## 1. The Co-Creation Process

**CIVIC/COMMUNITY/MUSEUM PARTNERSHIPS**

Building relationships and trust is key. Organizations have to be frank about their goals, priorities, capacity, expectations, and when these change.

Different partners did not take equal roles in all steps of the process but instead specialized in particular activities based on their expertise. The museum partners have been the glue and managers of each team's project.

Staff turnover was a major challenge for teams and their progress.

**Agenda Setting**

- Front-end evaluation to identify potential Forum topics
- Topic Selection Workshops
- Identification of socio-scientific question
- Development of content and facilitation materials
- Formative evaluation and revisions

General public audiences had a hard time identifying <u>specific</u> socio-scientific issues for a forum. Topic Selection Workshops felt repetitive with Welcome Events instead of moving the process forward.

Topics leaned more toward social science than natural/physical science, reducing the role of science partners. Civic partners served as content experts for the Boston team.

**TIME**

**Decision Making**

- Participant recruitment
- Staff/facilitator recruitment and training
- Convene Forum events

Recruiting audiences for serious, action-driven PES events (especially virtual ones) can be more challenging than recruiting for fun and educational public programs.

Each CC-PES event attracted new/different participants leading teams to question whether or not participants should be consistent.

Teams have tried synchronous and asynchronous online forums. Both present challenges for engagement but also an opportunity to draw in wider audiences.

**Policy Forming**

- Analyze and discuss outcomes from Forum
- Formulate action plans
- Dissemination

Low forum participation left teams with minimal data to inform their policy forming step. Teams were uncertain what specific action they could take in the final step.

Boston and Portland teams framed their policy events as opportunities to share information with audiences to help them take action around the issue.

Dissemination open question – What is the best way to share knowledge gained through this project with other institutions seeking to do CC-PES? What do you want others to know about this process?

Interruptions – most notably the pandemic – stretched project timelines which created challenges for teams and slowed their momentum. Longer timelines are good for building relationships but also make it difficult to address current topics in a changing world.

## 2. Notable Impacts

- Museums are learning from their community partners about how to center community voices, and community partners are seeing the communities they serve recognized in new ways/places. Example: The Museum of Life and Science is learning how to work with families experiencing homelessness. Community partner Families Moving Forward in turn sees their families being recognized as an audience the museum values.

- The project has helped to forge new and deeper partnerships between organizations and individuals. Example: The Urban College of Boston engaged in new ways with the Mayor's Office, bringing its students' voices to the forefront on housing issues.

- Team members have built skills and awareness in working across organizations – recognizing each other's different work cultures, priorities, institutional wisdom, etc. Examples: The contracting process which was familiar to OMSI was not familiar to Momentum Alliance and needed extra time to unpack. Civic partners are learning about forums as a way to seek public input.

- The Youth Advisory Council convened by the Portland team was empowered to guide the direction of their forum and had positive impacts from serving as leaders and forum facilitators.

## 3. Reflections and Questions on the CC-PES Model

- What is an ideal timeline for this kind of co-created project? How can teams respond quickly to community interests but allow time to build relationships and create meaningful experiences for the public?

- Thus far, the museums have served as de facto leads of each team's CC-PES efforts – especially when community and civic partners have to give priority to other essential work. Do partners need to be equally involved for the project to be considered co-created? If not, how do teams maintain a co-created approach?

- Forum topics were somewhat limited by the expertise and missions of the organizational partners involved. How does co-creation balance the goal of letting topics come from their audience with the need to identify partners up front?

- The teams have incorporated community voices in different ways – sometimes going directly to the community members they seek to serve, and other times relying on the expertise of community organizations. How deeply and directly do members of the public need to be involved in each step of the co-created process?

- The policy-forming step might be better framed as an action step, with flexibility in how teams define action. If teams cannot feasibly find a way to become part of a policy discussion, what are some ways they can still take action and move beyond a typical forum in terms of engaging the public with socio-scientific issues?

**Rockman et al**
Research & Evaluation

# Co-Created Public Engagement with Science

**Rockman et al**

Research & Evaluation

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# PROJECT OVERVIEW

The Co-Created Public Engagement with Science project (CC-PES) is an initiative of the Museum of Science, Boston (MOS). Funded by an NSF Innovations in Development award, CC-PES has focused on testing a new model for creating public dialog around socio-scientific questions. The CC-PES project proposal defines a socio-scientific question as "one that is informed but not answered by science alone, and requires inclusion of social values, norms, and personal experience. The heart of the CC-PES model is involving community and civic representatives as co-creators of dialog programs that address important socio-scientific questions, and then finding a way to turn community input into action.
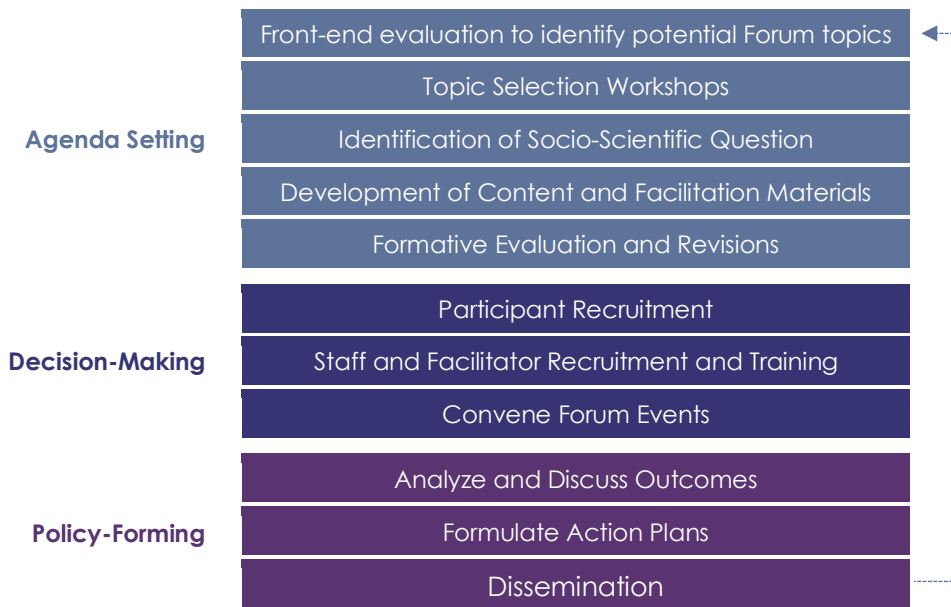
The Museum of Science, Boston and other institutions of informal science education (ISEs) have implemented public forums as a way to facilitate discussion on socio-scientific topics for many years. The National Informal STEM Education Network (NISE Net) and Multi-Site Public Engagement with Science (MSPES) projects, also funded by federal grants, have used these forums to promote a "public engagement with science" (PES). Public engagement with science seeks to foster mutual learning between scientists and general audiences by valuing the knowledge and perspectives that both groups bring. Previous PES forums created by MOS and its partner institutions sought to put scientists and members of the public on equal footing as they explore societal questions informed by science. Museums and scientists worked together to formulate the socio-scientific questions of interest for these forums, scientists provided their expertise on topics, and members of the public were invited to give their own perspectives on how the science or proposed policies intersect with their own values and experiences. The argument for PES is that this kind of equal and open dialog can make complicated science topics more accessible and relevant, increase trust and understanding between groups with sometimes disparate views, and eventually lead to better science/social policies. CC-PES aims to go beyond this earlier work by bringing a public voice to the entire process by which forums are developed and delivered. In this way, the public become co-creators rather than recipients of the public program, and the topics chosen for discussion and action are those that matter most to the community of interest.

The goal of the CC-PES project is to test a co-creation model, implemented by teams in four different cities. Each team is composed of a civic organization, a community organization, and a museum. Together, representatives from these organizations follow a process informed by Rowe and Frewer's[1] three steps of public participation: agenda-setting, decision-making, and policy-forming.

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[1] Rowe, G., & Frewer, L. J. (2005). A typology of public engagement mechanisms. *Science, technology and human values, 30*(2), 251-290. https://doi.org/10.1177/0162243904271724

**Figure 1. Key Activities of the CC-PES Model**

| | |
|---|---|
| | Front-end evaluation to identify potential Forum topics |
| | Topic Selection Workshops |
| **Agenda Setting** | Identification of Socio-Scientific Question |
| | Development of Content and Facilitation Materials |
| | Formative Evaluation and Revisions |
| | Participant Recruitment |
| **Decision-Making** | Staff and Facilitator Recruitment and Training |
| | Convene Forum Events |
| | Analyze and Discuss Outcomes |
| **Policy-Forming** | Formulate Action Plans |
| | Dissemination |

In practice, and in the minds of the project teams, the CC-PES roadmap is seen as a collaborative process punctuated by four key public-facing steps:

1) A **welcome event** where the teams introduce the project concept to a public audience and begin exploring ideas for a public forum

2) A **topic selection workshop** where public participants narrow in on specific socio-scientific topics that can be addressed by a public forum and then vote on topics of greatest interest or concern

3) The **forum** itself, during which members of the public engage in discussion and information sharing with scientists around the chosen topic and weigh possible solutions or courses of action

4) A **policy-forming** step that explores how public input from the forum could inform policy decisions or other actions with social/science implications

The four teams testing this model are located in Boston, Portland, Durham, and Detroit. The Boston and Portland teams kicked off their work first in Project Phase 1, so that they could provide mentorship to the Phase 2 teams based on their prior experiences. In early project meetings, the Durham and Detroit teams also provided a sounding board and outside perspective to the Boston and Portland teams in Phase 1. As of this writing, the Boston and Portland teams have completed their project activities, and Phase 2 is underway.

**Table 1. CC-PES Project Teams**

|  | Museum Partner | Community Partner | Civic Partner |
|---|---|---|---|
| Boston, MA | Museum of Science, Boston | Urban College of Boston | Mayor's Office of New Urban Mechanics |
| Portland, OR | Oregon Museum of Science and Industry | Momentum Alliance | Metro |
| Durham, NC | Museum of Life and Science | Families Moving Forward | Durham Neighborhood Improvement Services Community Engagement Team |
| Detroit, MI | Michigan Science Center | Sierra Club* | City of Detroit Office of the Mayor* |

\* These partners were identified in the initial project proposal but may change if partner needs and commitments shift.

# DOCUMENTING LEARNING AND IMPACT

## PROJECT AUDIENCES AND GOALS

The CC-PES project has target audiences at multiple levels (see Figure 2). There are the civic, community, and ISE institutions who have partnered to create the project. Representing each of these are the staff who comprise the project teams and who are following the CC-PES roadmap - organizing events, creating content for them, soliciting public input, and facilitating discussions. The CC-PES project also seeks to engage scientists in its events, both to provide important information relevant to the forum discussions but also to hear public perspectives and take part in a dialog. In the CC-PES project design, scientists are not directly part of the project teams but work closely with them in delivering the forum. Finally, there are the public participants who take part in the events and represent the community voice.

**Figure 2. CC-PES Project Participants**
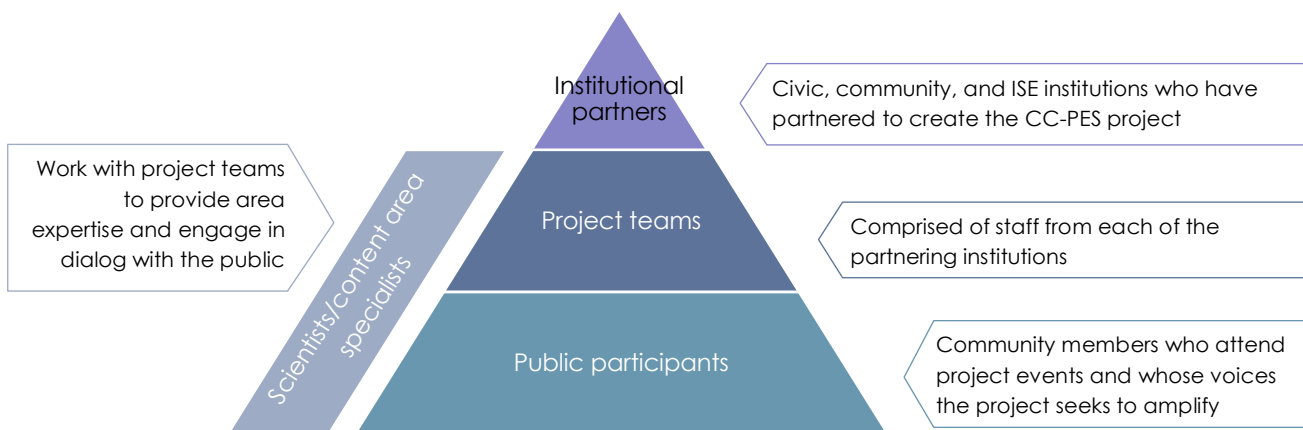


In addition to the audiences above, the final phase of the project will expand its reach to 25+ additional organizations by sharing out the lessons learned through workshops or other educational opportunities with the potential to build capacity for CC-PES in a wider audience.

