to be identifiable in their tone or content, and there may be some anxiety from recalling professional or personal experiences concerning equity.

This study is being conducted by research and evaluation staff at the Science Museum of Minnesota as part of an NSF AISL Research Grant (Award No. 1612640). If you have any questions about the iPAGE research study, feel free to email anyone on the iPAGE Research Team:

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Megan Goeke - mgoeke@smm.org

If you have a question that you didn't think of now, you can always ask later.

If you have questions about your rights as a research participant or related concerns, or to provide input on the study, you may call Heartland Institutional Review Board toll free at 866.618.4472 or email them at info@heartlandirb.org.

This project has been reviewed and approved by Heartland Institutional Review Board (HIRB No. 160531-22). Questions concerning your rights as a participant in this research may be addressed to: Heartland Institutional Review Board – Ph: 866.618.4472; email: director@heartlandirb.org

By clicking "next," you are agreeing to take this survey.

Definition of Equity
This is a survey about how staff at Informal Science Education organizations relate to equity. For the purpose of this survey, a basic definition of equity is *ensuring that everyone has access to what they need to be successful.*

A more specific way to think about equity is as: "a situation where a person's identity does not play a part in the way they experience policies, practices, or attitudes (for instance, educational, economic, and social differences) in their life."*

*Drawn from the Racial Equity Resource Guide. (2012). American Healing. W. K Kellogg Foundation. The original text reads: "The condition that would be achieved if one's racial identity no longer predicted, in a statistical sense, how one fares."

1) How much do you agree/disagree with the following statements?

	Strongly Disagree	Disagree	Agree	Strongly Agree
Equity is relevant to the work I do at my organization.	( )	( )	( )	( )
I am aware of actions my organization is taking towards greater equity.	( )	( )	( )	( )
My organization urgently needs to address equity practices that impact staff (for example, organizational culture).	( )	( )	( )	( )
My organization urgently needs to address equity practices that engage the public (for example, through exhibits and programs).	( )	( )	( )	( )

2) In the last two years, have you participated in or attended activities, workshops or, trainings at your organization that address equity?
    ( ) **Yes**
    ( ) **No**
    ( ) **Not sure**

Hidden unless: #2 Question is "Yes"

3) In the last two years, have you changed any of your work practices because of something you've learned through those activities, trainings, or workshops about equity?
    ( ) **Yes**
    ( ) **No**
    ( ) **I'm not sure**

4) How much progress do you feel has been made towards greater equity at your organization during the last two years?

If you have been here less than 24 months, please consider your perception of progress during the time you have been with your organization.

      ( ) **None**
      ( ) **Not much**
      ( ) **Some**
      ( ) **A lot**

5) Is there anything else you'd like to share more about, or something we didn't cover in the previous questions?

Following are a few questions about you so we can better understand your role at your organization.

As a reminder, these responses are collected anonymously and will only be reported on if there are 30 or more individuals in a category and then only as part of aggregated groups; however please skip any questions you do not want to answer.

6) Which of the following best describes your employment status at your organization?
      ( ) **Volunteer**
      ( ) **Part-time**
      ( ) **Full-time**
      ( ) **Other - please describe**: _____

Hidden unless: #6 is "Part-time" or "Full-time".

7) Are you a manager?
      ( ) **Yes**
      ( ) **No**
      ( ) **Prefer not to answer**

8) How many years total have you been employed or volunteering at your organization?
      ( ) **Less than 1**
      ( ) **1-2**
      ( ) **3-9**
      ( ) **10-19**
      ( ) **20 or more**

9) What percentage of time in your daily role is devoted to interacting with visitors or otherwise being visitor-facing on site at your organization?
      ( ) **Less than 25%**
      ( ) **25% - 49%**
      ( ) **50% - 74%**
      ( ) **75% - 100%**

These last few questions are demographics. We are asking them to help us understand how people of different ages and identities experience and think about equity in informal museums.

