

Community Designers: A Pilot Virtual Community Codesign Symposium

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I am a member of the Corcovada community in Añasco. I am passionate about visions directed towards human rights and being active in matters of social importance. I consider myself a militant in spaces that ensure collective well-being and cooperative work.

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1. Introduction: Who Controls the Power of Design?

What if you did not get to select your clothes? What if, instead, certain sizes, colors and styles were assigned to you based on what's typical for your demographic identities? Not only would your clothes not fit your shape or your taste, they might even cause further social and professional problems. At an even deeper level, not having the autonomy to make these decisions would undermine your self-efficacy and your trust in the institutions that are supposed to help and support you.

This scenario illustrates, by analogy, what happens to communities all the time. Policies, practices, and solutions to typical challenges are just that. Typical. NGOs and government agencies need to apply relatively consistent solutions for their own economic and operational efficiencies. Experts study problems from their own silos. As a result, communities are not only left with solutions that don't fit and can't be fully implemented or sustained, their future wellbeing and resilience¹ is undermined in the process.

While progress is being made to customize solutions, and in some cases to seek community engagement, the power of design still rests in the hands of the external actors that frequently undervalue or do not engage community knowledge and creativity. In the particular context of disaster recovery and long-term resilience capacity-building, for example, community designers (especially youth) are rarely in the lead. Often, the sense of urgency in a disaster recovery situation creates a "help the helpless" mindset among aid agencies, and also creates a time austerity that conflicts with listening, building local consensus, and modifying recovery plans [1] [2] [3]. Few funding channels are open to community teams to design and implement their own solutions. It is difficult for community designers to access scholarly research and technical engineering, and difficult for sophisticated engineers to embrace simple, inexpensive solutions.

To put this in perspective, we understand development approaches in general, and disaster relief approaches in particular, to fall under one of four design paradigms: "Top-down," "Design For," "Design With," and "Design By," as described in Table 1. The latter three notions are generalizations of what the MIT D-Lab describes as "Design for ...", "Design with ...", and "Design by ... people who are experiencing poverty-related challenges" [4].

¹ Resilience has been defined widely by different authors. Comfort describes it as "The capacity to adapt existing resources and skills to new systems and operating conditions." [18] and Cardona describes it as "The capacity of the damaged ecosystem or community to absorb negative impacts and recover from these." [19]

Top-down approaches presume that an external agent, such as a development agency, licensed engineer, or governmental body, singularly possesses the key economic resources and expertise that are necessary to carry out a project, and typically dismiss or even further marginalize the people who are the intended beneficiaries. Such approaches have dominated Western development and disaster response ideology at least since after WWII, fueled by the “myth” that “[w]hat had been produced in the industrialized countries would generalize itself across the planet” [5], a view nearly identical to E.F. Schumacher’s account that “the development aid of recent decades, and the associated attempts at accelerated industrialization through capital-intensive technology imported from the North, had largely failed as means of solving the basic problems of economic development in the South” [6]. William Easterly has also critiqued the vast amount of aid flowing from industrialized nations to non-industrialized nations, pointing out that it has not led to fundamental eradication of poverty, leading instead to economic dependencies that have increased vulnerabilities [7].

Table 1. Summary Design Paradigms.

Top-Down	Designed FOR	Designed WITH	Designed BY
‘Old-School’ Government & NGO’s	User-centered Design thinking	Co-Design Thinking	Community Designers
We know what’s best for you Constrained by disciplinarity	We design for you based on your stated needs	Community design partners invited into the process	Community teams invite facilitators and outside experts into their multi-disciplinary process
One size fits all is most efficient	Needs-based design is more contextual	Greater contextual and cultural accountability	Place-based and regenerative
Community feedback	Community Input	More Community engagement	Community-led

In an attempt to avoid the negative impacts of top-down strategies, various strategies have emerged to increase participation of community stakeholders. The concept of Creative Capacity Building (CCB), developed at the MIT D-Lab, is described as “Appropriate Technology 2.0” [8]. In the words of founder and co-director Amy Smith [9] (emphasis added),

[Y]ou can **design for people** who are living in poverty, you can **design with people** who are living in poverty, and you can encourage **design by people** who are living in poverty. All three can be effective strategies in different situations. Creative Capacity Building encourages design by people living in poverty, and it is a very grassroots approach to design for development. **Co-creation or co-design** is an approach that brings together people from different backgrounds to design with people in poverty. Design for people living in poverty is more of a top-down approach, but if you do a good job of what many people call human-centered design, you can really engage users in a meaningful way as well.

As hinted by Smith, “Design for” approaches, while well-intentioned, do not guarantee positive outcomes for the community. Lucena et al. have argued that in “engineering to help” projects, teams external to the community often carry mindsets and presumptions that inappropriately apply narrow interpretations of the engineering design process, and reduce community members to the role of “clients” [10]. Consequently, implemented solutions are often not adopted for reasons that have little to do with technical specifications, and more to do with a lack of understanding of the social context.

In contrast, when community members play a role as designers and innovators, solutions are much more likely to succeed [11]. Therefore, approaches that emphasize “Design with”, “co-creation”, “co-design”, and “Engineering with Community” [10], while still engaging external expertise, are more likely to account for social and cultural factors that will allow a project of appropriate scale to succeed. Other aligned philosophies that the authors have explored include responsible wellbeing, vernacular experience, and value-sensitive design [12].

We note that Design Thinking, due to its incorporation of empathy, has the potential to drive processes that engage and empower community designers. Indeed, as is discussed later, we employed Design Thinking as the working design theory for the Symposium. However, Design Thinking by itself does not guarantee community empowerment. It can be used, for example, by powerful companies to enhance their profits, and by universities to enhance their research agendas. Extractive empathy, or using “user’s” perspectives for the company’s (or the university’s) benefit, is symptomatic of top-down retention of the power of design.