Above all, the CC-PES project seeks to build capacity amongst its audiences for engaging in co-created projects. More specifically, project goals include increasing knowledge and skills around creating PES dialogue programs, developing strategies for different kinds of institutions to partner together, and building relationships between its partner organizations. The educational goals for the project teams and partners are outlined in the project's logic model and presented below in Table 2.

Table 2. CC-PES Project Educational Goals for Teams and Partners

| | |
|---|---|
| **Knowledge, awareness, and understanding** | • ISE professionals will increase their understanding of how to co-create and implement dialogue programs that involve partnerships with ISE institutions, community groups, civic partners, and scientists.<br><br>• Community groups and civic partners will increase their awareness of ISE institutions as a place to have conversations with scientists on STEM topics of interest to the community.<br><br>• Scientists and civic partners will increase their awareness of ISE institutions as a place to get informed public input on decisions related to socio-scientific issues. |
| **Interest** | • ISE professionals will increase their interest in implementing PES dialogue programs that involve partnerships between ISE, community groups, civic partners, and scientists.<br><br>• Scientists and civic partners will increase their interest in using ISE institutions as a place to get informed public input on decisions related to socio-scientific issues. |
| **Skills** | • ISE professionals will increase their abilities to co-create PES dialogue programs that involve partnerships between ISE institutions, community groups, civic partners, and scientists.<br><br>• Scientists, civic partners, and community groups will increase their abilities to participate in the design and implementation of co-created PES dialogue programs. |

Finally, a key research goal for the CC-PES project is amassing knowledge around implementation of the model: what works well, what works less well, the strategies the teams use, important contextual factors to note, and other information that can help other institutions seeking to take part in co-created public engagement with science.

## RESEARCH AND EVALUATION METHODS

Research and evaluation for the CC-PES project is being conducted by the Museum of Science's internal evaluation team alongside Rockman et al (REA), an external education research and evaluation firm. The roles of each evaluation partner are presented in Table 3. This report summarizes findings from REA's research, focusing on impacts on non-public audiences and lessons learned concerning CC-PES.

Rockman et al's methods are heavily qualitative, consisting primarily of interviews with project team members at key points in their journey along the project roadmap (e.g., following welcome events, topic selection workshops, forums, and policy-forming events). In some cases, REA researchers have been able to attend project events in person to conduct observations and intercept interviews. Once the pandemic forced project events online, REA researchers were able to attend certain events virtually. REA researchers have also attended leadership meetings to record reflections on the project's process and reviewed reflection documents that the teams submit to project leadership after each major project event.

Table 3. Research and Evaluation Roles

| | |
|---|---|
| **MOS research and evaluation team** | Formative evaluation mentors to the project teams. Help collect information to understand public audiences' ideas, concerns, and priorities that can guide the selection of the forum socio-scientific question. Assist in formative evaluation of forum materials. |
| | Examine summative impacts on public participants (decreasing polarization around STEM topics, developing trust/connections between scientists, civic organizations, and the public). |
| **Rockman et al** | Evaluation of the project's process, sharing challenges and successes as teams progress to allow iterative improvement. |
| | Using participant feedback to contribute to learnings on co-creation. |
| | Summative evaluation of impacts on institutional partners, project teams, and scientists. |

## CHALLENGES FOR RESEARCH AND EVALUATION

Conducting research and evaluation for the CC-PES project has had a number of challenges – some which are natural and inherent to working on an exploratory project with multiple partners and others which are external and inflicted by the Covid-19 pandemic.

One challenge for project research has been identifying the correct time points for data collection and the relevant team members to recruit for interviews. The project teams' timelines have been fairly open-ended rather than prescriptive, with activities shifting to accommodate team capacity and interruptions from the surrounding world. To reduce burden on participants, Rockman has sought to combine post-event interviews where possible (e.g., one round of interviews following the forum and policy-forming event when the two followed closely together, rather than a round of interviews after each). When project timelines stretch, however, this strategy can become a gamble.

Another difficulty has been anticipating the starting and ending points of team members' involvement in the project, making pre/post assessment challenging. For the Boston team, the time from project kick-off to final policy event was 22 months. For the Portland team, it was 30 months. During these long spans of time, a number of people joined and left the project and/or the institutions they represented. Furthermore, some individuals may have been heavily involved in one step of the project but were not involved in subsequent steps despite not officially leaving the team. Knowing when to capture final reflections from certain team members was therefore a challenge.

Finally, the pandemic and protests following George Floyd's killing had a significant impact on the project, its team members, and the institutions they represent. Individuals and organizations had to give their attention to the things that mattered most to them and their communities, project timelines were understandably delayed, and research activities had to find a new place in the hierarchy of participants' concerns.

# PHASE I ACTIVITIES

## TIMELINE AT A GLANCE

The purpose of Phase 1 of the CC-PES project was to allow two teams – both whose museum partners had significant past experience with forums – to test the project model before the next two teams began their work together. The proposed timeline for key project activities, as well as the actual timelines for the Boston, Portland, and Durham teams are shown below. Prior to the Covid-19 pandemic hitting the United States, the team's activities were progressing more or less on schedule. Timelines began to stretch starting in March 2020. Despite the difficulties of running an inter-organizational collaboration during a pandemic, the teams continued their trek along the project roadmap. The Boston and Portland teams have now completed each of their four main activities, and the Durham team is in the process of planning their forum.

**Figure 3. CC-PES Project Timeline**
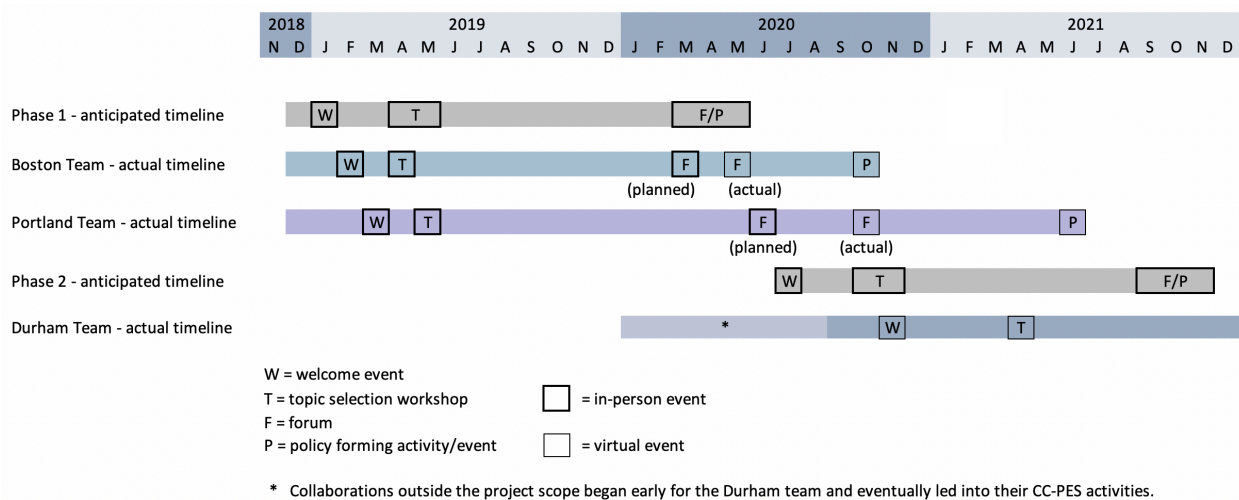


## ACTIVITIES OVERVIEW

Attitudes and enthusiasm were high at the project's outset. Participants recognized that collaborating across organizations and developing co-created events were considerable challenges, but they also spoke eagerly about the goals of PES and CC-PES. Team members talked about the potential of the project to serve communities in new ways, reduce skepticism or fear around science issues, and build enduring professional relationships.

Although forums were a familiar public engagement format for some team partners, they were new to many others, and on the whole the project presented many new activities for the partners to puzzle through. As one civic partner put it, "We're learning to build the plane as we fly."

In asking the public to generate ideas for forums, both teams found their audiences gravitating towards topics with a strong social science leaning rather than natural or physical science. This led the teams to rethink the role of the scientists in the project and reframe this as "content

experts" who could speak to the social sides of issues. Sometimes the teams still looked outward to recruit these content experts, but other times they found their civic partners could fulfill this role.

The time between the topic selection workshop and forum represented a slow down for most teams. The project timeline allowed a year for forum planning, which some felt was too long and contributed to a loss of momentum. It did allow, however, for the teams to test their forum materials with audiences before finalizing their content and delivery. Team members representing the museums took a more central role at this time, leading the design of the forums since this was their particular area of expertise. The Portland team also used this time to form their Youth Advisory Council – a group of young people who helped the team make decisions about the forum. A key challenge for the project teams at this time was turning the general topics of interest identified by community members into focused questions that could be addressed through a forum.

The Covid-19 pandemic disrupted the team's plans, especially the Boston team whose forum was originally scheduled for March 2020. From here forward, the teams held their events virtually, trying both synchronous and asynchronous formats and experiencing many challenges along the way but also generating many recommendations for others hosting virtual events. Communications between the teams became less frequent during the pandemic, partners experienced staff changes, and Portland's community partner became less engaged over time – likely due to competing priorities that were amplified by the pandemic. Nevertheless, the teams completed their forums. Online forum participation was fairly low for both teams, although the teams thought the audiences they did engage benefitted from the experience. Thoughts on recruitment and engagement are provided below under Designing CC-PES Events, p. 30. Not being able to collect much public data from the forums caused the teams to rethink what they might do during the final step in the roadmap – policy-forming.

Both teams had considerable difficulty interpreting the policy-forming step of the CC-PES process and deciding what they could do that aligned with this step of co-creation. Project leadership also spent time rethinking this step and what it can mean in a co-created project. In the end, both teams designed events that provided participants with skills and information for taking action on the forum topics.

## BOSTON

*Museum of Science, Boston (MOS)*
*Urban College of Boston (UCB)*
*Mayor's Office of New Urban Mechanics (MONUM)*

The Boston CC-PES team represented the first formal collaboration between the Museum of Science, Boston, the Urban College of Boston, and the Mayor's Office of New Urban Mechanics. The partnership got off to an excellent start, with positive feedback from team members on their ability to collaborate and contribute skills and perspectives. Serving UCB students quickly emerged as a goal for the team, with UCB staff positioned as experts on this community and advocates for their needs. As a civic partner that frequently seeks public input, NUM was excited about the project as an opportunity to explore a new way to collect civic data.

The team's welcome event and topic selection workshop were both conducted in the spring of 2019 and held on the UCB campus. It quickly became apparent that housing was a key topic of interest for their community members, although participants also talked about economic and education issues. The topic selection workshop attracted a different group of participants from the welcome event, which prompted reflection on whether or not the audiences for the CC-PES project should be consistent from one event to the next.

From April 2019 to February 2020, the Boston team worked on turning the ideas shared at the topic selection workshop into a forum. They decided to focus on housing and present participants with different ideas for developing a hypothetical open lot in Boston. The Mayor's Office connected the team with staff from Boston's Housing Innovation Lab, who could serve as the content matter experts for the forum. The forum provided information on housing costs and income levels in Boston as well as information on how development policies and decisions are made. Participants were also given a list of imaginary neighbors (stakeholders) with different values and priorities as a way to think about the development decision from a range of perspectives.