10) How old are you?
      ( ) under 18   ( ) 18 - 24   ( ) 25 - 29

( ) 30 - 34	( ) 45 - 49	( ) 60 - 64
( ) 35 - 39	( ) 50 - 54	( ) 65 +
( ) 40 - 44	( ) 55 - 59	( ) Prefer not to answer

11) Which of the following racial/ethnic identities apply to you? (please check all that apply)

[ ] **American Indian/Native American/Alaskan Native**
[ ] **Asian**
[ ] **Black/African-American**
[ ] **Hispanic/Latinx**
[ ] **Native Hawaiian or other Pacific Islander**

[ ] **White or Caucasian**
[ ] **Multiracial (unspecified)**
[ ] **Unsure**
[ ] **I identify with a group not listed here**:
[ ] **Prefer not to answer**

12) Which of the following gender identities apply to you? (please check all that apply)

[ ] **Woman**
[ ] **Man**
[ ] **Transgender**

[ ] **Non-binary**
[ ] **Prefer not to answer**

Thank you for completing this survey. Your responses are vital to helping us understand and catalyze change around equity in the field of informal science learning.

Your answers will only be recorded after you advance to the next page.

Appendix D: Consent Forms

[**YOUR LETTERHEAD**]

Gretchen Haupt
Department of Evaluation and Research
Science Museum of Minnesota
120 West Kellogg Blvd.
Saint Paul, MN 55102

[DATE]

Dear Gretchen Haupt:

This letter concerns [ORGANIZATION NAME]'s participation as one of the sites contributing to the iPAGE research project (NSF award #1612640) case study of organizational change and culture in the Informal Science Institution (ISI) field. I understand that participating in the research in this way will involve an onsite visit from 1-2 members of the research team at the Science Museum of Minnesota (SMM) to document, describe, and build the story of [ORGANIZATION NAME] in the context of studying how the ISI field can catalyze enduring changes towards greater equity. These visits will include individual and group interviews with staff, structured observations in both public and administrative spaces, and collecting artifacts (e.g., internal and public documents such as strategic plans, maps, brochures, reports, and reflections), and taking photographs.

All interviews and observations will remain confidential and accessible only to members of the research team—staff names collected during the visit will be redacted and replaced with a unique ID and care will be taken to protect individual identities in analysis and reporting. After the initial stages of analysis, the SMM research team will share back findings generated by observations and conversations at [ORGANIZATION NAME] and will collect feedback from staff on these findings. At the end of the project the SMM research team will provide back to me the final aggregated case study report. I may choose to share the results beyond the iPAGE team at [ORGANIZATION NAME].

With this letter, I am agreeing to allow the SMM iPAGE research team to gather and use the above information for research purposes, including publishing scholarly articles and presenting at conferences. The name of the institution and names of individual staff will not be included in any research report or presentation.

Yours truly,

[NAME]
[POSITION]

[SIGNATURE]

iPAGE Case Study Research Consent Form

You are invited to participate in a research study to understand:
1. How informal science education (ISE) organizations initiate and sustain changes around equity and diversity after staff participate in the iPAGE professional development program
2. What participating in iPAGE helps reveal about organizational culture.

Colleagues in your organization have participated in the iPAGE professional development program, and we are conducting a site visit as part of a larger case study to understand the impact their participation has had on your organization in order to learn more about how the ISE field grapples with equity. We ask that you read this form and ask any questions you may have before agreeing to participate in the study.

This study is being conducted by members of the Department of Evaluation & Research in Learning at the Science Museum of Minnesota: Marjorie Bequette, Megan Goeke, Gretchen Haupt, and Choua Her.

Procedure

As part of the research study, the research team is visiting your institution to inform our case study of the ISE field in respect to equity. During the site visit, iPAGE researchers will observe and take notes to document and describe how iPAGE ideas are being implemented. We would also like to conduct an interview with you to understand what changes might have occurred in your institution because of its participation in the iPAGE program. The interview will be up to an hour in length. We would like to audio record the interview so that researchers can listen to it again in case we would like to remember something you said that might be important to the research. You can still participate in the interview if you would prefer to not be audio recorded.

