

Working Towards Justice: Reclaiming our Science Center

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The injustice of not recognizing female scientists or anybody of Color and how we continued to reinforce that [at the science center], that seed started to grow stronger. Its roots, and the questioning, and just the feeling of 'is this the right thing to do?', even though nobody had done it before. I questioned, why it had not been done before? ~ Olga, Science Center Director of Learning, March 2019

Olga, a Latina and director of learning at the Science Center, offered these words as she reflected on why she was working to “reclaim the Science Center” with the Youth Action Council [YAC], a racially diverse group of about 20 youth, ages 9-16. In choosing the language of reclaiming, we call attention to the importance of centering youths’ lives and histories at the Center. As 16-year old YAC member, Bella, stated, “Our goal is to reclaim [the Science Center] so that we see ourselves here. We also want to honor the people, like us, who came before us, but whose stories don’t get told. . . We want to feel like we can be ourselves here, and not be judged for that.”

How science centers are arranged social-spatially –through images, words, and experiences – sends powerful messages about who that space is for. In this chapter, we explore how Olga, her partner educators and researchers, and youth *re-imagined* their Center through a research-practice partnership initiated in 2015. Initially formed to address the design of a maker space, it was in our efforts to enact these imaginaries that, over time, we came to alter both the space of the Center and how we related to it.

Beyond equity in informal science learning spaces

The importance of science museums and science centers in young people’s lives has been well-documented. These spaces offer a multitude of opportunities and resources not traditionally available within schools, including opportunities to participate in legitimate scientific practices and ways of being beyond traditional curricular structures and constraints. Still, inclusion and participation in museum environments are patterned hierarchically (Dawson, 2014). Equity could be called the most critical challenge facing these organizations. From access and opportunity to tools and scaffolds for culturally sustaining experiences, the equity-related challenges are complex and varied (Feinstein, 2017). The wide range of informal science programs and practices that reach different audiences are often accessible, connected, or empowering for only some participants, limited, in many cases, to white, English-speaking and high-SES youth and their families (Bevan, Calabrese Barton & Garibay, 2020).

Even when youth gain access to science centers, they often experience exclusionary patterns of practice similar to those found in formal environments (e.g., implicit bias and deficit discourses). They may also find informal curricula that do not leverage their lived experiences as valued learning resources. For example, one study shows how a large science museum presupposed a mastery of the English language and British customs in the display of exhibits, inhibiting visitors’ opportunities to use, understand, and learn from the displays (Dawson, et al., 2019).

Studies such as these help researchers better understand what issues of equity look like in science centers, and the extent to which oppressions operate across both formal and informal science learning spaces. They also explain why “access” alone is not enough. Youth bring different lived histories and experiences into learning spaces. These histories and experiences are shaped by social structures and identities such as race, gender, socioeconomic and linguistic status, culture, and class. However, if ISL environments value White, western, masculine culture more, then many youth worldviews and lived experiences are easily sidelined. This can make daily ISL discourse and practice oppressive, and deny youth a rightful presence there. Having a *rightful presence* in ISL means that the ISL learning community, through its discourses, practices and relationalities, support the on-going political struggle for legitimacy because of who one is, and not who is expected to be (Calabrese Barton & Tan, 2020). We use the term legitimacy to foreground how people are validated through cultural systems and power (Gonzales & Terosky, 2016). We see rightfulness as claimed through presence, in the sense that youth’s whole lives – and that which makes participation in ISL empowering and marginalizing – become integral to learning; and the outcomes of learning focus not only on individual gains but also social transformation, that allows for presence.

The charge for changing enduring inequitable patterns of participation must fall on those responsible for the infrastructures of informal science learning, not on those who have been traditionally overlooked in the design of such infrastructures. Thus, critically transforming cultural infrastructures has become an important task for museum and science center educators and researchers.

A research+practice approach

Researchers from Michigan State University, and later the University of Michigan when some members moved, came together with informal science educators and leaders engaged in afterschool and community programs at a regional science center to form an RPP in 2015. The Center is located in Great Lakes City, a mid-sized city in the upper Midwest.

In our RPP, we wanted to understand and design for equitable and transformative science education, particularly with minoritized youth. Through on-going conversations, we developed a set of guiding equity commitments related to both informal science education and to our collaborative process. We pledged to support each other by: 1) uncovering systemic injustices manifested in our practices (e.g., structural racism embedded in programs, curricula, pedagogies, and/or outcomes); 2) centering the cultural knowledge and community wisdom youth bring; 3) leveraging/amplifying this knowledge towards humanizing and expansive learning outcomes for youth, adults, and broader institutions.