Figure 4. The Boston team created a forum focused on housing development in Boston



The Boston team's forum was scheduled for March 24th, roughly two weeks after businesses and schools in the US began to close due to the pandemic. Disheartened but not deterred, the team converted all their forum materials to a virtual format using an online platform called Consider.it which allows participants to engage in discussions around important issues and vote on their priorities.[2] Consider.it is designed for asynchronous conversations, so the team also opted to hold a kick-off webinar to launch the virtual forum. During the webinar, representatives from Boston's Housing Innovation Lab presented to attendees about how housing decisions get made in Boston, and attendees could submit questions using a chat box. The event ended with a demo of the Consider.it platform and encouragement to participants to continue the conversation there. While the kick-off webinar received reasonably good attendance for the circumstances (14 individuals), only four people ended up using the Consider.it platform. The timing of the event was particularly hard – both for UCB students who were shifting to virtual coursework and

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[2] The Boston team's Consider.it forum may be viewed at https://mos.consider.it/

for the team members whose organizations were coping with closures, layoffs, and trying to support their audiences during a pandemic.

For their policy-forming event, the team opted to offer another interactive, webinar-style event, this time focused on showing participants how they can take action regarding housing policy. The event used accessory dwelling units (ADUs) as an example for how policy is shaped. In introductory presentations, UCB and civic partners emphasized the purpose of the event: "The most important part of this project is empowering you all… telling you what you can do to influence the housing landscape in the city." The event attracted approximately 50 participants, although many did not stay for the breakout room discussions. Nevertheless, the team felt those who did stay had productive conversations.

## PORTLAND

*Oregon Museum of Science and Industry (OMSI)*
*Momentum Alliance (MA)*
*Metro*

The Portland team's work had a bumpier start than the Boston team, with initial misgivings from the community partner over the project contracting process and the asks being made of their organization and community. While it was a slow process bringing Momentum Alliance on board, it generated important reflections on the different experiences partners bring when it comes to large scale grants. Team members also talked about having to examine assumptions about each other's roles and responsibilities and the potential for inequitable partnerships.

Momentum Alliance, OMSI, and Metro are all organizations accustomed to working with youth, and the team decided to make Portland youth audiences their target for the project. The team was also dedicated to making equity a focus for their project and finding a way to incorporate this into any topic selected. Like the Boston team, their welcome event and topic selection workshops were held in the spring of 2019, and the team put particular emphasis on making sure these events were fun for the participants involved. Similar to the Boston team, the Portland team's participants generated general ideas for a forum, but it fell to the teams to craft these ideas into a specific forum topic: corporate responsibility and climate change.

The space between Portland's topic selection workshop (May 2019) and forum (Oct 2020) was nearly a year and a half. While the team was not idle during this time, progress was inevitably slowed down by the pandemic and protests in Portland. The forum had initially been planned as an in-person event in June 2020. The pandemic forced the team to pivot to a virtual event, but they were able to learn some things from the Boston team's experience using the Consider.it platform.

The team opted to split into three groups to move forward on project deliverables. One group (led by representatives from OMSI and Metro) helped form and guide the Youth Advisory Council who would weigh in on decisions regarding the forum, another team (OMSI representatives) took the lead on developing the forum content, and a third team (OMSI and Metro representatives) focused on the policy-forming step. Momentum Alliance became less

involved at this time, although some of the youth associated with Momentum Alliance were involved in the Youth Advisory Council.

The Portland team's forum was a three-hour virtual event held on a Sunday morning in October. Two guest speakers spoke at the event: a professor who studies climate change's impact on cities, who spoke on how climate change disproportionately affects BIPOC communities (Black, Indigenous, People of Color) and low-income communities, and the Metro Council Deputy President, who spoke on his journey to becoming involved in public policy and climate justice. The importance of personal stories became a theme for the Portland team. Both speakers talked to youth about their own experiences, and this thread was carried on into the team's policy-forming event. For the forum discussion, the team presented youth with a variety of climate policies as well as corporate stakeholders. The Portland team asked their participants to think from the perspective of one of the corporate stakeholders when considering the presented policies, similar to how the Boston team asked participants to think from the perspective of neighbor stakeholders. The Portland team also put their forum materials on Consider.it,[3] but they used breakout rooms to hold synchronous discussions on the same day, rather than asking participants to weigh in on the platform later.

While turnout for the Portland forum was low, with 16 youth participants, the team felt positive about the discussions their participants had. They were especially proud of their Youth Advisory Council. Seven members of this council served as facilitators for the event, increasing the total youth count to 23 individuals. All of the team members felt these youth did an excellent job and benefitted from the experience.

The Portland team had no difficulty brainstorming ideas for their policy-forming event, but making an idea crystalize and planning something concrete took time. As one team member put it, "I think we got a little wrapped around the axle with the policy forming step." In the end, the idea came from a team member's father who had attended an impact forum delivered by the Climate Stories Project. These forums focus on helping participants harness their own personal stories to communicate about climate change and push for action. The Portland team decided to partner with the director of the Climate Stories Project to offer three workshops in June 2021. One of these workshops was designed for the general public, one was intended for youth, and one was for educators. In total, the three workshops attracted approximately 15 participants. During the workshops, participants crafted their own climate stories and received resources to help them on the path to climate action – including contact information for local and federal representatives, and information on climate justice organizations.

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[3] The Portland team's Consider.it forum may be viewed at https://climate-policies-oregon.consider.it/

# PROJECT IMPACTS – OUTCOMES FOR TEAM MEMBERS AND INSTITUTIONS

Members of the CC-PES project teams in Boston and Portland described a number of impacts the project has had on them in terms of how they think about working with audiences, how they think about collaborations across organizations, and new professional skills and connections. These impacts were not uniform for all involved, but varied by team, organization type, and other factors. Participants also talked about the influence the project has had on the organizations they work for, although these impacts were more apparent to some than others.

| | |
|---|---|
| **1.**<br><br>LEARNING TO CENTER COMMUNITY VOICES | *"I've become a more competent co-creator of projects. I've learned a lot about how to center the voices of the community in forming the [forum] question."*<br><br>*"This project has definitely gotten us to think about different forms of engagement."* |

Several team members said the project has caused them to think more about how they can engage community voices in their work. This was particularly true for the Boston team. While many individuals said CC-PES was not the first or only project that encouraged them to solicit public input or give public participants a more role to play, they said that being part of the project strengthened their commitment to this kind of work and helped them keep it in mind as they approached new projects. Several team members also said the project gave them a better sense of the difficulties in engaging public voices, but also some of the strategies for doing so.

Team members from community organizations were obviously already in the habit of elevating the voices of those they serve. At the project outset, a UCB team member described one of her hopes for the project: "that our students feel more comfortable engaging in conversations with civic leaders. That they know they have just as much right to be in the room and sharing their opinions as anyone else." Another individual talked about the importance of letting community members take an active role in research, rather than just being research participants. While CC-PES did not introduce her to this idea, she applauded its goals and urged for this kind of work to continue:

> Hearing things from their [the community's] perspective - I just think that is so, so important, and I don't think it happens very often… So, thank you for what you're doing, and just keep doing it. We need to have everyone's voice, and connecting our community to decision-makers is a step in the right direction.

Other team members (not representing museums) noted that being part of CC-PES introduced them to forums as a way to engage their audiences and invite their perspectives. "I'm thinking now about how to create continual feedback and communication," one team member stated.

Individuals from a civic organization also noted that the project pushed them to do a better job in communicating about their own work when speaking with general audiences. They noted that sometimes the complex processes or policies they are involved with are second-nature for those within the organization, but translating these for outside audiences takes effort. This outcome is similar to what some scientists reported in the Multi-Site Public Engagement with Science[4] – learning to communicate their work better with general audiences.

| # | |
|---|---|
| **2.**<br><br>IMPROVING UNDERSTANDING ACROSS ORGANIZATIONS | *"I think this project has also taught us about working with different stakeholder groups…taking into consideration the staff at each of those organizations but also the populations and audiences they serve."*<br><br>*"This project has made me wrap my head around the complexity and value of multi-organizational projects."* |

Another important outcome of the CC-PES project, and particularly for the Portland team, is a better understanding of the context in which other organizations work, and how this might differ from one's own institution. Working with different organizations was not necessarily new to the members of the CC-PES teams, but this project seemed to foster reflection at a deeper level on how to create productive relationships across organizations. These reflections often arose out of a struggle or challenge, but each of these became an important learning opportunity for the teams. For example, in navigating the project contracting process, team members realized that not all organizations are familiar or comfortable with grant paperwork. Furthermore, contract terms can raise questions about the capacity of organizations, their ability to meet project demands, and whether or not project benefits are distributed equitably. These are all important things for teams to consider when undertaking a project together.

Other challenges for the teams included defining organizational and individual roles and responsibilities and steering the project forward when the pandemic diverted everyone's attention, energy, and resources. These hurdles prompted individuals to think about how institutional cultures vary and the need for communication and clear expectations. The teams also talked about recognizing the priorities of each organization and weighing these against each other. In particular, team members talked about having to think about how museum goals and programs – which often focus on education – compared to the essential needs that some of the CC-PES organizations serve. One museum partner stated, "I think scientists can learn a lot from working with those kinds of organizations because it helps us think about where we fit in the order of magnitude of things, but I think it does require a different approach when it comes to co-developing a program." Team members recognize that these are difficult issues without clear cut answers, but the project has helped them consider these important factors as they collaborate with other organizations.

> *It was definitely a reminder for me of how much work our community partners have on their plates... It's just always a really good reminder when we're working*

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[4] The MSPES project was a previous NSF-funded project led by the Museum of Science, Boston, focused on creating forums and other events that fostered public engagement with science at over 100 institutions across the United States.

*with partners to remember to put their needs first and pay attention to how much capacity they have.*

While it may seem that institutional differences presented obstacles to collaboration, team members also talked about seeing strengths in their differences. "Everyone on the team brings a really unique skillset that we all can leverage in different ways," one individual stated. Both teams found productive ways to leverage the skills of their organizations toward their project deliverables. Furthermore, the exposure team members have had to people with a variety of backgrounds and expertise is valuable to them as individuals, which brings us to our next outcome.

## 3.
### BUILDING PROFESSIONAL RELATIONSHIPS

*"So often these large organizations rely on the personal relationships [of individual staff]. That's how the work actually gets done. In that regard, this project was really beneficial."*

After a year working together on the CC-PES project, several interviewees said that the relationships they built with other members of their team were some of the most valuable project outcomes and that they hope to sustain these relationships into the future. Another team member noted that it was through personal connections and conversations that they were able to overcome some of the collaboration challenges their organizations face.

Working with staff from different kinds of organizations has also opened some people's minds to the types of partnerships they might pursue. "It's interesting to think about our work and what we can accomplish together," one interviewee said. Another said because of their work on the CC-PES project, they feel more comfortable approaching different kinds of organizations and branching out to form partnerships.

## 4.
### ADVANCING PROFESSIONAL SKILLS

*"...effective communication..."*

*"...project management skills – planning and hosting meetings and making sure things get done..."*

*"...evaluation in different languages..."*

In addition to the experience team members gained in collaborating across organizations, interviewees described a number of other professional skills they developed through their involvement in the CC-PES project. Museum staff (who tended to serve as team leaders or organizers), talked about developing skills in project management – particularly because they had to wrangle team members from multiple institutions. A few team members also said the project has given them the opportunity to improve their communication skills – both with public audiences and with professionals from other organizations. Several people from the Boston team also talked about working in different languages – not just recognizing that audiences speak different languages but thinking about how best to utilize interpreters and translators, what materials should be translated, and how to plan for translation in a project timeline.

# 5.

## IMPACTS FOR YOUTH FACILITATORS

Interviews with the Portland team members revealed that their Youth Advisory Council represented a different, nested level of participants who weren't anticipated in the original design of the project. Because the Portland team wanted to make sure their events were driven by the needs and voices of youth, they developed a Youth Advisory Council who helped the team make decisions about the forum topic and agenda, the technology platforms for running the forum, the speakers who presented during the forum, and so on. Members of this council also served as facilitators for the forum. In the pyramid of project participants (Figure 2, p. 7), the Youth Advisory Council represented a halfway step between the public audiences who attended events and the professionals who comprised the project teams. The impacts on the council members are those that could be expected from both these groups. They had the opportunity to learn about the forum topic, but they also had the opportunity to build skills through the experience of working on a team and collaborating with other organizations.