The remainder of this article is our account of how we - a network of faculty, students, community leaders, and professional designers in Puerto Rico - through a convergence of opportunity, necessity, demand, and aspiration, developed the Simposio Co-Creando 2020, or the 2020 Co-Creating Symposium. The Symposium, which due to the COVID-19 pandemic was held virtually, joined several gender and age diverse teams from communities in Puerto Rico to ideate and develop prototypical solutions for challenges of relevance to the communities. The Symposium represents our attempt to reset the customary power dynamics of design for community scale solutions, within our local context, by placing the ownership and co-benefits of the creative process into the right hands. We set out to form a design space that attempted to push even further than our “Co-Creating” name implies, seeking to bridge the paradigms of “designing WITH” and “designing BY” community designers, with the hope of yielding not just solution items, but regenerative community empowerment that is the key to resilience and sustainability.

2. Prior History Leading to Co-Creating 2020

For 20 years, the Instituto Universitario para el Desarrollo de la Comunidad (IUDC; in English, University Institute for Community Development) at the University of Puerto Rico, Mayagüez (UPRM), has linked students and faculty with approximately 50 communities across Puerto Rico (with emphasis in the Western region), providing service, mentoring, and research-based expertise through Participatory Action Research as a means of advancing community goals. In particular, the IUDC provided vital responses to the catastrophic events of recent years, such as Hurricane María in 2017 and the earthquakes in 2020, during which new partnerships emerged, including with organizations such as Oxfam America. Through these partnerships, several “Community Resilience Workshops” were sponsored to promote “appropriate technology” and “do-it-yourself” (DIY) “hardware” solutions, as well as mental health “software” activities, enabling communities to be more independent and resilient through the various stages of recovery and redevelopment. As a result of these workshops, a Facilitators Manual was developed, and a series of companion “train-the-trainers” workshops were conducted. A summary of this work appears in [13].

As the Summer of 2020 approached, the faculty, students, community leaders, and professional designers of this network realized the need to continue to address the various ongoing challenges in Puerto Rican communities, compounded by the additional constraints and threats imposed by the COVID-19 pandemic. This led to a decision to recraft a planned summer conference as part of a sponsored research project “Cultivating Responsible Wellbeing in STEM: Social Engagement through Personal Ethics” (NSF 1449489) into a virtual symposium consisting principally of community designers. Thus, we launched the 2020 Co-Creating Symposium, in which we aimed to prototype a new model of solution-seeking at the community level which, as noted previously, would break the pattern of the paternalistic, outsider-driven power dynamics.

3. Co-Creating Guiding Principles

In conceiving the Symposium, we asked the following questions:

- How might we create an experience that shifts the power of design into the communities where it belongs?
- Building on our relationships of mutual trust, could we move toward a more collaborative and ongoing interaction between university and community?
- How could we do this safely and effectively in the COVID-constrained environment?
- Could we co-create regenerative pathways for future community-led design?

We understood that well communities are powerful communities. Powerful communities are resilient. Resilient communities are well. We discerned that the foundational elements of community power are captured by “5 Principles:” People, Place, Purpose, Process, and Positivity [14].

We started with People, because nothing collaborative or creative can happen without people's mutual trust. We intentionally created a sense of community and belonging within the Symposium. Community teams brought their own sense of Purpose and Place to the table, identifying which challenges were most pressing. We believe that communities who use, modify, and own their own reliable problem-solving Process are resilient overall, as solutions that come from the community are more likely to endure, leading to Positivity based on shared efficacy. This model enables addressing present and future community challenges together by maintaining focus on the challenge and relying on their trusted process. Community-owned processes can seek all perspectives, and engage all community knowledge and creativity to enact the solutions that are already there. Therefore, we posit the following elements to be necessary for regenerative collaboration with community designers:

1. **Build trusting relationships and balanced roles. (People).** Several faculty and students affiliated with the IUDC, representing a wide array of expertise in pertinent disciplines (including engineering, architecture, human resources, social work, sociology, urban planning, and psychology), were already acquainted with and trusted by the participating communities. They were trained to serve as *mentors* to facilitate and support the *community designers* to navigate the creative and implementation processes, but not for the purpose of doing the actual design work themselves; the primary design role remains in the hands of the community designers. In essence, the mentors are the bridge that joins the basics of the design process to the community designers.
2. **Build in belonging and community values. (Place).** The invitation to join the Symposium was initiated by the IUDC and affiliated mentors, and the community teams were created by community members. We strongly encouraged youth participation, because community concerns included building efficacy and civic engagement over time, and imparting to young community leaders a sense of belonging through contribution and changemaking. We lowered the digital technology barriers to participation, setting up a hi/lo tech interface so that a phone, unstable internet, and COVID-19 safety precautions would not adversely affect anyone's ability to feel part of something big. Familiar facilitators, community-building activities, appealing graphics, and a warm, curious, sharing tone among all participants within the Symposium helped participants to internalize that this moment belonged to them, and they belonged in it.
3. **Shift creative authorship and ownership of the process. (Process and Purpose).** Our student mentors became facilitators of an adaptable process set up to rely on existing community creativity and knowledge in order to elicit community-owned solutions. Now new mentors have joined in, and together they are in the process of serving the community's needs, by helping them to identify community assets, develop industry- and

funder-ready plans, and stay with them through the implementation. In the end, both students and community teams are developing habits favorable to regenerative community-led design.