To realize these commitments, we engaged educators and youth in research and co-design practices. One important practice of our RPP is giving witness to youths' and educators experiences on-the-ground, as they seek to, and sometimes struggle to, be and belong in ISL. By integrating the ideas and experiences of youth, educators, and researchers, our RPP's goal has been to produce more relevant and sustainable results for improving equity in research and practice.

In an effort to directly involve youth in our RPP, we formed the Youth Action Council [YAC]. The YAC met and continues to meet monthly to prototype, pilot, and revise science center spaces, exhibits, activities, and experiences. Since the YAC's initiation, we have undertaken several annual projects, such as designing a makerspace in the Center, developing new programs/activities, and examining/redesigning areas of the Center.

This particular chapter is a result of on-going RPP conversations related to the work of the YAC. In one of our RPP sessions involving adult educators and researchers, we discussed insights from two different but related YAC projects. The first was our effort to co-identify and analyze educators' pedagogical practices which "opened up" equitable and transformative learning opportunities. We focused, in particular, on the practices of sharing, disrupting, and transforming authority. The second was Olga's on-going professional learning work with her staff related to critical perspectives on broadening participation (see Bevan et al., 2020).

During the session, Olga raised the idea of wanting to build on the momentum of the YAC to more purposefully co-design for reclaiming the Center. To Olga, this meant involving youth in the co-design of spaces, exhibits, activities, and experiences and explicitly naming why this mattered in the lifeblood of the institution. She noted the positive feedback her Center had received on the design of the makerspace, including the strong youth presence in that space resulting from the creative ways their work was showcased, such as through the youth-designed signs and nameplates which hung on the walls. The nameplates, as we discuss later, had become symbolic of the ways we all sought to re-imagine youth lives at the Center.

Building on these insights, Olga suggested we start by working with youth to rename the educational rooms at the Center. Similar to many other science centers around the country, the Center's classrooms had been named after famous scientists, who were also white and male (e.g., Galileo, Tesla, Newton, et al.). Resonating with Olga's suggestion, we co-planned initial activities to engage youth in critically examining the spaces of the Center and renaming the rooms. Most of the subsequent planning happened in collaboration with the youth during YAC sessions.

As we worked with the YAC on these activities, we continued to meet via regular RPP sessions to collectively make sense of how involving youth in reclaiming could shape progress towards our equity commitments. This collaborative process was an important way to respect all RPP participants' accounts and practices. In engaging this process of sense-making, our RPP worked to identify moments salient to us regarding the practices, norms, and discourses toward/against reclaiming the Science Center.

We tried to unpack each moment in two ways: 1) by making sense of what happened –e.g., who participated, what they did, and what material objects and social relationships were produced; and 2) by making sense of how representation and materiality mattered during each moment such as, what messages were communicated about representation/presence –e.g., specific ideas for advancing representation/presence (whose, by whom, about

what?) and what decisions, if any, were made about representation/presence. It was from these RPP conversations that we developed our framework for reclaiming the Center.

Conceptual framework

We draw upon spatial justice as a framework for making sense of how our partnership sought to reclaim the Center. We did not enter our RPP work with this specific theory in mind. However, as we began to think more together about how the social and physical aspects of the spaces of the Center shaped youths' experiences, drawing on theories of spatial justice helped us to deepen our understandings.

Meanings of space and spatial imaginaries

Spatial justice is concerned with how relationships among people and things produce, reproduce, and/or disrupt injustices. It is also concerned with how these relationalities are enacted through discourses and practices towards the production of spatial imaginaries. First, we define what we mean by space and spatial imaginaries. Then we explain our stance on spatial justice and its relationship to the production of new spatial imaginaries.

We draw upon Massey's (2005) conceptualization of space as a dynamic, material, *and* symbolic construction that acts as a meaningful and practical setting for social relations and actions. Soja (2006) similarly describes space as where everything comes together, including the social, material, historical, geographical, and political. Thus, we take space to be the place where social relations happen, informed by both the real and imagined, as perceived, conceived, and argued over in a particular context and a particular time (Soja, 2010).