Many Youth Advisory Council members were too young to be involved in our research or else were not available for phone interviews, so feedback on their experiences comes mostly from the perspectives of the team members who worked closely with them. These individuals talked about how the council gained leadership experience and confidence for working on group projects and with professionals. They also talked about the connections that council members made with professionals and other youth, and finally, about how the forum topic gave them information for having important conversations about climate policy.

One YAC member who did take part in an interview said their involvement felt validating as a BIPOC member of the community. "Climate change greatly affects BIPOC communities, and I'm really grateful that forums have been used to bring in black and indigenous community members to inform themselves and spread that information." They also appreciated that through the council, the organizations were focusing on issues of relevance to BIPOC youth and giving them an opportunity to lead. Furthermore, they felt team meetings were supportive. In particular, they liked that the meetings had ground rules and that people could speak about whatever was on their minds.

This YAC member also said the experience was educational:

> *I definitely learned a bit more about the climate crisis and the role that corporations are playing and that communities that are affected are playing too. I learned about timber being one of the biggest polluters here in Oregon. That was a surprise for me.*

In addition to learning from the forum speakers and topic, they said the experience helped them build facilitation skills. Although they acknowledged difficulties in fostering conversations during a virtual forum, they also provided ideas on how to approach virtual facilitation that are included below (Virtual Event Challenges and Solutions, p. 35).

| 6.<br><br>NEW ORGANIZATIONAL PARTNERSHIPS | *"One of the most exciting things for me is having the opportunity to connect with these organizations that we haven't worked with much before."*<br><br>*"I think that this project aligns and reflects a long-term value of the lab – to engage in different kinds of partnerships, and to explore what engagement looks like with a wider range of stakeholders."* |
|---|---|

Some of the organizations who have joined the CC-PES teams had worked together previously, but in other cases this project was the beginning of a new relationship that the organizations hope to continue. UCB staff, in particular, talked about the value of being connected to city offices and the hope that they will continue having opportunities for their students to engage with city officials. They also talked about the pride and excitement of being part of an NSF-funded project that spans multiple cities, because small city colleges like UCB are often overlooked as potential partners on large projects.

Participants also talked about the partnerships formed through the CC-PES project as being different from past collaborations. One team member said that they hadn't worked with two outside organizations on a single project, so CC-PES represented a new level of complexity. An interviewee from a different organization said the reverse - they are usually involved in projects that bring many partners together, so this collaboration was more intimate than their typical work. For others, the change was in the kind of organizations they were working with. A community partner noted that they hadn't worked with a museum before or considered a museum's services as being tied to their work. Another community partner said the CC-PES project has them thinking about other exciting ways their audiences could benefit from the ties they have developed. Having access to museum and civic partners holds great potential for the people they serve – both in elevating their voices and in giving them access to resources that could advance their careers and improve their lives. Finally, a museum partner said that while they had often worked with other education-oriented organizations, their institution is increasingly seeking other kinds of partnerships. "This project has been really helpful in those conversations for me," they stated.

| 7.<br><br>BUILDING CAPACITY FOR CC-PES | *"I think it's a lot harder than I thought it was."*<br><br>*"I think it's good for us to be thinking about how to connect with audiences who are new or different for us. We are obviously learning and still have a lot of work to go, and there's a lot more that we can do to be more successful in this area."* |
|---|---|

For project team members, building capacity for CC-PES has meant learning to host forums and other public events using a co-created approach but also wrapping their minds around the meaning of co-creation and how to do it successfully. Different team members had different perspectives on whether they had progressed toward these goals.

In regards to forum development, creating and delivering forums was not new to many of the organizations in Phase 1. OMSI, MOS, Metro, and Momentum Alliance had all been involved in

forum projects in the past. The individual staff who represented these institutions, however, did not necessarily have experience creating forums. Several said the CC-PES project has developed their skills in that area.

Unlike the other organizations, UCB and the Mayor's Office of New Urban Mechanics were not familiar with forums, although individuals from the Mayor's Office said they had been part of other events created to solicit public feedback. For these organizations and individuals, CC-PES was an introduction to a new form of public engagement. Both the Portland and Boston teams acknowledged that the museum representatives took the leading role in designing forum materials and content, but the civic and community partners had a front-row seat to the process that left them with a better understanding of how forums are created.

Examining the extent to which the teams have built capacity for co-creation is a trickier question. On the one hand, some of the impacts outlined above – particularly centering community voices and building understanding across organizations – are important ingredients for a co-created project. A community organization team member said that being part of the CC-PES project has encouraged them to think about how a co-created approach could be applied to other work: "I'm thinking now about how to create continual feedback and communication." Interviewees frequently talked about how the CC-PES project has influenced how they think about their other work.

On the other hand, some team members – particularly those from museums – have lingering questions about what co-creation means and the extent to which they achieved it. For one individual, low engagement with the team's forum was an indicator that co-creation had at least partially failed, because they hadn't been able to gather meaningful public feedback. Another questioned if their projects could be considered co-created since the museum partners tended to take a leading role. These unresolved thoughts about co-creation (and limitations put on the project by the pandemic) are holding some team members back from putting a "mission accomplished" stamp on their work. While they may not feel they have cracked the code for co-creation, team members have amassed a wealth of information learned along the way, and we will turn to this next.

# LEARNING ABOUT CC-PES

The CC-PES project is designed to test a model for co-creation, and it has been up to the teams to translate the ideas from the grant into "practical project work," as one interviewee put it. The teams haven't always had examples of the processes and activities they are undertaking but rather are problem-solving as they go. One team member reflected on how the project design left certain questions unanswered, and the challenges and opportunities that go with that:

> *But it's a good challenge. I think the more that we try to do these types of projects hopefully the better we'll be getting at things, the more thoughtful we'll be about different steps along the way, and I do think that this project is trying to be thoughtful about what that looks like.*

This section reflects lessons learned from the teams' successes and struggles that can be a useful guide for others seeking to do co-created public engagement with science.

## BUILDING SUCCESSFUL PARTNERSHIPS

Bringing together civic, community, and museum partners is a key component of the CC-PES model, and a central theme for Phase 1 participants has been figuring out how to build strong relationships between these organizations. Phase I has demonstrated that teams benefit from intentional work on the relationships and understandings between organizations – both at the project outset and as the project progresses.

### *First Steps with New Partners*

Launching a collaboration between organizations is a complicated and sometimes fraught process. In Phase I, taking time to build trust and talk about expectations and priorities upfront was important. Even teams that feel an immediate synergy can benefit from slowing down and talking through the points discussed in more detail below: priorities, roles and responsibilities, leadership, and protecting audiences. The beginning is the perfect time to check for any assumptions about these different aspects of the partnership and map out how a team would like to work together.

Shortly after the CC-PES project launched, team members talked about how important it was for everyone to be equally excited about the work, especially since they envisioned sharing equal responsibility in the project. Talking about partners' respective enthusiasm and concerns surrounding a project is another useful way for approaching these initial discussions between team members. In the time between a grant proposal being written and a project being funded, any number of situations might change for a project partner. The beginning of the project is therefore a good time to check if partners still feel fully committed to the work, or if there are concerns or changes in capacity that need to be addressed.

Teams should also consider building in some intentional time to learn about each other's organizations. Developing a better understanding of the work each one does, why they do it (mission), and how and where they do it helps team members with perspective-taking and builds a stronger foundation for the team. In Phase I of the CC-PES project, the Boston team

found it beneficial to rotate where their early meetings were held so they had a chance to see each organization. It was a helpful getting-to-know-you exercise, and it also set the tone for a partnership where each organization and team member was treated as an equal. Some team members also talked about the need to make time for education so partners understand each other and the issues of relevance to their organizations. It's unclear the extent to which the Phase I teams were able to do this, but it undoubtedly has value for bringing together organizations with different backgrounds.

These are all useful strategies for the start of new relationships, but in a long project like CC-PES, teams may need to revisit them periodically. In Phase I, the teams learned that members would come and go and the surrounding world context can change dramatically. At times like this, it can be beneficial to regroup around these partnership questions to get everyone on the same page once more.

### *Organizational Priorities*

The organizations that have partnered for the CC-PES project each have different missions, audiences, and goals, and team members acknowledged that they had different goals for the CC-PES project as well. "At the end of the day," one civic partner stated, "we all have different interests in participating." Different goals don't necessarily have to conflict, so long as teams acknowledge these differences and talk about how they can shape their work for each organization's benefit.

In early project interviews, team members described their own priorities for the project as well goals for their organizations. In addition to building partnerships with the other organizations involved (something almost everyone mentioned), these themes emerged from the different partners:

- **Museum partners**: creating a valuable learning experience for audiences around a science topic, connecting with new communities they don't typically serve

- **Civic partners**: finding new ways to gather public input that can inform policy, strengthening relationships with different communities

- **Community partners**: offering a meaningful experience for the audiences they serve, particular one that feels relevant to their needs; giving their audience a new way to use their voice; connecting their audiences with people/organizations who can be a resource to them

It is also important to acknowledge where the project fits within organizations' other responsibilities and priorities. In wrap-up interviews, team members talked about how the pandemic and other contemporary issues forced them to reassess where priorities lay:

> *When our community partner is providing health and human services to their audiences, and education is much further down their list of priorities, it really does cause a reframing and a reprioritization of the project. That's been really interesting. I think there's value there. I think scientists can learn a lot from working with those kinds of organizations because it helps us think about where we fit in*

*the order of magnitude of things, but I think it does require a different approach when it comes to co-developing a program.*

Being sensitive to competing priorities sometimes means letting partners step back if they can no longer commit to the same level of effort as they originally intended. Teams can also think about how to allow for flexible timelines to accommodate partners when situations change. If all else fails, having an open conversation about the topic can help teams maintain the relationships they've built and leave the door open for future collaborations – even if one partner isn't able to continue.

### *Serving Each Other's Communities*

A key priority for all of the project partners is being sensitive to the audiences they serve, especially because the community partners involved thus far represent a number of marginalized and/or underserved groups, including BIPOC individuals, families experiencing homelessness, and low-income families. When working with these audiences, teams have to take extra care that they are serving their needs and not inadvertently using the audience to achieve diversity quotas. Given their historic mistreatment, most marginalized groups will have suspicions about projects introduced by outside organizations. It's important for teams to talk about these issues together and how they will keep their project rooted in their audience's needs. The Durham team (part of Phase II) has benefitted from starting collaborations early – well ahead of the CC-PES timeline. The team started designing and offering virtual programs for the families served by the community partner many months before their official CC-PES activities kicked off. This has helped the team build a stronger relationship between the museum and community partners.

### *Roles and Responsibilities*

Talking through the roles organizations will play throughout a project and the responsibilities each will take on is another important step for project partners – both at the project beginning and as it progresses. Defining the responsibilities of each organization and individual was sometimes a challenge for the CC-PES teams in Phase 1. The Portland team found they had to spend extra time on the contracting process at the project outset to talk through these issues and make sure the load on each organization was equitable, achievable, and in line with the compensation they received. It can be difficult to predict the time needed for different project activities, but being forthright and specific about the levels of effort required can help teams avoid surprises or resentment once a project is underway.

Some of the roles and responsibilities for the project partners are outlined in the CC-PES model defined in the initial project proposal. These are shown in Table 4, along with ways Phase I partners have expanded those roles or adapted them.

This table represents the basic functions each partner fulfilled, but the organizations also found other ways to contribute, and roles occasionally overlapped. The three organizations on the Portland team, for example, already had experience working with youth and helped to form the Youth Advisory Council that guided their forum development. The Portland team also brought in an outside party to deliver their policy-forming event, demonstrating the teams can think outside their immediate members when they need other skills and expertise.