4. **Self Efficacy and Proactive Solution-Seeking (Positivity).** A sense of belonging and purpose, builds out shared efficacy and leads to further problem-seeking, solving and proactive resilience over time. The **positivity** gained by successful implementation of community-created improvements not only adds to community well-being directly, but in a spiral of benefits, additionally improves the community's sense of purpose and place. Resilience comes to be understood as the power to drive change, and communities are more likely to take up the complex and existential challenges of climate change, food and water security, and public health.

In closing this section, we note that Lucena et al. [10] cite four determinants for communities, based on work of Mathie and Cunningham [15]: relationships among its members, relationship with place, differences in power and privilege (within the community), and alliances with a common purpose or purposes. The first two of these factors mirror our first two ideas for People and Place, and the fourth associates with our concept of Process and Purpose; the third determinant is not explicitly listed among our listed elements, but is implicitly addressed through the process that aims to include participants with both age and gender diversity.

4. 2020 Co-Creating Symposium: Specific Objectives and Content

The development of a virtual co-design workshop embodied the need for adaptation that was brought by the new coronavirus (SARS-CoV-2). Flexibility and real-time adaptation throughout the event was necessary for successfully completing the workshop and building trust among participants. At the same time, our co-creative event was directly addressing the need for community and interaction that had been growing due to lock-down measures and physical distancing.

4.1. Objectives

We established the following objectives for the 2020 Co-Creation Symposium:

1. To support community resilience and responsible well-being² in communities of our region, with particular regard to risks driven by natural events and public health emergencies (such as the COVID-19 pandemic).

² Responsible well-being can be defined as the need for communities to have a minimum access to resources to enjoy a good life while also not exceeding the limits of consumption that are detrimental to human wellbeing. According to Robert Chambers, "For well-being to be responsible, in a sustainable global eco-social system, those with more have to accept having less" [17].

2. To explore community needs, interests and priorities within the following focus areas: energy resilience, water sanitation and hygiene, and strategies to facilitate contact tracing.
3. To engage community members in the design process in order to ideate and prototype their own innovative solutions to community challenges.
4. To create action plans and form partnerships in order to facilitate project implementation.
5. To contribute to bridging the generational gap in community leadership by engaging young and adult community members in community co-creation as teammates.
6. To create and facilitate a community-centered design experience which adapts to the new global pandemic context in a safe manner for all participants and facilitators.

4.2. Symposium Content

Focus areas

The 2020 Co-creation Symposium was centered around the following focus areas, identified by previous collaborative community engagement:

COVID-19 Family Journal

Contact tracing is a vital tool for identifying potential COVID-19 cases in the community and preventing future infections. The Family Journal is a tool for documenting the activities that family members partake in and the people they come into contact with, thus facilitating future contact tracing if necessary. During the symposium, innovative ideas were generated to facilitate the documentation of outings and contacts within the community context.

Portable Sinks and Personal Hygiene

Hand-washing with soap and water is our strongest weapon against COVID-19. Nevertheless, natural events such as hurricanes, earthquakes and droughts, can result in water outages - and prevent proper hygiene maintenance. This focus area challenged participants to design portable hand washing stations and other hygiene alternatives for their community challenges.

Community Energy

The failure of the electric grid is one of the most common outcomes of events such as storms, hurricanes and earthquakes. Extensive and prolonged interruptions can have fatal consequences for the population. Participants in this focus area explored their energy needs and appropriate solar energy alternatives for their community.

Place-based Design Thinking and Co-Creation

The symposium included sessions and activities focused around design thinking and the design process in such a way that participants were introduced to a methodology that could be applied to

different challenges and projects in the future. The curriculum included a design sprint to practice design thinking, an introduction to the team's selected focus area (presented by subject matter experts), and then proceeded with design thinking activities, further defining needs and interests within the focus areas, ideating and then prototyping solutions, and developing action plans. The curriculum included community-led, hands-on and practical exploration, ideation, prototyping, feedback and reflection sessions that resulted in a conceptual design conceived by the community team.

4.3. Symposium Methodology

Organizing Team

The organizing team for this symposium included several members of the IUDC, each of whom is a principal author of this work: 3 professors (Marcel Castro, Electrical Engineering; Christopher Papadopoulos, Engineering Sciences and Materials; and Luisa Seijo Maldonado, Social Sciences, and the Director of the IUDC), a consultant of the IUDC (Nathalia Ospina), two design thinking practitioners (Pamela C. Silva Díaz, DBA PamLab Design and Engineering and Maggie Favretti, founder of DesignED 4 Resilience), and approximately 10 students. The organizing team led the curriculum and experience design, community recruitment efforts, virtual delivery logistics, and general facilitation. All elements and procedures for the Symposium were approved in advance by the University's Institutional Review Board.

Recruitment

We recruited community participants principally through coordination with community leaders via phone and chat, with whom the community and university partners already had a close relationship with from past projects. Most of the participating communities are highly vulnerable to the impacts of disasters and public health emergencies, due to weak power, water and telecommunications infrastructure, remoteness, lack of access to health services, and challenging social and economic circumstances. Community leaders were requested to recruit community participants that could both participate in the event and be involved in a longer term continuation of the projects. We encouraged the participation of young community members in order to achieve inter-generational teamwork. Participants completed registration forms before the workshop in order to express focus area preferences, availability, and access to internet service and devices. Finally, each participant was offered a stipend of \$300 for their completion of the Symposium.

Tools and Methods

Teams, including youth, from nearly a dozen communities participated in the Symposium, which consisted of 4 days of sessions and activities, all virtual, with synchronous and asynchronous components. The teams attended in two cohorts, one from July 27 – August 3, 2020 and the

other from August 4 – 7, 2020. A final presentation with both cohorts was held on August 21, 2020.