Space is political. It produces meaning through relations of power enacted there at any given moment (Massey, 2005). As Massey puts it, instead of space "being this flat surface it's like a pincushion of a million stories: if you stop at any point in that walk there will be a house with a story" (2013, p. 2). When Olga refers to reclaiming the Center, she indicates these relationalities, and the millions of stories made visible or silenced by the space of the Center. She deliberates how people in the here-and-now may construct themselves and their possible social futures with and in science through new interactions and relationalities with people and things at the Center.

Spatial imaginaries are entwined with space. Spatial imaginaries are the ways in which people think about, desire, and act towards possible social futures in a particular space. There may exist many imaginaries in any space at any given time, as spaces reflect the collision of lives, histories, politics, and geographies. We call attention to both a critique of how the white, patriarchal imaginary dominates in science centers and to the imaginaries of the youth of Color and girls with whom we collaboratively sought to reclaim the Center.

The white, patriarchal imaginary has guided social interpretations of science museums and centers, setting out implicit guidelines for acceptable ways of knowing, doing, and being in these spaces. These imaginaries are partially constructed through the materiality of the spaces – images, texts, and representations made available to people through how rooms are named, organization and flow of exhibits, and words and images used. They are also partially constructed through the explicit and implicit discourses and practices legitimized in social interaction made possible by the materiality of the space as well as the experiences supported therein. We view this dialectical relationship between space and social interaction as crucial to promoting greater justice in science centers. It is in spatial imaginaries that injustices can be reproduced or disrupted in "how the past and present advocate for what the future may look like, or what people should do to shape it" (Watkins, 2015, p. 510).

Connecting space with spatial justice in science museums

Spatial justice calls attention to how the spatial ordering of people and things reflects and enacts power and politics to produce/reproduce (in)justices (Massey, 2005). One way to think about this is in how people see themselves while visiting science centers: How the materials (e.g. exhibits) are built or organized is shaped through social relations regarding ideals about whose knowledge matters most in these spaces.

For example, Dawson et al. (2019, p.13) show how the "museum space" put girls in a "difficult position for both learning science *and* enacting the identities they were invested in." When museum exhibits aligned with identities girls valued – through the activities they invited, the stories they shared, and the histories they represented – the girls engaged with the science exhibits. However, Dawson and her colleagues learned that this was rare for these girls at the science center. Most exhibits eschewed the girls' lives, limited opportunities for their meaningful engagement.

These examples show how *spatial* relationships produce *social* relationships in museum environments, where there is an interconnectedness among the physical, political, and disciplinary at any given time. These powered dynamics are exerted through/within the physical environment and impact who we are and who we will become.

However, central to our stance on spatial justice is that because spatial imaginaries are socially produced, *they can, therefore, be socially transformed.*

Co-producing new spatial imaginaries

Below we explore how our RPP team, including the youth, co-produced new spatial imaginaries in/for the Center through both what and how we talked about what science is, who can do science, and where science happens in relation to our lives as it is taken up and represented in the Center (transforming discourses) and the practices we collectively took up to enact these discourses towards altering the spaces of the Center (transforming practices). These transforming discourses and practices helped to make visible the histories and presents of youths' lived lives and created foundations upon which the RPP could organize for action. This included drawing on youths' collective, community wisdom, and their experiences with systemic forms of racial and gendered injustices encountered in science and society. We share three vignettes to explore the co-production of spatial imaginaries for reclaiming the Center. Across these vignettes, we illustrate how youth took up familiar spaces in new and multimodal ways through their discourses and practices.

Vignette #1 - Nameplates: Making present lived lives and fraught histories in science and society

Below we describe how a makerspace activity expanded from making marble mazes to also making nameplates and how this mobilized the narratives youth held for themselves and their communities about their lives in science and society in transforming the discourses and practices at the Center.

Nameplates: A "living entity of oneself"

A main activity of the YAC was to provide input on the development of Center activities. At this particular session, Olga worked with the youth to pilot a "power tools" activity: Building marble mazes. To introduce the activity, Olga shared a few different examples. She provided the youth (and researchers and educators present) with many tools (hammers, electric drills, saws) and materials (varying sizes of wood, screws, nails, popsicle sticks). Everyone was encouraged to explore what such an activity could "look" and "feel" like.

Everyone but 14-year-old Samuel made a marble maze. Instead, Samuel used the materials to build a wooden sign for his local community center (Figure 1). When asked about his motivations, Samuel said a sign would be more useful. He could "hang it at the club" where "everyone could see it." He also said that "when people see my sign they think 'that's cool. I want to do that too.' It kinda shows who we are and what we do."