Table 4. CC-PES Roles and Responsibilities

| | Roles and Responsibilities Outlined in CC-PES Model | Additional Roles that Emerged in Phase I |
|---|---|---|
| **Civic partner** | Contributes an understanding of how issues relate to local government and policy.<br><br>Helps the team consider how public feedback might be translated to action or inform future policies. | Served as content experts on socio-scientific topics selected by teams.<br><br>Provided connections to additional city officials depending on project needs. |
| **Community partner** | Possesses connections to local audiences the project seeks to serve. | Served as experts and advocates for the communities they serve, guiding how materials should be presented.<br><br>Provide input on best ways to recruit public audiences. |
| **Museum partner** | Has expertise in translating complex science topics for public audiences. Phase I museum partners also have prior experience creating and hosting forums.<br><br>Work with other partners to develop forum materials. | Served as project leaders/organizers.<br><br>Led forum development, providing drafts for other partners' feedback. |
| **Scientist partners** | Serve as content experts on the socio-scientific topic of interest. Help recruit additional scientists to take part in forums. | For the Boston team, the civic partner served as the content experts in Phase I. |
| **Evaluation mentor** | Assist teams so they are able to collect their own data from audiences, with the goal of improving project deliverables.<br><br>Help teams build capacity for gathering feedback from audiences. | Served as a link between the Boston and Portland teams, as well as between the teams and project leadership.<br><br>Helped communicate project challenges, successes, and strategies across team boundaries.<br><br>Served as advocates for using data to elevate community voice. |

For the most part, team members thought that the roles played by each partner made sense and worked well for their projects. There were a few cases, however, where team members had doubts or thought things could be improved.

One area where these doubts emerged was surrounding the role of the scientist partners. After the Boston team identified housing as their topic of interest, they ended up leaning on their civic partners as their content matter experts. While the civic partners had a wealth of experience in

housing and policy in the Boston area, some team members wondered if their project would have benefitted from bringing in scientists from outside of the project team.

Another area in which the teams encountered challenges regarding partners' roles was in their relationships with the evaluation mentors, noted at the bottom of Talking through the roles organizations will play throughout a project and the responsibilities each will take on is another important step for project partners – both at the project beginning and as it progresses. Defining the responsibilities of each organization and individual was sometimes a challenge for the CC-PES teams in Phase 1. The Portland team found they had to spend extra time on the contracting process at the project outset to talk through these issues and make sure the load on each organization was equitable, achievable, and in line with the compensation they received. It can be difficult to predict the time needed for different project activities, but being forthright and specific about the levels of effort required can help teams avoid surprises or resentment once a project is underway.

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Table 4. These mentors were included in the project design to help the teams collect data from their audiences, make sense of that data, and use it to inform their work. Each team has been assigned a mentor, all of whom are part of the Museum of Science's Research and Evaluation department. During Phase I, the evaluation mentors ended up working on the periphery of the project teams, never quite fully incorporated into the main circle of the civic, community, and museum partners. The evaluation mentors attended team meetings whenever possible but found they often had to reinsert themselves as their role took a backseat to other project activities. The mentors identified several factors that may have contributed to this dynamic:

- Other team members might not have fully understood the role or utility of the evaluation process

- Team members might have felt less motivated to move the evaluation process forward because the research questions were outlined in the grant rather than chosen by the team.

- Differences in locations and time zones – only the Boston team had the advantage of a mentor located in their city.

Regardless of the reason, the evaluation mentors stressed that their role is vital on a co-creation project for determining the best way to gather public feedback and then making sure this feedback informs the development of project deliverables:

*Moving forward, I think that this role needs to be more embedded onto the team because I think it's important for the evaluator to know what's happening with the project so they can provide their support, even if it's not necessarily in an evaluation capacity. I think we bring a perspective to the team that needs to be there in thinking about the public facing part of this.*

Reframing the evaluation mentor as the evaluation partner and spending more time discussing their role at the project beginning might help teams rethink how this person fits in amongst the other partners. Selecting an evaluation partner in the same location as other team members could also help make sure this person is integrated into the work of the team.

Finally, some team members had concerns around the role of the museum partners – particularly in providing leadership to the team and guiding forum development. This issue is discussed below.

### *Leadership and Project Management*

Finding the right solution for leadership can be a difficult task in a co-created project where partners seek to work on equal footing. As one team member pointed out, partners can share equal responsibility and voice, but there still needs to be a set process for making decisions, and all teams need a way to assign tasks as a project progresses. In some cases, the CC-PES partners naturally assumed tasks that aligned with their strengths and their comfort with different steps in the process. At other times, however, team members wish they had communicated more about responsibilities or had a system for delegating work to help things feel equitable and keep the projects moving forward. One team member noted that having all partners on equal footing sometimes left questions about leadership hanging:

> *When I came into the project, the vibe I got from the team is that everything was equally shared. There wasn't one obvious person facilitating each meeting. Everyone was kind of contributing equally, which I thought was actually really nice in terms of sharing the power or sharing direction. But it did mean that when things kind of separated… when we went remote and the project changed, the project team kinda had to do a reset. Who's leading this project, and who's making decisions about our timeline and things like that?*

One thing which teams reported working well in the early months of the project was having a designated person serving as a project manager – someone who organizes meetings, creates agendas, keeps notes, sends reminders, and otherwise keeps the project on track. For both the Portland and Boston teams, a museum team member stepped into this unofficial role naturally, and parties on all sides were grateful for it. Other teams seeking to launch co-creation projects should consider identifying a person for this role at the project's beginning, making sure the workload that goes along with this role fits within their other responsibilities and their organization's commitment to the project.

While the civic and community partners seemed to feel comfortable having their museum partner lead and organize their efforts, the museum team members sometimes had doubts. They wondered if by leading their projects they were tipping the balance of co-creation where all partners should have an equal voice. In particular, the forum development fell largely to the

museum partners. These team members did the bulk of the work drafting the agendas and content for the forum, then invited other members of the team to review drafts and give feedback. One team member wondered how this process was different from the formative feedback the museum typically gathers for other projects that are not considered co-created. Despite the uncertainty some museum partners felt about this arrangement, other team members did not seem to have concerns. The Portland team was also very happy with the role played by their Youth Advisory Council, who did make decisions during the forum development stage. The question of the museum partners' role in regards to leading the project or leading particular stages of the project may simply need further discussion in future iterations.

### *Team Member Turnover*

A significant challenge for the partners in Phase I of the CC-PES project has been dealing with the departure of team members – usually due to staff being reassigned within an institution, staff cuts during the pandemic, or individuals leaving an institution for other opportunities. In particular, the Durham team has seen a rotation of team members because their primary contacts with their community organization have been individuals on temporary AmeriCorps assignments. Turnover is especially difficult for the CC-PES project because the success of the teams is largely tied to the strength of the relationships built between the organizations.

Team members in Phase I didn't have many strategies to offer for dealing with this challenge. One individual, however, observed that having multiple people from the same organization on the team helped to buffer them against the loss of an individual person. Other than this, teams should just be aware that a longer project timeline increases the risk of losing team members along the way.

## AGENDA SETTING: CHOOSING AUDIENCES AND TOPICS

### *Identifying a Target Audience*

Agenda setting is the first step in the CC-PES model (Figure 15, p. 5), but part of the pre-work for a CC-PES project is identifying the target audience. For most of the CC-PES teams, finding a community partner has been equivalent to finding their target audience, since the model assumes that the community partner's key role is to serve as a representative for the target community. This relationship has been fairly clear for Boston (UCB students), Portland (Portland youth), and Durham (families experiencing homelessness), because each of their community partners serves a well-defined audience.

Early discussions with the Detroit team, however, showed that the relationship between partners and audience might not always be direct. Detroit's community partner at the project outset was the Sierra Club's Great Lakes Program, which works with Detroit residents broadly defined. In team conversations and individual interviews, the specific audience for this project was an unsettled issue. Some team members identified things that unite Detroit residents and give them a common identify – e.g., that they are predominantly African American, that many struggle financially, and that they share pride in their city despite the hardships it has faced. They also acknowledged, however, that the city is not homogenous. College students, for example, are a special category of residents who undoubtedly bring different kinds of perspectives and priorities. The question of who to focus on will be important for the group as they work to plan

their welcome event. It may be that the Sierra Club represents a better scientist partner than community partner for the team, as they have extensive experience addressing issues of water quality and other science-related topics in the Detroit area.

In early project meetings, the CC-PES leadership team also pointed out that teams should consider inviting different voices to the table in organizing their events so that the socio-scientific issues can be considered from the perspectives of multiple stakeholders. This raises a question for the CC-PES model – whether the topic or the audience needs to be identified first – since a team can't identify stakeholders without knowing the issue at hand.

Finally, a lingering question for the CC-PES teams is whether or not the audiences who attend the events need to be consistent from one event to the next. On the one hand, the CC-PES model suggests clear benefits to having a consistent audience, because one event builds off another. The earlier events in the model (welcome event and topic selection workshop) help build the team's relationship with the target community while identifying issues that are important to them. The forum is then an opportunity to address those issues through a discussion, or deliver on the input that participants gave during the earlier stages. Some team members wondered if the forums might have engaged audiences more if the participants had been the same individuals who took part in topic selection.

On the other hand, attracting the same public participants to multiple events is a significant challenge when they are free choice learning experiences spaced widely apart. Public participants in Phase I of the CC-PES project likely thought of themselves as one-time attendees to singular events of interest, rather than an audience for a larger project with multiple steps. Furthermore, the pandemic created obstacles to inviting the same audiences back, and the pivot to a virtual format changed the appeal of the events. Durham's team also has the unique challenge of working with a partner whose audience changes quite purposefully – as the families served by Families Moving Forward find stable housing, they are no longer in contact with that community organization.

One possibility considered by project leadership is that the participants who take part in topic selection don't necessarily have to be part of the forum, but that they should be involved in the policy-forming step. The reasoning behind this idea is that the people who identify the socio-scientific issue they would like to address should also be involved in deciding how to act on that issue. The forum dialogue used to gather public input on the issue, however, might call for a wider audience or slightly different audience.

### Guiding Versus Following Audiences to a Topic

The goal of the agenda-setting step for the CC-PES project is to identify a socio-scientific issue of relevance to the public, and this turned out to be a more difficult task than teams might have anticipated. Both the Portland and Boston teams designed their welcome events to be very open-ended, giving their audiences the freedom to identify any issue of importance to them. Survey data from the welcome events helped the teams narrow in on thematic areas to address during their topic selection workshops. The Portland team focused on education and climate change, while the Boston team focused on housing, education, and the economy. At the topic selection workshops, participants heard from guest speakers with expertise in each of these areas. The Boston team provided issues related to each of these topics for their participants to

react to and vote on, while the Portland team had participants brainstorm their own issues and present them to the larger group. When the experience was completed, however, team members felt they had a long way to go in narrowing general interests into a specific forum question around which they could foster dialogue and then decisions.

One reason the teams did not come away from the topic selection workshops with more focus is that participants had a hard time doing the job of identifying specific issues within the broad topics presented, as well as how those topics could be connected to science. One observer in Portland felt participants needed a better explanation of what a forum question was before they began brainstorming, and another thought it would help to have people at the breakout tables who could help participants make the bridge between the issues and science.

In later reflections, some team members wondered if it was reasonable to expect members of the public to come up with forum questions. One individual noted that public audiences don't always know about the policies that their ideas could inform. Team members felt the workshops gave participants the opportunity to talk about their experiences and feel involved in an important process, but that participants were also uncertain of what was expected of them.

The teams also found they had to reconcile the interests of their audiences with those of their partner organizations. Some of the issues raised by audience members weren't relevant to the work of the partners, and in the CC-PES model, the civic partner in particular needs to have a strong connection to the forum topic in order to support the team regarding policy and action possibilities. In narrowing their focus after the topic selection workshop, both teams steered themselves away from issues that were less connected to the work of the partners. One team member wondered if it was disingenuous to say that they wanted the topic to come from the public if the team partners were selected in advance.

The question of how much guidance to give participants in selecting a topic is a key question for the CC-PES model, because centering the voice of the community is so central to the project goals. As one example, the model intentionally placed scientists outside the core project teams to avoid them having too much influence over the chosen topic. The teams have been dedicated to letting the community voice guide their work, but one team member wondered in a closing interview if they had gone *too* far in leaving things up to the public. Finding the right balance on this issue – a way to provide audiences with the information they need without limiting their ideas and input – will be an important step for the remaining teams and future co-creation projects.

### *Choosing Topics with an Eye Towards Action*

Knowing how their forum topic might eventually relate to policy decisions or other kinds of community action may be difficult for teams that start out with a very broad approach to their projects. The Phase I teams discovered, however, that these discussions need to start early in the project rather than waiting until the policy-forming stage. Thinking ahead to the next steps in the project (see Forum Development, p. 32 and Policy-Forming, p. 39) will help teams identify strong topics that support the later stages of CC-PES – topics that can energize people, that are timely, and that can meaningfully inform policy decisions.