The online event was carried out using the videoconferencing platform Zoom. As some community members were unfamiliar with the platform, written and video instructions were sent out before the event, members of the organizing team checked-in with community members to verify readiness and clarify doubts, and instructions were repeated during the sessions. The translating feature was used as needed to facilitate communication between native English and Spanish speakers. Technical facilitators provided individual assistance to community members who had technical difficulties during the sessions. Safety protocols and requirements were explicitly informed throughout the event (from initial recruitment throughout the sessions) in order to prevent any unsafe behavior, such as in-person gatherings to attend the event.

While we used a virtual platform for meeting, the Symposium activities themselves were “low-tech” in order to remove any obstacles due to potential low technological literacy and limited or inconsistent bandwidth. The “chat” feature was used extensively (sometimes as input to “word clouds” that facilitators would produce) and participants were encouraged to write or draw in pieces of paper, later showing their pages on their web cameras.

Schedule

The schedule of the Symposium was planned as 4 all-morning workshops, with some activities for the participant teams to be completed on their own or with mentors during the afternoons. The first day was focused on orienting participants to the concepts of Design Thinking, as well as to the three broad focus areas, along with fun team-building activities that emphasized the need to listen to others. A brief design sprint around designing a public bathroom was conducted to illustrate design thinking steps. Between the first and second day, the participants were asked to conduct interviews with other members of their family or community regarding their ideas of what makes an ideal public bathroom. The purpose of this exercise was to practice the skill of listening with curiosity to people’s ideas. On the second day, participants were asked to give presentations about what they learned from the interviewing experience. Also on the second day were further interviews within the cohort centered on the focus areas.

On the third day, the focus was on problem definition and ideation, as distinct from arriving immediately at a partial solution. Then on the fourth day, further iterations were generated as a means toward partial convergence. Implementation ideas, such as how to identify and solicit resources, were explored. Finally, the Symposium culminated with a combined presentation day for both cohorts.

A general summary of the Symposium schedule is in Table 2.

Table 2. Schedule of Symposium

Day 1	Introduction to Symposium and tools Participant introductions and team building Introduction to focus areas Design Sprint
Day 2	Design Sprint presentations Empathy exercises Interviews and insights
Day 3	Problem definition Ideation Concept selection Introduction to alternative topic
Day 4	Introduction to alternative topic Idea iterations Feedback Implementation plan Reflection
Day 5	Final Presentations with potential partners

5. Results

The results of the Symposium include a variety of direct and broader impacts, ranging from the initial prototypes generated by each of the 10 community design teams to expressed experiences and attitudes of all participants. In general the results demonstrate the feasibility to adapt Design Thinking in a “power balanced” community design experience, the generally positive experiences of the participants, and lessons learned for future improvements.

Community Prototypes

While the prototypes responded to the three focus themes established at the beginning, the range of creative alternatives presented expresses each community’s perspectives and also feasibility of the “power balanced Design Thinking” approach to elicit these prototypes. For example, while a number of communities presented their own version of a touchless hand washing station, some proposed “do-it-yourself” styles that emphasized low budget for a public, partially-monitored outdoor area, while others emphasized the need for a more “finished” aesthetic, subject to a higher budget, for use at a highly monitored indoor community center. A summary of all of the project prototypes is in the Appendix, and details also appear in a locally published report [16].

Participation and survey results

A total of 11 different community teams, comprising a total of 41 people, participated in the Co-creating Symposium. Participants' ages ranged from 12 to 69 years old, and 7 of the participants were under the age of 18. The majority of participating members, 29, identified as women, while 12 identified as men.

An online survey was conducted in order to evaluate the symposium experience and gather feedback. In this survey, 91.3% of the respondents evaluated the Symposium content as "excellent" and the event duration as "adequate". Furthermore, 65.2% of the respondents expressed that they are "very likely" to use the design process or other tools used during the symposium to respond to future community challenges, and 30.4% responded they are "likely" to do so.

Respondents expressed very positive feedback about the experience within the survey. Some of the top aspects of the experience, as stated by the respondents, include "sharing and developing ideas", "teamwork", "empathy", and "prototyping". Participants also mentioned obtaining key lessons and insights surrounding solar energy, sketch modeling techniques, Covid-19 prevention, problem solving, teamwork, design thinking, portable hand washing stations, and the family journal method. Some aspects of the Symposium that can be improved, according to participants, include technical difficulties and more ample community participation. Some participants expressed their interest in being part of more workshop experiences like this one.

Feedback and continued commitment from the mentors suggests that for most of them, participation in the Symposium was transformative in their thinking about multi-disciplinary convergence and also about applying engineering research and principles of practice in ways that enhance trust and generate shared and regenerative efficacy around enacting local solutions. Many have volunteered to step into the implementation landscape with the community design teams.

The facilitators also made observations that are relevant to evaluating and adjusting the workshop. One key observation – perhaps not different from more formal design settings – was that participants had the tendency to "jump over" the problem identification stage to land immediately in prescribing solutions. Future offerings of this or a similar experience might do well to emphasize not only the need, but the actual process, to identify problems, as distinct from solutions.

Finally, in the spirit of empowerment that is at the root of the Co-Creating Symposium, each participant is considered an author of this article in recognition of their direct contributions. The Appendix contains direct commentaries of several participants that express their further insights and experiences.