Benefits and Risks of Being in the Study
There is no direct benefit to subjects who participate in this study, though we have found that participants benefit from reflection on their daily practice. The only potential risk of participating in this research is that some of your responses may not remain private. This is very unlikely and we will work to make sure this does not happen. We will store your responses and audio-recordings on a computer that requires a password to login. Only the research staff will have access to this computer.

Confidentiality
Your confidentiality is important to us. The records of this study will be kept private and stored securely on a server that requires a password to access. If you have agreed to participate in a group interview, the other individuals in the room will know the content of your responses. In any sort of report we might write, we will not include your name or any information that will make it possible to identify you.

Voluntary Nature of the Study
Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relationships with the Science Museum of Minnesota or your job evaluation at your organization. If you decide to participate, you are free to withdraw from the research at any time without affecting those relationships.

Study Contacts
Should you have any questions about this research, please do not hesitate to contact any member of the Research Team:
Marjorie Bequette – mbequette@smm.org (651-221-4778)
Megan Goeke – mgoeke@smm.org (651-312-1744)
Gretchen Haupt – ghaupt@smm.org (651-312-1757)
Choua Her – cher@smm.org (651-221-2506)

This project has been reviewed and approved by Heartland Institutional Review Board. Questions concerning your rights as a participant in this research may be addressed to: Heartland Institutional Review Board – Phone: 866-618-HIRB, email: director@heartlandirb.org

Consent Statement
I have read the above information. I have asked questions and have received answers. I consent to participate in the iPAGE research study.

Your full name (please print): _____

Is it okay for the researcher to audio record your interview? Yes ☐ No ☐

Your signature:_____   Date:_____

Signature of researcher: _____   Date: _____

Observation Consent Form

iPAGE Case Study Research Consent Form

You are invited to participate in a research study to understand:
1. How informal science education (ISE) organizations initiate and sustain changes around equity and diversity after staff participate in the iPAGE professional development program; and
2. What participating in iPAGE helps reveal about organizational culture.

Some of your colleagues have participated in the iPAGE professional development program, and we are conducting a site visit as part of a larger case study to understand the impact or their participation on your organization in order to learn more about how the ISE field grapples with equity. Please read this form and ask questions before agreeing to participate in the study.

This study is being conducted by members of the Department of Evaluation & Research in Learning at the Science Museum of Minnesota: Marjorie Bequette, Megan Goeke, Gretchen Haupt, and Choua Her.

Procedure
As part of the research, members of the research team are visiting your organization to inform our case study of the ISE field in respect to equity. During the site visit, iPAGE researchers will observe and take notes to document and describe how iPAGE ideas are being implemented. We would like to observe a meeting or program you are involved in as one way to understand what changes might have occurred in your institution because of its participation in the iPAGE program. A researcher will attend the duration of the meeting or program and record their observations as written or types notes from an unobtrusive location. We will not audio record. If you choose not to participate in this aspect of the study, the researcher will not include you in their notes by omitting your comments or interactions from the record.

Benefits and Risks of Being in the Study
There is no direct benefit to subjects who participate in this study. The only potential risk of participating in this research is that some of your responses may not remain private. This is very unlikely and we will work to make sure this does not happen. You may find the presence of an unfamiliar person in the room uncomfortable.

Confidentiality
Your confidentiality is important to us. The records of this study will be kept private and stored securely on a server or in locked filing cabinets that requires a password or key to access. Physical documents will be destroyed after 1 year, digital documents will be destroyed after 7 years. Other individuals in the room will know the content of your comments and interactions, but your name or any information that will make it possible to identify you will not be included in any written reports or share out of findings beyond the research team at the Science Museum of Minnesota.

Voluntary Nature of the Study
Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relationships with the Science Museum of Minnesota or your job evaluation at your organization. If you decide to participate, you are free to withdraw from the research at any time without affecting those relationships.