A key reason for including civic organizations as partners in the CC-PES model is to help the teams think about the kinds of action that might be taken based on their audiences' input and recommendations. Future teams will need to consider how to work this process in during the stage of topic selection and maintain the focus on action throughout the duration of the project.

## DECISION MAKING: DESIGNING CC-PES EVENTS

In designing their CC-PES events, the Phase I teams found that they had a large number of logistical decisions to make, as well as some larger questions to answer about how best to implement the CC-PES model. The following sections summarize project learnings on how to design and deliver co-created events. While many lessons are presented in relation to the forums the teams created, they can also be applied to other project events, such as the policy event and topic selection workshop.

### Project Timelines

Defining the project timeline is important to keep teams on track, but figuring out the right project timeline for a busy group of public service professionals can be difficult. Projects on a tight schedule may not leave enough time for team and trust building, skill development, thinking through strategies, or gathering the right resources. A civic partner in Phase I commented that they welcomed slowing down for this particular project. "One thing that I have taken away from this is that there is immense value in processes that feel as though they move at a slower more deliberate pace," they stated, "and that is not always the way in which we operate as a city." On the other hand, the CC-PES teams have identified challenges for longer timelines as well.

**Figure 5. Initial CC-PES model timeline**
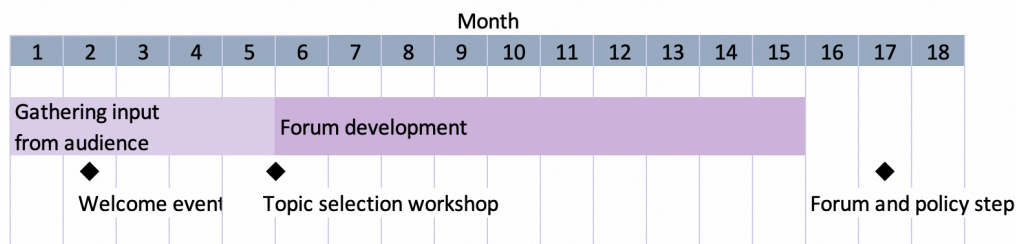


The initial timeline proposed for the Phase I teams of the CC-PES project was approximately a year and a half long, with the bulk of the time being dedicated to the forum development process. Both teams ended up stretching their timelines due to the pandemic (see Figure 3, p. 10). While these changes could not be avoided, both teams reflected that a shorter timeline might have worked better for their projects. As projects stretched on the teams experienced more staff turnover, which necessitated onboarding new people. With a longer timeline, it's also easier for a team to lose momentum, especially if there aren't regular check-ins, a strong project leader, or other mechanisms to keep the team on track.

Another challenge for CC-PES projects with longer timelines is that they are hindered in their ability to address current issues in a rapidly changing world. The pandemic greatly amplified this problem for the Phase I teams, both of whom chose their topics prior to March 2020 and then found public attention completely diverted from the issues they had selected. One member of the Boston team, reflecting on low forum engagement, reflected on this conundrum: "I think the reality is no one wants to talk about housing right now. People might be stressed about finding housing, but it's not something they want to discuss in a forum."

In creating their own timelines, teams should therefore consider if a more condensed version of the model in Figure 5 could work for the partners involved. This will depend on the capacity of each team member and their previous experience with the types of activities the project requires.

### *Designing for Audience and Engaging Participants*

Demonstrating to communities that their voices are valued is essential to co-creation, and the CC-PES teams have therefore paid close attention to the needs of their audiences in designing each of their events. The Portland team chose to focus their project on youth, with each organization reaching out to the youth they serve and engage. The Boston team started by focusing on UCB students as their audience. UCB students are for the most part non-traditional, low-income, non-white, and take night classes so that they can work during the day. Many speak Spanish or Mandarin. In designing for these audiences, the teams considered the following factors:

- **Location** – What locations are easily accessible to the audience? Will participants feel welcome and comfortable or out of place? Team members pointed out that not all people feel equally welcome in museums, whose audiences tend to skew white and upper middle class. Choosing a location that your target audience knows will make conversation flow easier. If this isn't possible, teams should consider what extra steps they will take to make the location feel welcoming to participants.

- **Language** – The UCB team chose to give the initial address at their Welcome Event in three different languages. The remaining presentations were in English, but translations of the materials were provided.

- **Timing** – When are participants available and most likely to attend? Knowing that childcare and jobs were both hurdles for their audience, the Boston team leaned on their UCB partners to find a time that would work best for the students.

- **Fun** – Infusing fun into events was a big priority for the Portland team due to their youth audience. Icebreakers and other light-hearted activities played a big role in their events, particularly early in the project.

One thing that the Portland team had not fully considered in designing their Welcome Event was that their organizations would end up convening youth with very different backgrounds and life experiences, and that this in turn could lead to difficult conversations. After some uncomfortable discussions about race arose during their event, the team members reflected on how they could

better prepare participants – e.g., by laying ground rules for conversation, by talking about equity directly rather than waiting for participants to stumble into these conversations, or by providing some historical context and vocabulary so that participants feel better prepared to talk about the issues. The goal of CC-PES is to create dialog around societal issues informed by science, and it's likely that difficult conversations will arise at other forums as well. The techniques the Portland team has considered are all good practices that could be translated to other situations where diverse perspectives are shared.

Beyond the needs of specific demographics or target audiences, there are a variety of good practices that the Phase I teams have recommended for co-creation events, regardless of the participants involved. These include:

- Using warm up activities to break the ice and get participants talking with each other
- Creating comments walls or other feedback devices to emphasize that there is a place for participants' voices
- Providing nametags with a spot to designate pronouns
- Prepping speakers to have a two-way conversation as opposed to a lecture or presentation. Talk about the goals of PES with speakers before the event.
- Breaking participants into small groups to discuss particular topics in greater depth
- Training facilitators who will take part in small group discussions so they are comfortable providing guidance and drawing out participant voices
- Setting guidelines for respectful and open discussions
- Allowing adequate time for share-outs after discussion
- Providing breaks for participants to move around if an event is long

In addition to the techniques suggested above, many of the strategies suggested engaging participants in virtual forums (p. 35) are applicable for in-person events as well.

### *Forum Development Process and Content*

The Phase I teams found that when it came time to develop their forum content, it helped for the museums to take the leading role. The teams' museum partners had previous experience designing forums and thus were fairly confident creating the content. The larger team – including civic and community partners – provided feedback on initial drafts created by the museum team members. Both teams built in additional review steps to refine their forum content. The Boston team held two focus groups to test their materials with public audiences. The Portland team's Youth Advisory Council served as their review audience. For the most part, the teams felt the distribution of responsibilities at this stage of the project worked well and that the process felt collaborative, despite the museum team members driving the content development. A lingering question for some museum team members, however, is whether the museums' tendency to adopt a leading role throughout the project conflicts with the goals of cocreation. (See further discussion above under Roles and Responsibilities, p. 23.)

When developing forum content, it is important for teams to consider what kinds of feedback it will elicit from their audiences and how this can inform the policy step of their projects. In reflecting back on their process, the Phase I teams acknowledged that this connection was lacking. One team member noted that the forum felt like the culminating event of the project, so their team wasn't thinking ahead to how its outcome could inform policy or other action steps. Future teams may need to think about their projects more holistically from the start to solve this problem, rather than tackling one step of the CC-PES checklist at a time.

Another possible way to make the connection between forum and policy-forming is to design forums to address particular local policies. One Portland team member reflected that they hadn't done this in their forum, although they did discuss a range of policies *based* on real world examples. Likewise, the Boston team pulled real income and housing data for their city to create context for their forum but opted to frame discussion around a hypothetical city lot rather than an actual one. It may be that these example scenarios, although just a small step away from reality, are not specific enough to lead to action. A member of the project leadership team reflected that involving the civic partner more directly in forum development is another possible strategy that could help teams create forums tied closely to policy and/or action.

Creating forums that are more action-oriented could also pose dilemmas for museums and their partners, however. Historically, museums have tried to present a neutral front on political issues, and other co-creation partners may have similar reservations. In Boston, the civic partner steered the team away from using a real city lot as the basis for their forum discussions. They were worried that talking about a specific lot would create an audience expectation that the city would follow through on any recommendations made – something they could not promise.

While the Phase I forums did not generate decisive feedback on a particular issue, their general framework still contained useful elements that other teams can emulate. The Boston and Portland teams followed a similar structure for their forums, although the delivery varied (see Table 5). Both teams led into the forum with a speaker presentation, then introduced the forum question, possible solutions, and stakeholders whose viewpoints the audience was asked to consider. The Boston team decided to use the Consider.it website to host an asynchronous discussion, while the Portland team used virtual breakout rooms to facilitate small group discussions during their live event.

The Phase I teams were both fairly happy with the design of their forums. While there were issues of engagement and participation, teams owed these largely to the virtual format (discussed below) and not to the content or agendas they had created.

Both Phase I teams found ways to incorporate people in their forums who were reflective of their audience and felt that this was important as a design feature. In Boston, the team intentionally designed their imaginary neighborhood stakeholders to reflect the diversity of their audience and the city of Boston. In Portland both speakers were persons of color, and the second speaker was young and relatable, able to talk to participants in an accessible way.

Table 5. Phase I Forum Structure

| Presentation by content expert with Q&A |
|---|
| Attendees listen to a presentation by a scientist (Portland) or civic partner (Boston) on issues related to the topic question as a lead-in to the forum's theme. Q&A follows.<br><br>♦ Boston's civic partner spoke about how the city makes decisions regarding open lots and housing and how the public can get involved.<br><br>♦ Portland's speaker presented on how equity issues are interwoven with city development and climate change. |

| Introduction of forum topic: |
|---|
| Museum partner presents the forum topic that participants will be considering. Both teams' topics were presented as hypothetical scenarios, although based on real and familiar examples. Each team presented several potential solutions for participants to weigh.<br><br>♦ Boston: How should an open lot in Boston be developed?<br><br>♦ Portland: What climate change policies should the city adopt? |

| Presentation of stakeholders |
|---|
| The attendees are presented with an array of stakeholders whose perspectives and priorities related to the question have been mapped out for the audience.<br><br>♦ Boston: Neighborhood residents with different housing needs and preferences<br><br>♦ Portland: Three different companies, City of Portland, State of Oregon |

**Boston** covered the first three steps of the forum in a kick-off webinar approximately one hour long. The discussion step was held asynchronously via the Consider.it website.

| Discussion |
|---|
| The attendees are given time to discuss the topic from their own viewpoint, as well as from the viewpoints of the various stakeholders. The Consider.it platform used to host forum content allows participants to post comments and place votes.<br><br>♦ Boston: Discussion was designed to take place asynchronously on the Consider.it website in the days and weeks following the kick-off webinar.<br><br>♦ Portland: Discussion took part in virtual breakout rooms, each guided by a facilitator. After the breakout rooms, the participants reconvened to share was they had discussed. |

| Closing presentation (Portland only) |
|---|
| The Portland team closed their event with a second speaker from local government, who talked about his own journey to becoming involved in the city council and how youth can get involved and lend their own voices to local decision-making. |

**Portland** covered all their forum content during a three-hour virtual event.

The Portland team was especially proud of their Youth Advisory Council and their role in the forum development and delivery. The council reviewed forum materials, made decisions about which technology platforms to use, helped design recruitment materials, selected the speakers, and served as forum facilitators. All of these contributions kept the forum grounded by the youth experience and supported the co-creation goals of the project.

Aside from policy/action connections, the one area where the teams felt their forum design could have been improved was in the quantity of information provided. Both teams provided a considerable amount of information for participants to wade through and felt that it ended up being too great a burden for the audience. This was particularly true for the Boston team, whose participants were intended to review the forum materials on their own after the kick-off webinar. The team suspected that it ended up being too much content for people to unpack, and that this was one reason for the poor engagement during the asynchronous stage. Most team members made suggestions about cutting content to make it more manageable for the audience, but one individual from the Portland team instead suggested lengthening the event and making it into a workshop where more time could be spent giving participants the background information they need to make decisions about the forum topic.