Continuity efforts

From the very beginning, the Symposium organizers discussed the need to plan for continued engagement and support after the conclusion of the Symposium. The organizers recognized that offering resources (education, stipends, etc.) has little value by itself, and indeed could be *disempowering*, if lasting solutions could not be both generated and realized as a result of the Symposium. Therefore, the Co-Creation Symposium was crafted to spark exploration and conceptual design processes which were not meant to end – or be the end product – as the event concluded. Over the last several months, the organizing team has continued supporting the team projects so that the conceptual designs can evolve to more detailed designs and eventually blossom into prototypes and flourishing implemented solutions. The following actions have been taken to support and continue the virtual symposium:

- Implementation plan section at final day of symposium
- Final presentations with potential partners or funders
- Mentors from IUDC continue to be assigned to community teams. These mentors accompany community teams in their project development process. Currently there are five (5) mentors (four students and one design practitioner) directly accompanying community teams, and seven other members of the organizing team are involved in the continuity efforts.
- Bi-monthly meetings with community mentors.
- Partnerships with stakeholders to support team projects, such as volunteer engineer organizations, universities and non-profit organizations.
- Matchmaking with potential funders.

Due to these efforts, community teams have made progress with their projects since the Symposium. Some teams have been able to recruit new community members to join in their projects in order to continue its development. Other teams have already been able to apply for grants in order to begin building their prototypes, and are awaiting decisions. In particular, one community (Corcovada) sought and received funds to install the community center handwashing station they had conceived during the workshop (See Appendix for a summary of community projects and Reference 16 for more details); another community (Arenas) was partnered up with volunteer engineers to inspect a building that they propose to serve as the community emergency center and for which they designed the space layout during the Symposium; and two other communities (Culebra and La Salud) have continued the detailed design of their respective innovations, in partnership with university students (from the University of Puerto Rico and MIT), and with their community groups. It has been noted that community mentors have represented a trusted contact to guide and support the teams in the project development process. On the other hand, some community teams did not have either the availability or the interest to continue working on the project past the Symposium event.

6. Challenges and Recommendations

Running a community-based virtual workshop can present special challenges, including poor phone and internet service, weak power infrastructure, and low technological literacy levels of participants. In addition, even in the absence of these challenges, the very notion of a virtual event raises questions as to whether such an event is conducive for realistic community based design activities. Our experience indicates that indeed, it is possible to have such a meaningful experience in a virtual setting with other structural challenges. The following recommendations can be of use when planning and delivering an online community workshop:

- Establish a communication channel with participants (ex. WhatsApp chat).
- For COVID-19 safety, actively discourage groups from meeting in-person in order to share devices or internet service (unless they are family).
- Assign technical facilitators who are in charge of time keeping, break-out rooms and giving technical support. Assign at least two facilitators, in case one of them loses internet service.
- Practice the event with the organizing team to identify possible difficulties and adjust the curriculum appropriately.
- Start early and allocate additional time for potential delays.
- Send instructions - preferably step-by-step videos - to use the platform and its capabilities (such as chat, translation, or break-out rooms).
- Provide the contact information of technical facilitators and address technical issues offline so as not to interrupt the agenda.
- Incorporate activities with body movement and bathroom breaks.

It is important to note, that while a virtual community workshop comes with its set of challenges, it also brings an array of opportunities that would otherwise not be present. Due to its online nature, the workshop was able to connect communities from different parts of our region, and bring together facilitators and subject matter experts from different locations.

Beyond the logistics of the event itself, a broader challenge of a community-centered design experience is how to support and plan for continued growth and development of the projects after the event itself. Within the event dates, participants discover both practical techniques as well as belief in the possibility to succeed (this is borne out in several comments recounted in the Appendix). However, thereafter, how does the network of community teams and partners continue the co-design and co-development process?

In considering this question, the issue of resources to support continued mentorship, management, coordination and overall funding must be considered. A lack of support for mentors and other involved actors can lead to burdens and eventual exit, which can lead to community abandonment which in turn undermines trust..

Another dynamic that might occur is that new team members might get added to projects, leading to delays related to the need to train members in the collaborative design process. Also, other non-community members may join the team, possibly leading to diminished community representation, as well as the need for training the new members in the collaborative design process.

In considering these challenges, we offer the following insights and recommendations:

- Plan for a complete design and development cycle at the beginning of the process, to the extent possible. This includes anticipating necessary resource requests and applications.
- Incorporate elements of the development process beyond the immediate technical design parameters, such as resource seeking (e.g., funds, expertise), organization of commitments, and presentations (e.g., to inform stakeholders of progress).
- Maintain continued communications, with roles delineated.

In the case of the Simposio, several of the core development team and student mentors are maintaining a bi-weekly meeting to encourage projects and share updates. This is being done essentially on a volunteer basis, although resources are being sought to provide stipends or part time income to the involved team members.

7. Closing Remarks

Founded on a desire to address both immediate local concerns to communities in Puerto Rico, and also challenge the dominant top-down, one-size-fits-all, paternalistic paradigm of development and disaster recovery practices, the Co-Creating Symposium brought together 41 participants from 11 communities, of whom 29 were women and 7 were under the age of 18. The combination of “Design with” and “Design by” elements tangibly placed responsibilities and ownership of ideas in the hands of the participants as they conceived solutions to situations that they determined were meaningful to their communities. A variety of positive outcomes emerged, both in direct solution prototyping to shifting of attitudes and engendering senses of empowerment. That such a meaningful experience was achieved in a virtual environment is a further success of the Symposium, and demonstrates at its heart, community design is ultimately about the body of people present, and their sense of place and purpose.