Study Contacts
Should you have any questions about this research, please do not hesitate to contact any member of the Research Team:
Marjorie Bequette – mbequette@smm.org (651-221-4778)
Megan Goeke – mgoeke@smm.org (651-312-1744)
Gretchen Haupt – ghaupt@smm.org (651-312-1757)
Choua Her – cher@smm.org (651-221-2506)

This project has been reviewed and approved by Heartland Institutional Review Board. Questions concerning your rights as a participant in this research may be addressed to:
Heartland Institutional Review Board – Phone: 866-618-HIRB, email: director@heartlandirb.org

Consent Statement
I have read the above information. I have asked questions and am satisfied with the answers I received:

☐ I agree to participate in the iPAGE research study (You may document my comments and interactions).

☐ I do **NOT** agreet to participate in the iPAGE research study (You may NOT document my comments and interactions).

Your full name (please print): _____

Your signature:_____ Date:_____

Signature of researcher: _____ Date: _____

Appendix E: Site Contact Communications

Email Template for Case Study Participation

Dear [Team Captain Name],

I hope this message finds you well. As I had mentioned in my voicemail, I am providing you a description of what it will entail for [ORGANIZATION NAME] to participate in the iPAGE Research as a case study site. If you could please distribute the attached description to the rest of your iPAGE team (I have already cc'd [CHAMPION NAME]), along with any other decision makers at the [ORGANIZATION NAME] who might be impacted by participation, and decide if you would like to participate in the research in this manner. I am happy to answer any questions via email or to schedule a phone/video call session to make sure you and your team have all the necessary information to make decision.

We would like to have made final decisions on the case study sites and have obtained a firm commitment from each team's Champion before the winter holiday break, so I am asking that you provide an initial indication of interest to participate and arrange to ask any clarifying questions as soon as possible, but no later than Friday, the 7th of December. The next two weeks will be when I address more specific questions and concerns and request a formal site administrator letter of permission to conduct research (I will provide the template for signature) as required by our IRB.

Thank you so much and hope to hear from you soon,

Description of Participation in iPAGE Case Study Research Attachment

During the third year of the iPAGE research project, the research team intends to conduct 4-6 case studies in order to inform our research questions about how, if at all, participating ISI's change with respect to the three components of the iPAGE framework. Specifically, we are interested in understanding how changes might be instigated and maintained and the role of leaders and leadership in possible shifts.

Your ISI is among seven organizations being invited to participate (thought ultimately we will be selecting a maximum of six sites) based on our initial criteria for eligibility as a case study. We feel it is important that case study sites have had an overall similar programming experience as a starting point for exploring how an institution does or does not change their practice. Therefore, our first priority is including sites where the core team has participated in a complete 11-day iPAGE program --5 day institute and three 2-day colloquia-- in a single year. For some sites, the majority of their teams had their Institute experience during one of the 3 PAGE National programs in 2014, 2015, or 2016 when the content had not been as fully adapted for an audience of staff at informal science organizations. Additionally, teams would

need to have had enough time between their last program experience and beginning of case study data collection to act as change agents.

Case studies will include site visits and the collection of artifacts. During site visits we will conduct observations, focus group prompts, and individual interviews. The second selection criteria includes willingness to participate. Obviously, sites that decline to serve as a case study will not be considered, but we also feel developing a rich narrative of what is happening at each site depends on a certain degree of enthusiasm to facilitate the full range of research activities, which we realize may expose sensitive topics. Following is a description of what your organization will be asked to do as a case study site:

1. Host 2-3 members of the iPAGE researcher team for 2-3 days in April, May, June, or possibly July.
2. Identify a primary staff contact person for researchers with whom to coordinate the visit.
   a. This need not be an iPAGE team member, but they would need to have a solid understanding of Inclusion and Equity work happening at your organization as well as knowledge of the key individuals involved in that work in order to arrange meetings during prep calls/emails and work out other logistics. This individual would also be a key contact onsite during the visit.
3. Support onsite data collection by identifying individuals, artifacts, and activities that will help researchers answer the key questions in the project. Researchers will want to conduct 5-10 individual staff interviews, and 1-2 focus groups as well as observe activities and collect artifacts in order to get a feel for your organization This could include:
   a. Attending project meetings,
   b. Attending public programming, events, or activities,
   c. Spending time in the galleries,
   d. Collecting maps, brochures, handouts, or other documents.
   e. Speaking with a variety of staff in different departments,
   f. Any other things that you think would be good for us to experience to get a sense of what it's like to be at your organization.