### *Virtual Event Challenges and Solutions*

The COVID-19 pandemic threw all of the CC-PES teams into a new environment for offering public programming, which greatly affected the forums created in Phase I. Both the Boston and Portland teams created their forums with the intention to host them in-person and then had to adapt their materials for a virtual format due to the pandemic. The Boston team had to make this pivot last-minute, while the Portland team had a little more lead time to adapt their approach. While both teams felt that the virtual format worked largely against them and their ability to engage participants, they had valuable reflections for the future of online programs. Challenges the teams identified, as well as strategies for addressing these, are presented in Table 6. While not every challenge has a strategy yet, knowing the hurdles will give future teams a leg up as they plan their own events.

**Table 6. Virtual Event Challenges and Strategies for Addressing Them**

| Challenges | Strategies |
|---|---|
| Communicating the purpose of a virtual event and requesting the right kind of participation from attendees can be difficult. | • Make marketing materials as descriptive as possible.<br>• Describe your goals at the beginning of the event, and describe how you hope the audience will participate.<br>• Include an opportunity for the audience to speak early on the agenda to establish a participatory tone. |
| Selecting the right day of the week and time of day for an online event is challenging because it is difficult to gauge availability of potential participants. | • This challenge was amplified by the pandemic and may ease over time.<br>• Community partners should be able to provide helpful advice on how best to reach their audience. |

| | |
|---|---|
| Some audiences may have limited access to the technology needed to participate or have low comfort with online tools. | • Community partners may be able to help participants access devices, as was the case for the Durham team.<br>• If audiences may be joining by phone, don't count on their ability to view additional screens or extra materials.<br>• Provide ample time for participants to get to know any technology being used.<br>• If a simpler tool exists for what you are trying to accomplish, use it. |
| Online events sometimes lack the fun factors of in-person events – for example the atmosphere the venue brings, food, and the opportunity to socialize. | • Be creative in imagining your event experience.<br>• Play background music while waiting for attendees to arrive.<br>• Use icebreakers or other moments to create space for casual conversation. |
| People may be more reluctant to engage in discussion in an online environment. | • Choose a topic that is personal and that people are passionate about. This is a primary goal of the CC-PES project.<br>• Be specific in describing how audience feedback will inform the action step. Participants will be more motivated to engage if they feel their voice can make a difference.<br>• Offer opportunities for light, medium, and deep engagement to encourage participation from those with different levels of commitment.<br>• Use the chat box or collaborative tools (e.g., JamBoards)  to encourage participation from those who are hesitant to speak. |
| Developing a connection with new people and addressing sensitive topics can be harder in a virtual environment. | • Make time for ice breakers or other light-hearted activities. Small things that put people at ease are worth the time invested.<br>• Give your participants time to warm up, and don't jump to fill silences. One team member said, "Be empathetic, because that's really all you can do." |
| Facilitating online events is challenging. Stimulating and guiding discussion can be difficult, and navigating virtual tools can be difficult to manage as an added layer. | • Give facilitators time to practice and get comfortable with their role.<br>• Recruiting facilitators who reflect the audience in terms of background or demographics can make discussion flow more easily.<br>• When possible, designate one facilitator to focus on the conversation and another to manage any technology needed (e.g., keeping an eye on chat messages or handling screen-sharing).<br>• Use a common Zoom background to signal who the event facilitators are. This makes it easy for the audience to know who to focus on and helps them to direct questions to individuals if they need to. |
| Online attention spans are shorter than in-person attention spans. | • Find ways to limit or break up the information participants have to digest in order to engage with the forum. The Boston team used videos to cut down on the amount of text their forum used.<br>• Avoid complicated tools that have a steep learning curve. Simple tools can be just as effective and keep the focus on the topic rather than the tool. |

| Participants' home environments might not be ideal for learning or participating in a group discussion. | • Consider providing participants with a means to weigh-in asynchronously (but don't rely on asynchronous participation to drive an event without creating additional supports to spur engagement). |
|---|---|

The table above shows there is no shortage of challenges for virtual events, especially as many people experience video conference fatigue during the pandemic. Problems with attendance and engagement discouraged both the Portland and Boston teams and left many with doubts about the potential of virtual forums. "I think I'm really just not sold that forums are great in an online setting," one team member stated. "I think they're not as engaging as sitting at the table with other people. There's a piece that's missing." Most team members, however, could picture a virtual forum working well under different circumstances and could even point out advantages that virtual forums have over in-person forums:

- Virtual events are more accessible in many ways. Attendees can come from any geographic area and don't have to figure out transportation. Events can accommodate large numbers of participants with fewer logistical problems. People with mobility or health issues can attend more easily.

- Speaker recruitment is easier because the time commitment is smaller and doesn't require travel.

- Breakout rooms allow discussion without the distractions that might happen in a physical setting.

- Asynchronous forums offer huge flexibility for people to participate at their convenience.

- Virtual platforms can leverage a variety of tech tools for collaboration, some of which don't have a parallel in an in-person environment:

    o The chat function in most video-conference software allows attendees to pose a question to any speaker or participant without interrupting the flow of a presentation.

    o Virtual polls can allow for instant feedback from audience members.

    o Closed captioning tools can make the event more accessible for everyone.

Phase I participants acknowledge that they have made the best out of a difficult situation, and it remains to be seen if the remaining teams can leverage virtual events to hold successful events for the remainder of the project. It is also worth noting that the members of the Youth Advisory Council had a more positive outlook on the virtual format, and that these online events may look less inhibiting for younger audiences or for those who aren't comparing them directly to the in-person alternatives.

*Recruitment*

Closely tied to the conundrum of virtual events for Phase I teams was the issue of recruitment. While the turnout was good for in-person events, both teams noted that recruiting participants for their virtual events was a challenge. Museum team members noted that the previous, in-person forums that they had experienced were fun outings for their audiences. Once the pandemic forced the CC-PES events online, generating interest and engagement was more difficult. Although they tried a variety of approaches, team members felt they could improve their strategies and also dedicate more time and effort to this important component of the project. The following recommendations were offered by the Boston and Portland teams following their forum and policy events:

**Give recruitment the time and energy it deserves.** As one team member noted, "It's actually a huge task in itself to get people to come to your forum once you've designed it," so this step of the planning process cannot be overlooked.

**Individualize recruitment efforts whenever possible.** The Boston team had very limited success with mass marketing techniques. They recommended using personalized invites to individuals who have the greatest stake in the forum topic or who have turned up for similar events (in this case, the welcome event or topic selection workshop).

**Make the event stand out from the crowd.** When advertising events, teams need to emphasize what makes their event different from other opportunities competing for people's time. This is particularly true for online offerings during the pandemic. People spending increasing amounts of time online are more reluctant to sign up for virtual events in their free time.

**Certain audiences may require additional incentive to participate.** This includes youth who aren't accustomed to taking part in this kind of educational activism or underserved audiences for whom the topic is difficult or who are suspicious of the event's intentions. The Portland team's recommended incentives for youth included extra credit for school or small gift cards. Other reluctant participants might be more receptive to event marketing if it comes from a trusted source.

**Other audiences may require additional supports to participate.** This includes those who face more barriers to participation – for example, lack of free time, speaking another language, and other access issues. Teams have to identify what kinds of accommodation they can provide (for example, translating materials or allowing for asynchronous participation online). Finding ways to align events with other activities participants are already taking part in may also help.

**A strong topic and well-defined audience make recruitment easier.** One team member pointed out that successful recruitment is closely tied to the topic of the forum and its ability to mobilize audiences: "I think what has to happen to really be able to have meaningful virtual conversations are really good questions to begin with. Things you really want to respond to." Knowing who has a stake in your forum topic is also critical.

All of the points above apply to in-person events as well as virtual events, although teams should be aware that virtual ones will likely require more effort.

Policy-forming is the final phase in the CC-PES model, and this step proved the most difficult for teams to interpret and carry out. The project proposal described the vision for this step as follows:

> In the third **policy-forming** step, civic, community, and scientist partners will meet together to analyze and consider the ideas and recommendations suggested by Forum participants. Civic partners will present their reflections of what actions might be taken by the community and how this could inform future policies. The group will **formulate an action plan** and share it with all of the community representatives and scientists who were involved in the agenda-setting phase and with all of the Forum participants.

In trying to follow these guidelines the teams encountered a number of hurdles, some of which can be owed to the unique circumstances of their projects, and some of which point to the need for further experimentation with this step of the CC-PES process and clarification of its goals.

### *Gathering Audience Recommendations*

The first challenge many team members pointed to when discussing the policy-forming step was their lack of sufficient audience data. According to the model, feedback gathered from forum participants should provide direction for the policy-forming step; however, the feedback the Phase I teams were able to collect was small in quantity and inconclusive in nature. Both teams used the Consider.it platform to solicit thoughts and opinions from their participants, but the websites were underutilized by participants in both cases. Low forum attendance was one reason for this, but the teams also suspected that the complexity of the platform and the large quantity of information presented were barriers to participation. Future teams seeking to use Consider.it or similar tools will need to consider additional supports that can encourage its use or ways to simplify the information provided.

In addition to the Consider.it site, the Portland team elicited participant feedback through their breakout discussions, but team members didn't feel these were deep enough or targeted enough to provide the information they were looking for. "It kinda felt like people were just answering questions because we had questions to ask," one team member said, "and it didn't quite get at what we were hoping to get out of it." Another team member commented, "Those conversations were solid and meaningful, but I think it could have been a lot more impactful." One team member suggested rethinking the question prompts they used during the breakout discussions, and another wondered if there was a way to make the topic feel more personal to help draw perspectives from the audience. Tying the forum topic more directly to local policies (discussed above under Forum Development, p. 32) may be one strategy to elicit stronger audience opinions, provided teams are able to recruit participants who have a definite stake in the topic at hand.

Regardless of how they go about gathering participant feedback, Phase I demonstrated clearly that planning for the policy-forming phase has to begin earlier in the project, ideally during the agenda setting phase. Additional guidance from the project proposal states that the involvement of civic and scientist partners in the topic selection workshop – before the forum - should help ensure that these partners are interested in hearing the information gathered through forums, disseminating this information to colleagues and other interested parties, and using this feedback to inform their work. This means that as early as the topic selection workshop, the teams need to be thinking about how participant feedback can lead to practical action.

### *Empowering Audiences to Take Action*

Because the Phase I forums did not provide the teams with clear audience recommendations from which they could formulate an action plan, the teams had to rethink what the policy-forming step of the project model might look like and what it should achieve. One team member noted that starting the policy-forming phase felt like starting from scratch, and without prior examples to draw on the teams felt somewhat lost. In the end, both teams decided to create educational events with a focus on empowering participants to take action. Both events were held virtually via video conference. It is interesting to note that the CC-PES model does not specify that the policy-forming step must be accomplished through a public program, yet both the Boston and Portland teams took this route – perhaps because educational program planning is a familiar arena for the museum partners.

At the Boston policy-forming event, civic partners presented on how housing policy in Boston is made, using additional dwelling units (ADUs) as a recent example. While some participants were initially confused about why they had been invited to a conversation about ADUs, the team explained that they hoped to show the audience how they can influence policy, through the lens of ADUs. The breakout room discussions that followed were fairly successful, with participants sharing their concerns and questions around ADUs with civic representatives. The audience seemed to appreciate having the chance to talk directly with city officials, and feedback from the event showed that participants felt they could take action in the future on housing policy issues. Furthermore, civic partners also reported learning from the event and said participants' comments had influenced their work in the weeks following.

For their policy-forming event, the Portland team decided to partner with the Climate Stories Project, an initiative that helps individuals leverage their personal experiences to communicate about climate change and its impacts. As part of their mission, the Climate Stories Project offers workshops that are focused on empowering participants – a natural fit for the Portland team's needs. The director of Climate Stories worked with the team to tailor his workshops for the three audiences the team wanted to reach – youth, educators, and the general public. One workshop was held for each group in June 2021. During these workshops, participants learned about using storytelling as a technique for starting discussions around climate change and had the opportunity to work on crafting their own stories from personal experience. In addition to building this skill, the team gave their participants tools for taking action by providing directions for finding contact information for local and federal elected representatives and information on local climate justice organizations.

While both teams had to shift their plans slightly away from the guidance of the CC-PES model, they were fairly happy with the outcomes of this final stage of the project. While neither event sought to influence specific policies, both teams thought their events offered participants guidance on how their voice could make a difference. The Boston team had the added success of directly connecting their audience with people in the position to make housing decisions.