<Insert Figure 1 here. Samuel's wooden sign>

Inspired by Samuel's actions, adult members of the RPP created a plan to provide all of the youth the chance to make their own "nameplates" using the same set of tools and materials. Olga reflected that the nameplate activity was a nice complement to the marble maze because it offered youth personalized and creative ways to become adept with power tools. YAC members created their own personalized nameplates that remain displayed on the makerspace wall, providing visitors with a visual reminder of the youth who helped make that space a reality. (Figure 2).

The nameplate activity made visible a set of discourses and practices around youth as rightful members and co-designers of the Center's makerspace. Consider what Ivy, a member of the YAC whose nameplate hangs on the wall of the makerspace, said two years later:

It was cool to see myself up there. It shows that you don't need to be an accomplished adult. Like kids did that. *We* did that. Kids of color and girls and like all of the people who grew up in their science classes, they didn't grow up seeing people like us.

The nameplate activity became central to many of the Center's outreach programs. This mattered because it shifted not only the materiality of the Center as youth-authored artifacts with their names became a part of the space, but also the spatial imaginary of how people talked about, expressed, and valued youths' expertise, and how they were recognized as STEM people.

<Insert Figure 2 here. YAC youth's nameplates in the makerspace>

One of the outreach activities involved the local refugee center, where Center educators worked with local refugee youth to construct nameplates and write stories of home. The Center hosted an exhibit on the main floor with these nameplates and accompanying stories. The “living entity of oneself,” as Olga put it, attracted and engaged many visitors. Refugee youth shared complex dimensions of their lives as expressed by the ways they organized, decorated, and described their nameplates. For example, one nameplate, created by a youth from Kenya, included his name, a painted map and flag of his country, and narrative explaining the significance of his nameplate:

I use yellow and blue because they are my favorite colors. I use fabric to make my country’s flag and pipe cleaners to make my country’s map using colors exactly as they look on the flag. I want people to know more about Kenya and where I am from. I want people to get the feeling of how beautiful Kenya is from the map. The flag is a perfect expression of how beautiful Kenya is and its fantastic, lovely people. The land of agriculture. Lovely Kenya.

One of the youth council members, upon seeing the nameplate exhibit produced by the refugee youths, stated,

WOW! These are so amazing. It just really helps me to think more about what refugees are feeling right now. I love the nameplates. It is really hard to believe that we actually started it [with our nameplates]. It really shows, like, how important it is.

Olga, herself an immigrant, reflected on the outreach as an expansion from YAC noting that the outreach program with refugee youth should position them as insiders of the Center and our community – not the outsiders they are often positioned as by national policies and political rhetoric. Rather, she hoped, the Center could be a space for visitors to learn from the refugee youth through the knowledge, stories, and desires shared in their nameplates.

Chris, the lead educator in this outreach program, participated as an immigrant himself. By placing himself as a maker alongside the refugee youth as he made his own nameplate, he saw and felt the power of presenting himself in the form of a nameplate and bringing one’s knowledge and skills to do STEM. He later included the nameplate activity in his own “Make with Wood” summer camp.

How did nameplates make the histories and presents of youths’ lived lives visible resources upon which one could organize for action?

The co-development of the nameplates led to a cascading set of discourses and practices that helped to transform how youth and visitors experienced the Center. Youth went from being invisible and transient recipients to being rightful members whose ideas/creations matter and co-designers of the Center’s makerspace and activities. Educators adapted and expanded the nameplate activity. They created space for youths’ presence to be explicitly visible. Youths’ work and stories describing the work were made accessible to visitors. This centering of youth-authored material artifacts also bore witness to youths’ systematic erasure and transformed spatial imaginaries adults held about how spaces could be re-created, for whom, and why. As the nameplate activity moved across space and time, it signified youth agency and presence in STEM. Olga’s purposeful decision to render the activity as central to the makerspace, reflected her desire for youth to be seen in ways of their choosing, even when they were not physically present.