While we don't require any special activities planned specifically for our visit, we would be interested in coordinating the timing of our visit to coincide with something that is already planned to to occur.

4. Provide a site administrator permission letter for research activities to occur at your organization. we will provide a template to print on your letterhead that should be signed by the team Champion (or higher-level administrator if appropriate). Upon request, the research team will also provide a copy of our IRB approval, outline of research activities, and draft instruments prior to our visit.

In order to help offset the impact of hosting the research team, the research team will provide a $500 institutional honorarium. Additionally, we will provide $25 pre-paid VISA gift cards to every staff person who participates in an individual or group interview as a thank you for their time.

Finally, the research team will remain in in communication with staff at your organization to member-checking our initial findings prior to reporting.

We will do our best to obscure identity. Each case study site will be de-identified to maintain confidentiality (for example: Organization A is a medium size institution located in a major metropolitan area on the West Cost), however it is still possible that a case study site could be recognizable based on other aspects reported.

If your organization is able to support the iPAGE research team by serving as a case study site based on the information provided above, please indicate interest by sending Gretchen Haupt (ghaupt@smm.org) an email by Friday, December 7th.

If you have questions, concerns, or would like more information, please contact Gretchen at the above email or by phone (651-312-1757) to determine if a follow up phone or video call would be helpful.

Appendix F: All Staff Email To Sites

Header:
Researchers at [ORGANIZATION] - Study on museums and diversity initiatives

Hi everyone,

In the next few weeks, you may receive an invitation to participate in an interview or meeting observation for a research study concerning organizational culture and change around equity, diversity, and access. We were selected for this study because some of our staff members have participated in a professional development program at the Science Museum of Minnesota called iPAGE (https://www.smm.org/ipage). I want to give you some context about the study before the invitation comes so you know what to expect.

First things first: [ORGANIZATION]'s leadership knows about the study and has agreed to participate, but you are under no obligation to participate yourself, and the researchers won't tell anyone else who did and did not agree to participate. If you do agree to be interviewed or participate in a meeting observation, the interview or observation will be confidential — what you say won't be reported to me or anyone else at the museum (unless you want to waive confidentiality).

The study focuses on equity practices in museums, and how museums work to be equitable organizations. The researchers are particularly interested in whether participating in the iPAGE professional development program is affecting how we, as an organization, think about and take action on equity. They are interviewing people from participating museums around the country, and we are one of five organizations selected for an in-depth case study.

Researchers from the Science Museum of Minnesota - [RESEARCHER_1] and [RESEARCHER_2] - will be visiting [ORGANIZATION] on [DATES]. [RESEARCHER_1] and [RESEARCHER_2] have been very clear that this is not a study about how museums are failing or what they are getting wrong—it's about the challenges of doing demanding and important work.

I am proud of the work we've been doing concerning equity, diversity, and access, and although there are always things that could be better, I think we have a lot to share. I'll be participating in an interview myself, and look forward to learning from the results of the research.

Please let me know if you have any questions about this project, and thanks!

Appendix G: Email Template: Invite to All Staff Survey

To: ALL STAFF
SUBJECT: Invitation to all staff to complete iPAGE Equity Survey

Hello Everyone,
[OPENING PARAGRAPH Needs to be organizationally centered -- written by internal Staff or greatly modified by them. Grounded in sites needs and to help support buy in. Ground in local work and need. For example "Senior team will see aggregated data and that is very exciting to help us with this work"]

On behalf of the iPAGE research team from the Science Museum of Minnesota (SMM), I would like to invite all staff age 18 or older (including volunteers) to complete a very brief online survey as part of [ORGANIZATION]'s iPAGE case study research about institutional change around equity and inclusion in the informal science education field. [RESEARCHERS' NAMES] will only be able to visit for a short time and speak with a relatively small sample of our staff, so this is an opportunity to hear from [ORGANIZATION] more broadly, which is extremely important when trying to understand complex issues like equity.