Acknowledgement

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Appendix. Summaries of Community Projects and Commentaries

Community	Challenge, Need or Opportunity	Design	Details
1- Culebra Island off east coast of Puerto Rico	This community is in a municipality with high touristic activity, and limited medical resources. The community is concerned about Covid exposure due to tourism and lack of adequate hygiene facilities.	“Touchless” hand-washing station: A stand-alone, contactless hand washing station that uses rainwater catchment and solar power for its operation.	The hand washing station contains a solar power system for electronic components, and a rain-water catchment and treatment system for the water supply. It will be placed outside of a public restroom to avoid overcrowding.
2 -La Salud Mayagüez, western Puerto Rico	The main concern for this community during power outages is not being able to keep food, milk and medicine safely refrigerated.	Solar-powered refrigerator lockers	As the local community center has a solar power system, the community proposes to create refrigerator “lockers” where residents can keep a limited amount of supplies.
3 - Añasco Playa Añasco, west coast, north of Mayagüez	Contact tracing during the COVID-19 pandemic can be challenging without a proper way to record gatherings and outings.	Family Journal: Mobile app and Notebook	The mobile application can register family outings and facilitate contact tracing. The team also ideated an analog option: a family notebook with color coded charts family members with lower literacy.
4 - Arenas Guánica, southwestern Puerto Rico	This community is prone to frequent and prolonged power outages, especially during disasters such as storms or earthquakes.	Community Emergency Center	The community emergency center – which will be located in a community school- will include charging stations, refrigeration, storage rooms, and water storage.

5- El Seco Mayagüez, western Puerto Rico	Public spaces in the coastal community lack adequate facilities for hand washing.	Portable Hand-Washing Station for Community Gazebo	The handwashing station will be fixed to a gazebo which is frequently visited by residents and outsiders. It will include a sensor-based soap dispenser to avoid contact with surfaces.
6 - La Esperanza y Portillo Miramar Juana Díaz and Manatí, central/eastern Puerto Rico	Provision of practical COVID-19 prevention supplies for the community.	Covid-19 Prevention Kit	The kit contains the following items: family journal, N-95 masks, hand sanitizer, alcohol, wipes, and educational material.
7 - Villa Esperanza Toa Alta, northern Puerto Rico	The community tends to suffer power outages during the year, and they can take months to regain electrical service after a storm.	Community Nano-Grid	A group of neighboring houses (4 to 5 houses) will share a solar power system to address basic needs during a blackout and share important appliances, such as a refrigerator and a freezer.
8 San Antonio Naranjito, central/east Puerto Rico	Contact tracing during the COVID-19 pandemic can be challenging without a proper way to record gatherings and outings.	Family Journal: Calendar and stamp system	The color-coded calendar will be able to record family member outings. Additionally, a stamp system was ideated to record visits to community businesses: each business will provide a stamp when a client visits in order to record outings and facilitate contact tracing.
9 - San Salvador Caguas, central/eastern Puerto Rico	Team members identified that there is little access to hand washing facilities while carrying out errands outside the home.	Covid-19 portable kit	This kit is small and portable, so it can be stored in bags and backpacks while running errands. It contains liquid soap, hand sanitizer, wipes, masks, and alcohol.

10 - Corcovada Añasco, western Puerto Rico	The community activities center can host groups of people for special events, and shared restrooms could dissuade physical distancing and touching contaminated surfaces.	“Touchless” hand-washing station for community activities center	The hand washing station will be located beside the main door so that activity participants can wash hands upon entry. It will not require touching handles or levers for dispensing soap or water, and will be included in the rental of the venue.
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Participant Commentaries:

From Culebra (Community 1):

- “It was a great atmosphere to get into perspective the fact that many communities are working hard to lift themselves up towards a more sustainable and resilient future. The symposium provided “a space of solidarity and knowledge”. It had structure but at the same time it felt flexible. It was an enriching experience that made the community feel supported and as though there was a genuine interest from the mentors and symposium organizers to help Culebra. The symposium’s environment made me feel comfortable with bringing ideas and receiving feedback, as I was welcome to contribute. The interactions along the week made me feel excited because I see a Puerto Rico that emerges with youth and with innovative ideas and that we bet in our communities for transformation.” (Phone Interview, March 7th, 2021).

- Dulce Del Rio Pineda, community leader, Mujeres de Islas community organization from Culebra, PR.

- “As a student, I was not aware of any of the efforts that have been carried out for years in Culebra. The community is clearly an example of sustainable self-management. Their sustainability-driven efforts and initiatives are really something admirable and very atypical in communities in the main island of Puerto Rico. Without a doubt their continuous investment in their youth’s potential through community engagement and education should be a role model for many communities and us all.”

-Javier A Moscoso Cabrera, undergraduate student in electrical engineering with a minor in music. Participated as mentor in the pilot of the Co-creating Symposium.

Currently IUDC research volunteer with experience in participatory action research.

- “The collaboration between all the project participants has been very enriching. From day one the team has been a hard worker, with a lot of motivation and dedication to the projects that are being carried out. The biweekly meetings with people from other communities are also very beneficial, at least for me since I know more about other communities, their needs and there is even a space for people who do not work with the community to suggest ideas for the benefit of the communities, which I think is excellent since it is always good to have a lot of support in this type of project. It feels like a very welcoming and hopeful group that there are people fighting and working for communities that do not have sufficient accessibility to many resources. But, what I have felt the most has been learning, learning from fellow mentors, coordinators, people from other countries that through this project we have managed to contact and above all learning about people from PR communities, who do not give up and fight for a better future. I have learned too much about the Culebra community. They take advantage of their needs and turn them into their strengths. It is a community somehow forgotten by the government of Puerto Rico as it is an island municipality, and they do not have the same facilities that we have "on the Big Island" as they say. They suffer from a lack of many essential services, however, they have decided that this will not be an impediment, that if the Government does nothing for their community then they do it themselves. It has many local projects of planting, teaching, dining rooms, housing for people who would go to work there, promoted by associations, foundations that they have managed. They are an excellent example of self-management and that there is no big or impossible dream for anyone, only the desire to get ahead is enough.”