Discourses and practices from the nameplates vignette

Discourses	<ul style="list-style-type: none"> ● Youth as rightful members whose ideas/creations matter and co-designers of the Center’s makerspace and activities ● Making youths’ ideas/wisdom a public and shared resource for others
Practices	<ul style="list-style-type: none"> ● Adapting the nameplate activity ● Extending the nameplate activity to other learning communities ● Displaying youths’ nameplates on the wall of the makerspace and in the main exhibit hall ● Co-creating nameplates alongside youth ● Sharing stories with visitors about youths’ nameplates

Vignette #2 - Critiquing and re-seeing the science center

Below we explore how Center educators and researchers worked together to support youth in using the perspective of their lives and fraught histories to examine and critique the Center – shifting not only *what* we see, but *where*

we see and re-see towards re-imagining what could be. We describe how youth were positioned by Center educators and researchers as legitimate critics of who and what was represented in/by science centers. We show how discourses operated through multiple modalities. As adult members of the RPP collaborated with youth to explore and examine different spaces of the Center, they documented what they “saw, felt, and heard.” These multimodal explorations linked the introduction of discourse threads on representation to what was present/not present and visible/not visible in the Center.

Linking discourse threads and activity in multimodal ways: “Where are the people?”

Which picture do we as a group want to celebrate? And this picture right here, if I was, and I am, a female, Hispanic woman, do I fit in that science club? I might think that there's no place in there for me. . . There's a reason I'm not being represented.

Olga spoke these words as she, and fellow educator, Chris, prepared the youth to examine the spaces of the Center. She brought herself into the discourse by reminding them that as a woman of Color, along with other “people like me,” she was made to feel like we “don’t belong” or “aren’t good” enough. She used this to ask the youth to begin to think about who was represented in the Center itself. She then explained to the youth that they were about to use their ideas about representation and critically investigate their own Center:

What we're going to do is we're going to talk a little bit about the scientists that are represented inside the Science Center. I went through the names of the classrooms that we have here at the Center. Who can name some of those?

After the youth called out room names – Tesla, Einstein, Galileo, Newton – Olga told the youth:

I want to make clear [the question]: *What we are counting?* We're not saying they weren't important. But we get these messages about the scientists in our science folks, we got men, everywhere we go. What we are trying to do is have a place more typical of all of us. Tell a fuller picture of the story of science. So, what we are trying to do is think about what that can *look* like here at the Science Center. How does that, how does that represent?

She then asked the youth to “hang out” and roam the different spaces of Center on their own, including “classrooms, floor exhibit areas, and stairwells in new ways” as long as they wished. She encouraged the youth to carefully document their observations of the “images, the words used, and the people” to document what they “saw, felt, and heard” taking notes, collecting footage on their iPads, and talking with each other so that they could share their ideas with others when they reconvened.

Olga supported the youth to re-appropriate the Science Center into “something different from what the dominant social order intended” (Gutiérrez et al., 2019, p. 43). As youth moved where they wanted to document what they saw, felt, and heard, they engaged in political acts of making their own lives visible. Youth used these familiar spaces of the Center in new ways, and to leverage multi-sensory observations. In so doing, Olga linked the introduction of discourse threads on representation to what was present/not present and visible/not visible in the Center.

Youth split into small groups and decided where to visit and why. Consider Bella’s comment:

When Rae and I walked around the Center, we actually began to see it in a new way. I guess I thought about it before, but this time, I really thought about it. It’s not fair that the rooms are named after only white men. I didn't fully realize it. . . Now that I do, we have to do something. We sat down by the Tesla room and just, like, took it all in. Like we were stepping back and seeing it all for the first time.

Bella had spent countless hours in the Tesla room. However, she now saw it in new ways, “all for the first time.” She noted how the activity helped to make issues of invisibility clearer and more urgent. Similarly, Jazmyn commented “Like, I knew that most places only talk about the accomplishments of white men [in science], like I don't matter, but by doing this research, it made it, like, something we had the power to change.”

In the next quote, Ivy pointed towards how the activity raised questions about how science itself (and not just the scientist) is represented.

Actually, it wasn't the names of the room that I was thinking about at all [as I walked around], but the artwork and things on the walls. I observed actually not many people at all in it. It was just science. So that said something to me. Are people not a part of science? Where are the people? . . . Like where are the *ordinary* people?

Being physically present in these different spaces offered youth the space to see, hear, and feel and critique the dominance of white, male figures in these spaces, and the absence of others. It also helped to link those observations to how youth felt. For the youth, the seemingly mundane became pronounced, allowing them space and the power to redefine themselves in the Center and in STEM.

How did they make the histories and presents of youths' lived lives visible resources upon which one could organize for action?