[editable -- how the results will be shared or inform your work] The iPAGE research team also intends to share-back findings with me to help inform our own work of institutional change.

To help you feel more comfortable participating, I want to assure you of the following:
- **The survey takes less than 3 minutes** on average to complete**.**
- **All responses will be collected anonymously**, which means no names will be attached your answers.
- **Your participation is voluntary**, and there will be no way to track if you choose to take the survey or not.
- **No one at [ORGANIZATION] will see the raw data** (how any one individual answers the questions).

The survey will be open until [DATE].

Please use this link to take the survey
[INCLUDE ORGANIZATION'S SURVEY INVITE LINK]

If you have questions or concerns about the survey or the iPAGE research project, please contact [RESEARCHER NAME AND EMAIL].

If you have questions about [ORGANIZATION]'s participation in iPAGE or the case study, please contact [INTERNAL STAFF CONTACT].

Thank you again for your willingness to support [ORGANIZATION] and the iPAGE project,
[STAFF SIGNATURE]

Appendix H: Sampling For Interviewees

We would like assistance identifying individuals in the Tier 2 (both Active and Passive) and 3 categories. We will likely conduct interviews with iPAGE team members (Tier 1), the research team already has their contact information. We do not plan to interview individuals in Tier 4, but include the description to help further define the boundaries of our pool.

Tier 1 - iPAGE team:

Includes only those staff at and organization who have attended programming presented by the IDEAL center during institutes and colloquia held at the Science Museum of Minnesota in St. Paul.

Tier 2 - Integrated into iPAGE work

Includes employees, volunteers, or board members (hereafter referred to as "staff") at the organization who have not participated in programming lead by IDEAL center during institutes and colloquia held at the Science Museum of Minnesota in St. Paul, but have been integrated into the iPAGE specific efforts. They may also be involved in parallel or overlapping DEI work. Within this category of informants, we consider two levels: Active and Passive

2a. Active: Individuals who serve in similar leadership positions as Tier 1 (iPAGE team members) and/or are involved in planning and implementing changes in practice, dissemination of new ideas/norms based in iPAGE.

2b. Passive: Individuals who knowingly participate in or recieve ideas, strategies, and tools brought to the organization through change efforts, but are not actively involved in shaping those experiences. Examples of passive Tier 2 informants would be attendees at a professional development experience, lunch and learn activity, or supervisors who are disseminating knowledge and strategies to other staff.

Tier 3 - Adjacent to iPAGE work

Includes staff who are aware of (and possibly participated in initial activities) iPAGE initiatives at the organization, but are either *not yet* active participants (Tier 2) or are no longer active participants in the iPAGE work. Tier 3 staff may be resistant to participation or have just lost momentum and settled closer to the perimeter of iPAGE work. The latter characterization does not necessarily mean an individual has become resistant to the changes or work, but has decreased their active level of involvement.

Tier 4 - Uninvolved and Unaware (only included in observation)

Individuals who are either unaware that they are participating/involved in iPAGE initiatives or have likely not experienced any change efforts as well as being unaware of the initiatives in the first place. Unaware, but involved staff may have experienced changed norms, practices, or policies but likely do not realize the origin in iPAGE (e.g., staff who's supervisors have changed practices, or staff who have been hired since changes in HR policy).

Appendix I: Meeting and Observation Sampling

The research team would like to experience the locations described in columns A (Public Spaces) and B (Non-public spaces) if they exist --ideally as a tour guided by iPAGE team members that incorporates time to take photos and engage in informal conversation with and be introduced to other staff. We anticipate the non-public space tour may take in excess of 2 hours to allow for such interactions. Scheduling the public space tour as the first activity for researchers has been a useful strategy to help familiarize them with the building and general feel of the organization, which is helpful context or interviews. Tours need not happen in a consolidated block --in fact multiple staff on the iPAGE team might lead different aspects based on their role in the organization.