-Marian Amneris Irizarry Plaza, undergraduate student in industrial engineering with a minor in project management. IUDC mentor volunteer with experience in participatory action research.

From La Salud (Community 2):

- “The co-creation symposium could be described as an excellent and very nourishing/learning experience for communities. All members and mentors got together to plan a collective project that would help all the communities. Likewise, I can mention that the co-creation symposium was helpful for community development. The integration and collaboration between all the participants were very pleasant and cooperative.

Therefore, it could be described as a positive one. Yes, there is more learning about community, because you think about what is more important and essential for communities. What is more truthfully important is to develop community self-management where everyone could get united for a common good.”

-Kevin O’neil Crespo Pagán, undergraduate student in general social sciences with two minors one in teaching preparation in history and social studies; and the second one in sociology and environmental public policy. Participated as a young community leader in the pilot of the Co-creating Symposium. Currently a IUDC mentor volunteer with experience in participatory action research.

Original comment: *“La experiencia del Simposio Co-Creando se puede definir como una excelente y de mucho aprendizaje para las comunidades. Todos los miembros y mentores se unieron para planificar un proyecto colectivo que ayudará a toda la comunidad. Por lo tanto, también puedo mencionar que el simposio fue uno de mucho beneficio para el desarrollo comunitario. La integración y colaboración de todos los participantes es muy amena y cooperadora. Por lo tanto, la misma se puede definir como una positiva. Si se está aprendiendo más acerca de la comunidad, ya que te hace pensar en lo que verdaderamente es importante e imprescindible en una comunidad. Lo verdaderamente importante es lograr un desarrollo de autogestión comunitaria donde todos y todas nos unamos por un bien en común.”*

From Arenas (Community 4):

- “I loved it; I learned a lot. It was a very productive time. This experience helped a lot in the idea that we had for the community center. Before we were very fearful about many things that we didn’t know, but after the Symposium we learned how to cope better.”

-Virgen Rosado, Community member.

Original comment: *“Me encantó, aprendí demasiado. Fue un tiempo sumamente productivo. Esta experiencia ayudó a la idea que teníamos del centro de gran manera, pues antes estaba temerosa de muchas cosas que no conocía, luego del simposio aprendí a desenvolverme mejor”.*

- “It was an enriching experience, we learned about many topics apart from the one chosen from the community (solar energy). After this experience, we can say officially that the school that we want to use for our community center is ours. During the symposium we got in touch with people that have had similar experiences, this is why it helped a lot.”

-Miguel A Barrero, Community member.

Original comment: *“Fue una experiencia enriquecedora, se aprendió sobre varios tópicos aparte del escogido por nuestra comunidad (energía solar). Luego de esta experiencia, oficialmente podemos decir que la escuela que queremos utilizar para el centro comunitario es nuestra. En el simposio hubo contacto con personas que ya habían pasado por experiencias similares, por lo que, él mismo nos ayudó demasiado”.*

- “These are the words from the people that participated in the Co-Creating Symposium from the Community when we asked about the experience. As we can see, the comments are very positive and full of joy. This community had worked for a long time before the symposium with all the paperwork for them to get the community school that had been closed many years ago. During the symposium, besides helping the community with the solar energy theme, we helped them with all the necessary parts to establish objectives and routes to head towards the ideal goal, to have the Emergency Community Center. In my opinion, the symposium was a success and more during the pandemic, it allowed us to transport ourselves for a few hours to talk and help different communities. Additionally, to see that the community was perseverant, fighter, and worker made me think that we would have a future with all the established goals during the symposium. Today, approximately seven months after, I can realize that they are closer to fulfilling their tasks and goals, now the community owns the school and they have made arrangements for engineers to make inspections. ... The community is very ahead, I trust that soon they will have The Emergency Community Center.”

-Alexis Ramiro Burgos Rivera, undergraduate student in electrical engineering. Participated as a mentor in the pilot of the Co-creating Symposium. Currently IUDC research volunteer with experience in participatory action research.

Original comment: *“Estas son las palabras de las personas que participaron del Simposio Co-Creando de la comunidad Arenas en Guánica al preguntarle sobre su experiencia en el mismo. Como podemos observar los comentarios son muy positivos y llenos de alegría. Esta comunidad había estado trabajando desde tiempo antes del simposio con los trámites para que le cedieran una escuela en la comunidad que había sido cerrada años atrás. En el simposio, además de ayudar a la comunidad con el tema de energía solar, se le ayudó con las partes necesarias para establecer objetivos y rutas para encaminarse a su meta ideal, tener el centro comunitario de emergencias. En mi opinión, el simposio fue un éxito y más en medio de la pandemia, pues nos permitió transportarnos por unas horas para hablar y ayudar a diferentes comunidades de Puerto Rico. Además, ver que la comunidad de Arenas era una perseverante, luchadora y trabajadora me hizo pensar que tendrían mucho futuro con las metas establecidas a lo largo del simposio. Hoy aproximadamente 7 meses después me he dado cuenta de que están más cerca de lograr su acometido, pues ya la escuela le pertenece a la comunidad y han hecho gestiones para que ingenieros la inspeccionen. Esto con la intención de resolver el problema de columna corta en la misma (problema por el cual luego de los temblores de enero 2020*

colapsaron varias escuelas). La comunidad va bastante adelantada, confió en que pronto tendrán el Centro Comunitario de Emergencia de la Comunidad Arenas en Guánica.”