This vignette illustrates how educators and youth co-produced new spatial imaginaries in/for the Center through both what/how they talked about what science is, who can do science, and where science happens in relation to their lives as it is taken up and represented in the Center. Center educators, researchers, and youth used the perspective of their lives and their histories to examine and critique the Center. Educators engaged the youth in the critical examination of power dynamics in representation by introducing new discourse threads regarding issues of in/visibility in the Center and how this impacted them in multisensory ways. The youth also took up space at the Center in new ways as they brought their perspectives to bear on the layered ways in which injustices manifest.

Youth were positioned by Center educators and researchers as legitimate critics of who and what is represented in/by community spaces such as the Center. Center educators engaged youth in reflecting upon how images and patterns in representation made them feel, and how this was shaped by what they saw and heard. Collaboratively they noticed, called attention to, and changed who/what was represented and who/what belongs in the Center and in science. This shifted not only *what* they saw but also supported them in re-seeing possibilities towards what could be.

Discourses and practices from critiquing and re-seeing the science center

Discourses	<ul style="list-style-type: none">● Critique● Representation● Embodied experiences
Practices	<ul style="list-style-type: none">● Asking youth how images and patterns in representation make them feel● Asking youth to experience Science Center spaces multi-modally (see, feel and hear)● Co-constructing ideas around representation

Vignette #3: Changing spaces and spatial imaginaries

In the next vignette, we discuss youths' reactions to some of their co-design work, which included both the development of a new classroom, the Katherine Johnson room, and a stairwell exhibit of women in science culminating in a sign with a mirror for visitors to see themselves as a person in science.

Co-designing the Katherine Johnson room

The new Katherine Johnson room included three storyboards about Johnson's life: her background, sexist and racist barriers, and accomplishments. It also included an interactive whiteboard with a prompt that invited people to share their own stories and an interactive counting activity involving a person-sized calculator and an abacus.

During the reflective conversation after this renaming/redesigning a room project, the youth first noted that their efforts showcased their imaginaries for what a re-design could be. Jazmyn noted that the room did a "great job" at showcasing a scientist that met the criteria they had created for reclaiming the Center. Jazmyn said that unless someone did their own research on Johnson they might never know of the racism she had to confront or the dehumanizing experiences of human calculators at NASA. Jazmyn's comments point towards the importance of how the room embodied the transformation that they sought – in how it raised people's consciousness around issues of race, while also humanizing what it meant to be a person of Color in STEM.

The youth also positioned themselves and others inside the Center as a part of the science stories being told there. Tray, in reference to the interactive whiteboard he helped to imagine, commented that "we might be little, but we

have big ideas” and “we need a space for people to *put themselves in here*.” Bella expanded on this idea when she noted, “Dr. Johnson is literally asking us, as youth, this question [“What inspires you?”]. . . This interactive display offers the ability to relate to Dr. Johnson, but also to better understand her and us to understand ourselves.”

As they positioned themselves as insiders, they also noted their agency to do so. Gerard, who previously described the Katherine Johnson room as “the biggest example” of “reclaiming space” indicated that he felt “accomplished” because he and his peers “actually made something happen.” Lia noted that they, as youth, “changed the rules” just as Katherine Johnson had changed the rules: “All the science rooms are named after these old white men. We changed that and took one of the rooms and now it’s called the Katherine Johnson Space. . . . She changed the rules.” Later when we asked her about this comment, she added, “We’re changing the rules by changing this room.”

The other project, redesigning the stairwell, emerged during the youths’ exploration of the Center. The youth noticed the absence of women’s representation in STEM which is why they recommended Olga and educators use the stairwell as a space to display and honor just that. They suggested placing a mirror on the wall (at eye-level for youth) so that youth -particularly those who identified as girls - could see themselves represented while seeing the displayed images of scientists. They sought to help other young people identify themselves among STEM experts whose lives had been challenging due to their struggle against the prevailing sexism in STEM.

Most of the YAC members indicated that this stairwell project was particularly personal and inspirational. Jazmyn noted that “I feel like any room they’d visit they’d feel excited, but this one they’d probably feel *inspired!* . . . Then there’s the mirror. I was like, “HAH! I’m a woman of color! I could be on the wall too!” Likewise, Lia stated that “when you’re walking by, you see all these important scientists that did all this great stuff, and then you see *you*, and it feels like you just belong; like you’re important too, and you’ve done good things too.” As this stairwell exhibit is still going on, we look forward to further investigating the impact this youth-authored reclamation will have on the community visiting the Center.