### *Finding Your Audience*

In planning their policy-forming events, both of the Phase I teams had to repeat their earlier recruitment struggles and found it difficult to attract participants. Part of the challenge can again be owed to the fact that the events were virtual rather than in-person. The disconnect between forum feedback and the policy step was another factor. In the model design, the forum and topic selection workshop participants are the natural audiences for the policy-forming step, since it provides recommendations based on the input they provide. The Phase I teams were unable to close this loop, however, and had to think anew about their target audience in the final phase.

In team discussions about recruitment for this step, team members identified a number of challenges. First, the policy-forming events are unlike other activities the museum partners typically host – most of which combine education with fun and recreation as opposed to education in service of community activism. Another team member wondered if the word "policy" failed to motivate people and if the word "action" might have more appeal.

No matter how the events are framed, teams should be aware that engaging participants at the action level is a difficult task. In the field of program evaluation, inspiring participants to take action is often viewed at the top of the impact ladder: the most difficult rung to reach. Lower on the ladder are impacts that are easier to achieve, such as exposing participants to new knowledge or increasing their interest in a topic. (This is not to say, however, that these lower level impacts won't eventually lead to behavior change.) Portland's workshop organizer noted that recruiting participants is always a challenge for the Climate Stories Project, and other team members wondered if there is a way to hone in on those individuals in a community who are naturally poised to take action. This reflection calls to mind the role of the civic partners, who are also an intended audience of this step of the CC-PES process. Ideally, the civic partners are individuals in a position to do something with the information the public has provided – the burden should not be on the participants alone.

### *Defining the Policy-Forming Stage*

The goals and possibilities for the policy-forming stage of the CC-PES model remain open for exploration in the next phase of the project, and the remaining teams may find new ways to interpret this step in a way that is meaningful for their communities.

One member of the project leadership team reflected that this step of the CC-PES model may need to be defined more broadly but also cautioned that without some boundaries the teams may not be able to arrive at a concrete outcome. The outcome, moreover, should be something of value to the community. The need for a tangible action seemed to linger unresolved for the Boston and Portland teams at the conclusion of their work. Team members

pointed to comments from some event participants that discussion around these particular topics was not new. These individuals wanted to know what would be done to address the issues at hand. In future iterations, teams may need to think about how action steps can be embedded in their policy-forming stage more definitively, or else redefine the stage to place value on the empowerment outcomes described above.

## RESOURCES AND SUPPORT

By nature of their role as path forgers, the Phase I team members have not had all the supports they might have liked while progressing through the CC-PES model. Despite the challenges, the teams have helped identify a number of supports that are useful for these kinds of projects and ways their own experiences can build a foundation for future teams.

### *Having Examples to Follow*

The CC-PES team members repeatedly expressed in their interviews that having examples to follow has enormous benefit when designing CC-PES events. Although the CC-PES model provided the teams with a basic outline of what each project event should achieve and who should be involved, many steps of the CC-PES project have been new for the partners involved. One team member described the difficulty of being the first to try out the model:

> *For the process as a whole, it was hard being one of the first people to do anything, and it felt like we didn't have a lot of success along the way because we didn't have anything to measure it against. I would say we still don't fully understand the process ourselves and what we're trying to accomplish.*

Likewise, those who *were* able to learn from the examples set by others found this support extremely beneficial. This includes members of the Durham team who were able to attend events held by the Boston team in-person, prior to pandemic shutdowns. One member of the Boston team was also able to attend a forum held by an outside project, which they said was helpful for understanding this particular deliverable of the project. In addition to creating opportunities for in-person experiences, the Museum of Science, Boston provided samples of forum materials for the teams to review, which were later used by the Portland team during their own forum development process. Not all team members may have been equally aware of these examples, however, or they may have joined the project after the materials were shared. One civic team member from Portland said they wished they had seen examples of forums or received "forum 101 training" to help clarify this step of the process.

In contrast to forums, the teams did not have good examples of how to organize the roles and responsibilities within their cross-organizational partnerships, nor did they have examples of how a museum forum might lead into the policy-forming step of the model. Not having guiding examples was in many ways a necessary hurdle for the Phase I teams who pioneered the CC-PES model, and their efforts have the potential to now serve as examples for the remaining teams. The Durham team has noted, however, that the fall off in larger project meetings since the pandemic began has been a frustrating barrier to learning from other teams' experiences. Finding ways to revive communications across project participants will be important for helping Phase II participants build on the knowledge gained during Phase I.

### Sounding Boards and Expert Guidance

Near the end of their project activities, a Phase I team member pointed out that even if the other teams could not provide examples to support each other, they provided helpful outside perspectives on the challenges everyone was working through. Having the input of other civic, museum, and community partners can be useful to teams, regardless of their previous experience with the CC-PES model.

The project teams have also had the opportunity to lean on the project leadership team for guidance in interpreting the model and translating theory to action. In interviews, team members said they felt they could reach out to project leadership for support if needed. Some parts of the CC-PES model remain unclear (for example, the policy step described above, p. 38), but future discussions between the project leadership and Phase I partners may help to elucidate these for Phase II teams and future organizations taking on co-created projects.

The CC-PES project also organized a panel of consultants with expertise in community, civic, and research partnerships. This panel, however, has been underutilized by the teams thus far. Early in the project, the consultant panel gave presentations about soliciting public input on socio-scientific issues, but the guidance provided did not have staying power over the teams' long timelines. Even in early interviews, most team members were only minimally aware of the consultant panel. On only one occasion has a member of the panel provided direct support to a team. Finding ways to create proactive and ongoing support from such a panel may be a better way to leverage their skills, rather than relying on teams to reach out on their own.

Finally, the evaluation mentors ended up playing an important support role during Phase I as a result of the bridge they represented between the teams and the project leadership. Because the evaluation mentors are from the Museum of Science, Boston, questions about the model and other requests have often been directed to them. In lieu of regular all-team meetings during the pandemic, the mentors have also assisted by relaying the teams' progress to the leadership team and serving as general conduits for information.

### Resource Sharing

A final support which would be helpful to the CC-PES teams and future organizations is having an organized means of sharing and saving resources related to their work. Several team members raised this idea during their interviews – for example, saying that it would be helpful to see the recruitment scripts or flyers that other teams created, forum facilitation guides, event agendas, reports generated by the evaluation mentors, or any other number of resources created throughout the project. While some of these resources have been compiled for the teams, maintaining this library and sharing it effectively are an unfinished project goal. Such resources would also be immensely valuable for the eventual CC-PES guide and helping other institutions recreate the model.

# REFLECTING ON THE MEANING OF CO-CREATION

Phase I has generated some important reflections on the CC-PES model, as well as on the overall meaning and goals of co-creation. In their initial project interviews, team members described co-creation in a variety of ways, including these elements:

- Letting the community set the agenda – "We want this to matter to the community… to do a forum that brings the community together because it's something that <u>they're</u> really interested in talking about."

- A ground-up initiative led with the community rather than a top down initiative designed for a community – "Whereas PES might be more transactional, CC-PES is more from the ground up, developed with the community partners."

- Inviting voices that don't typically drive scientific research or museum programming to become collaborators – "Including more diverse voices in the content creation process"

- Elevating community voices, valuing their expertise and viewpoints – "Co-creation elevates everyone's expertise to the same plane."

- Collaborative development of materials and activities – "Making something together rather than making something for someone"

- Incorporating the strengths of all three partners – civic, community, and museum. – "Everyone on the team brings a really unique skillset that we all can leverage in different ways."

Each of these conditions is in line with the spirit of the CC-PES project, but some aspects have been complicated when putting theory into practice during Phase I. Following are some of the key questions posed about co-creation during these first years of the project. It is worth noting that these questions were raised primarily by the museum partners and project leadership. The community and civic partners have generally expressed fewer concerns, either because they are satisfied with how their projects played out or because they are not prone to the same level of introspection on the process as those who have been steeped in the philosophy of CC-PES.

### How should the civic, community, and museum partners balance their roles?

To some members of the CC-PES project, co-creation implies equal involvement of the civic, community and museum partners. Phase I demonstrated, however, that it was not always possible to achieve this balance, and furthermore, that teams may sometimes prefer other arrangements.

One of the key challenges during Phase I was experienced by the Portland team in trying to generate equal buy-in from their community partner. During early interviews, several team members stressed the importance of partners being equally committed to the project – especially because as a co-created project the teams wanted to avoid one partner dominating the process. As discussed above (Portland Activities, p. 12) Portland's community

partner had initial misgivings about the project's intentions, which delayed them from engaging fully in project activities. Later in the project, it became clear that the organization's competing priorities – especially during the pandemic – were preventing them from participating on the same level as the other partners. Some team members questioned whether it was reasonable to expect equal participation from organizations serving such different community needs.

Another question raised by some team members was whether civic and community partners needed to be more closely involved in the forum development process. The museum partners on both the Portland and Boston teams took the lead on creating their forum content. This arrangement worked well for the teams in terms of efficiency and process, but it also led to doubts about whether the forums could be considered co-created. At the same time, each of the partners brought their own skill sets and expertise to the project, and letting the museum partners drive forum development is as logical as letting the community partners serve as the liaisons to the target communities. Co-creation may therefore not mean that all partners are equally involved in each stage of a project.

Creating a shared understanding of CC-PES means clarifying that the roles of partner organizations may overlap at some times but not others and that effort levels may vary. Teams may need to be comfortable with less involvement from certain partners at different points in time – arrangements that are not necessarily equal, but which are equitable and sustainable.

### *What level of community involvement is required for co-creation?*

Different team members had higher expectations or different expectations for community involvement at the beginning of the CC-PES project, and as a result some expressed doubts that they achieved "true" co-creation in their activities.

The first example of this was in choosing the forum topics. After running their topic selection workshops, the teams wondered if their public audiences were in the right position to identify specific forum topics, since their participants had a hard time generating ideas that were targeted enough for a forum discussion (see discussion p. 27). An open question for the CC-PES model is how much guidance teams should provide in this area. Finding the right balance or kind of community input at the topic selection phase is also important for the following phases, since the right topic will ideally drive strong community engagement in the forum and policy forming steps.

Another question for community involvement is defining who counts as the "community." In the CC-PES model, the community can be represented by different entities, and it's not always clear which of these satisfies the community requirement at different stages of the project. The community partner, for example, is intended to represent the interests of the community served by the project; however, one team member pointed out that although they work for a community organization, they themselves are not a member of that target community. There may be times when the community partner does not feel positioned to speak for their audience. The CC-PES model also provides times when members of the target communities can provide their input directly – such as when participants at the topic selection workshop weigh in on potential socio-scientific issues. The Portland team also developed a third kind of community group in their Youth Advisory Council. These teens were selected as representatives of the team's target community and were elevated from audience to facilitators and decision-makers.

Each of these examples are ways the community voice can be incorporated in the CC-PES model, and teams may have different opinions on which feels appropriate for different steps of their process.

On a more meta level, team members and project leadership have also discussed whether a project idea and model conceived of by the museum partner can be considered co-created. Some team members wondered if the pre-determined design of the CC-PES model put limitations on the teams' activities, as opposed to a truly organic, grassroots approach. Following this logic, project members have considered whether the model should have been more open-ended or if the community partners should have been more heavily involved developing the project design at the grant proposal stage. Both of these alternatives present challenges, however. First, successful grant proposals need to be focused so that teams can work toward clear deliverables. In fact, Phase I team members said they appreciated the guidance provided by the CC-PES model and felt it was necessary to keep their work moving forward. Second, community groups have limited resources to put towards grant development work and may not have the capacity to be involved at the proposal stage. One member of the project leadership team suggested that the CC-PES project is perhaps designed for co-creation of content, but not necessarily of format.

Resolving these issues of community involvement will be difficult, but it may be that clear-cut answers are not needed. Instead, community involvement could be viewed on a spectrum, with some projects exhibiting different levels of community input based on their unique contextual factors and the experiences and preferences of each team.

### *Conclusion*

Co-creation – much like public engagement with science, participatory action research, and community-based participatory research – is a guiding philosophy that seeks to replace traditional top-down approaches that dictate the relationships between the public and science. The CC-PES project has demonstrated that co-creation can take on a wide range of forms when put into practice, much like these other schools of thought. Helping teams embrace a more nuanced understanding of co-creation may help future organizations identify the kind of co-creation that works for them and feel a sense of achievement from their collaborative work, rather than hold themselves to an impossible standard.