Researchers would also like to attend a sampling of Activities described in column C, prioritizing meetings and PD. We are interested in observing a range of meetings, but if possible please help connect us with opportunities to see both where iPAGE (or equity more broadly) is a key aspect of the gathering as well as more routine activities centered finance, exhibits, development, or department briefings that typify "getting the work done" at your organization. Item 3 in Column C (Unstructured time in work spaces) may fit better during the guided tour of non-public spaces if your organization relies on proximity sensors/badge access between departments. Please feel free to suggest other locations or activities not included in the outline below.

A. Public Spaces	B. Non-Public Spaces	C. Activities

1. Galleries
2. Classrooms
3. Lobby
4. Ticketing/Willcall
5. Social Media
6. Cafe's/Food Service
7. Gift Shop/Store
8. Parking areas
9. Campus/Grounds
10. Surrounding areas adjacent to building
	1. Work spaces
	2. Staff Intranet
	3. Conference rooms
	4. Collections
	5. Production/Shop
	6. Facilities/Maintenance
	7. Non-"work" spaces
	  a. Cafeteria
	  b. Mothering/pumping spaces
	  c. Quiet/meditation spaces
	  d. Physical activity/exercise
	  e. Social spaces
		1. Meetings
		  a. iPAGE
		    i. Led by iPAGE team members, or
		    ii. iPAGE Champion in attendance or leading, or
		    iii. Focused on iPAGE activities and change initiatives
		  b. Non-iPAGE
		    i. Led by non-iPAGE team members, or
		    ii. Focused on other activities
		2. Professional development opportunities that might be occurring during the site visit.
		  a. Brown bag presentations
		  b. Small group meetings
		3. Formal programs
		  a. If they are examples of iPAGE change in action and there is an opportunity to debrief afterwards
		4. Unstructured time in work spaces

Appendix J: Memo Template

<u>Background Information</u>
Short paragraph to capture person's background/demographics that they share in their interview. Make sure to include:
- Age
- Identities
- History at organization (# of years employed)
- Role in Org (FT/PT, leadership/front staff/volunteer)
- History of equity work inside and outside Org
- Proximity to iPAGE team at Org

1) How does this person present, engage, feel about the organization?

2) Kotter: How does this person see organizational progress through these stages?

Urgency:
Powerful Coalition:
Create a Vision:
Communicate a Vision:
Empower others to act:
Short Term Wins:
Consolidation:
Institutionalizing:

3) How does this person present the major organizational priorities (main stories)?

4) What other stories emerge? (i.e., Are you seeing a specific kind of work as a kind of important equity work in the institution but also apart from overall equity work?)

5) Additional quotes (optional)

Major Stories:

Overall	Tensions on funding (money as a limited resource/obstacle)
	Defining culture around multiple tasks (role of the to-do list, "too busy") - is equity framed as fitting in or sitting outside
	Purpose of training
	Recent Major Events
	Emotional Labor: specifically the work done by individuals of marginalized identities that is/was present, may or may not be framed as part of the change
Emerging stories for each site (can be updated as we move along - if you see other stories in the data, make sure to code for it in Dedoose with "story" code):	
Site 1	Readiness as obstacle - never ending quest for everyone being ready for the change before starting it
	Comfort with some topics (sexual orientation, gender identity, accessibility) over others (patriarchy/gendered oppression, race/ethnicity)
Site 2	Move/new site (Major Event)
	Pay Equity for Entry Staff
	Hiring/Retaining staff of color
Site 3	High personal agency/Individualism (Work Culture)
	Mission Central - saviour narrative, traditional educational model
	New Leader (Major Event)
Site 4	"New" Site (Major Event)
	Tension of Local Community - wealth gap
	Involvement of Board
	Gender Roles with staff
Site 5	Perfectionism - public image and needing "guaranteed" success
	Accessibility as success story vs. Fumbled Equity Opportunities
	Organizational structure (consortium, siloing) as support/impediment

References

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