How did they make the histories and presents of youths’ lived lives visible resources upon which one could organize for action?

This vignette illustrates how educators and youth co-produced spaces to realize their spatial imaginaries in/for the Center developed through their critical discourse and practice of exploring and examining the represented injustice in/through STEM and the Center. Youth were positioned by Center educators and researchers as legitimate creators of the spaces and, by doing so, imprinted their imaginaries permanently in the Center. Their justice-oriented criteria for reclaiming, which were grounded in the perspective of their lives and their histories, led youth to rename and reproduce spaces in the Center so they became inclusive for those who have been excluded, invisible, and unheard. The educators actively reflected youths’ design ideas to practically change the Center. This shifted not only what they could imagine, but also how that imagination could be realized.

Discourses and practices from changing spaces and spatial imaginaries

Discourses	<ul style="list-style-type: none">● Showcasing imaginaries● Insiders and part of the science stories told at the Center● Agency● Personal and inspiring
Practices	<ul style="list-style-type: none">● Co-designing signs and experiences● Asking youth to design the physical and material representations of the room● Physically changing the space following youths’ suggested imaginaries

Discussion

Our RPP efforts to reclaim the Center led to a youth-engaged disruption of normalized representations in science. The co-generated discourses and practices also supported new social-spatial imaginaries for youth and adults alike, which both critiqued current injustices and offered directions for change-making. These discourses and practices opened up new experiences that had a cascading effect as they moved across space and time. The initial nameplate activity legitimized youth as co-designers in visitors’ eyes, and launched outreach activities, which then further transformed the exhibit floor of the Center. Both Chris and Olga, as immigrants to the U.S., more visibly positioned themselves with the youth of color and refugee youth through the nameplate exhibit. And as YAC members who initially designed the activity noted, the Center was beginning to look and feel different.

The spatial justice work was subtle yet pervasive at times, as material structures were slowly physically transformed through both ordinary and extraordinary activity. The re-naming of rooms, accompanied by new signage and experiences reflected a combination of ordinary efforts of supporting youth in co-opting designed experiences towards their ideas for making their lives present, displaying work, and hosting dialogues on what this all meant. This was also extraordinary activity that required financial backing from the board, and significant infrastructural work. While Olga and the youth created new visions for what could be, Olga needed to secure buy-in from those with the power to make decisions on how spaces are physically altered at the Center, and with what resources. This buy-in could be facilitated when redesign of spaces is already an agreed upon priority, but even then, support for youth visions for these spaces was not a foregone conclusion. We saw this when the Center was brought into a city project to create an outdoor classroom on the Riverwalk next to the Center. In that instance, the city dismissed the idea of having youth as co-designers at the table. This highlighted that building relationships across positions of power in an organization, as Olga has done during her time at the Center, is both extraordinary and an essential component of reclaiming work.

Engaging in new discourse threads on social-spatial justice potentially opened youths' fraught histories with/in the Center in ways that posed new challenges and/or disrupt in unanticipated ways (Watkins, 2015). These discourses bore witness to youths' systemic erasures from the Center; made visible and present youth lives; and expanded their presence. While our work took place in a Science Center, we think this work has implications for equity in museums broadly. As youths' nameplates hung on the walls as legitimate artifacts of STEM, and as their narrative and experiential rendering of Dr. Katherine Johnson's life came to life in the new classroom, so too can youths' artistic engagements shape how their lives are made present in art museums.

Museums and science centers are white and male-dominant spaces, social-spatially positioning youth of color and girls as outsiders. However, enacting practices oriented towards new spatial imaginaries can support youth and their educators in authoring a more rightful presence in their center. Being rightfully present centers their political struggle to disrupt normative power relations and practices of the space, and what that means for who legitimately belongs to the space. Such disruptions can be generatively built over time, integrating social and material dimensions of the space. The re-production from disruption calls attention to the youths' reclamation involving not only the physical dimensions of the space but also the perceptions and meanings of their own selves and their futures.

This chapter is about reclaiming the science center. It is also about reclaiming whose voice matters in the reclaiming process itself broadly across the museum world. The initial vision of the reclaiming project conceived by our RPP was further developed by the YAC teen members, who suggested new, radical, and caring visions. This joint process led us to form a community of trust, sharing and enacting the commitment of reclaiming, as Olga said, "the most bold move" of disrupting the prescribed structure and redefining the presentation of the space.

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