From La Esperanza and Portillo Miramar (Community 6):

- “Within the different spaces of collaboration and integration, it has been possible to feel empowerment, awareness and control before events that concern us as members of society. In addition, it has been possible to develop a space of respect and horizontality where everyone is listened to and included in the development and growth processes in the face of challenges. As a person who supports the communities, I have learned that their empowerment must be desired by each person in order to achieve transformation. Contributing and knowing the realities of each person in the communities has allowed us to be aware of each story. On the other hand, we have experienced willingness, desire and strength which allows us to continue serving as support and contribution to community improvements.”

-Genesis Crespo Cruz, undergraduate student in psychology with a minor in human well-being, participated as a community member in the pilot of the Co-creating Symposium, IUDC coordinator volunteer with experience in participatory action research.

Original comment: *“Dentro de los diferentes espacios de colaboración e integración se ha podido sentir empoderamiento, conciencia y control antes eventos que nos competen como miembrxs de la sociedad. Además, se ha logrado desarrollar un espacio de respeto y horizontalidad donde todxs son escuchados e incluidos en los procesos de desarrollo y crecimiento ante el enfrentamiento de los retos. Como persona de apoyo a las comunidades he aprendido que el empoderamiento de ellas debe ser deseado por cada persona para así lograr una transformación. El contribuir y conocer las realidades de cada persona en las comunidades nos ha permitido ser entes conscientes de cada historia. Por otro lado, hemos experimentado disposición, deseo y fuerza lo cual nos permite seguir sirviendo de apoyo y contribución a las mejoras comunitarias.”*

- “It was a challenging experience.” says N. Rivera. She discussed that talking about the necessities of the community she’s part of was the hardest part of being part of the Symposium. On the other hand, she liked the experience because it made her aware of the power she has as an individual. Gabriela Otero mentioned; “As a mentor of the team of students who are working with the community, I feel hopeful.” With everything that is occurring in the world and even in our personal lives, knowing that people have a huge compromise with the well-being of the communities is encouraging. Also, the

cooperation between people from distinct academic backgrounds with everyone having the same thing in mind, to support all the communities we can, gives an optimistic outlook. One of the biggest strengths of Portillo Miramar is the knowledge they have about their community. They know what they want and need for it to flourish. The community is in need of people that support them and be with them step by step in order for them to reach their goal of building the COVID kit.”

-Gabriela A. Otero Andino, sub-graduate student in Natural Sciences with a Minor in Biological Sciences. IUDC mentor volunteer with experience in participatory action research.

From San Antonio (Community 8):

- “The community describes participation in the Co-Creando Symposium as an experience full of fun learning, in which it is allowed to share ideas, talk about the community, get to know other communities, and also meet the needs that they have for each other.”
 - Jolimar Z. Torres, young community member. High school student.

Original Comment: *“La comunidad San Antonio- Barriada Naranjito describe la participación en el Simposio Co-Creando como “una experiencia llena de aprendizaje divertido, en la cual se permite compartir ideas, hablar de la comunidad, conocer de las demás comunidades y así mismo encontrar las necesidades que se tienen”*

- “An enriching experience, where we are challenged to present ideas that contribute knowledge to our community, such as the Family Diary”.

-Nicolle M. Torres, young community member.

Original comment: *“Una experiencia enriquecedora, donde nos retan a exponer ideas que aportan conocimiento a nuestra comunidad, como lo es el Diario Familiar”*

- “Regarding the feeling of collaboration, interaction and cooperation among the participants of the symposium, it is mentioned that it was a “process full of great energy, since we shared ideas, and this allowed us to listen to the ideas of the other participants, which contributed to leaving of our own thoughts and took us out of the comfort zone, because it was understood that all communities had different needs and ideas and regardless of the needs of the communities, all participants have the same vision that it is to help to their communities. On the other hand, in the process as a mentor of the Co-Creating Symposium, It leaves a learning in which it coalesces into a conclusion and

that is that the communities have different needs and requirements, this will depend on their history, territory, culture and interaction among community members. As a strength in the communities of [our area], it is considered that they are very well structured, organized and cohesive, which allows the communities to have their objectives defined and to proceed to reach them.”

- Geraldine Alvarez Fajardo, Social worker and graduate student of a master in business administration and human resources. Participated as mentor in the Co-creating Symposium. Currently IUDC research volunteer with experience in participatory action research.

From San Salvador (Community 9):

- “My experience was enriching. I really liked it, it helped me to train in areas of community and social work that I did not know or master due to lack of information or strategies. I would like the workshops and the dynamics to be replicated in other areas of social and community help. I congratulate all the members, facilitators, mentors and the work team in general, the university and the Co-Creating space for the opportunity it offered us to create, develop and learn in collaboration of Projects aimed at the awareness and integration of communities, and individuals for the solution of our social problems and needs. Looking for a better result in action. Very grateful.”

-Carmen I Aponte. Community Leader, COSS San Salvador, Caguas.

- “My experience during the Co-Creating symposium was enriching. Not only did I have the opportunity to pass each topic, but I also had the joy of meeting such extraordinary mentors who made this teaching a great opportunity. It was an experience in which I was able to learn new ideas and ways of carrying out work plans on issues that affect my reality both socially and economically.”

-Zadkiel I. Garcia Gonzalez. Young community member. Undergraduate student of socio humanistic studies.

- “ You have to live it to understand that this beyond teachings was an excellent organization where we all had our time to participate. I think there are no words to describe what one can feel with this opportunity. They were very attentive to our needs, doubts and ideas. They were always available for any help we asked for, as well as being very attentive and friendly”

-Maria Calixto, Young community member, Professional Nurse.

- “The experience as a mentor and facilitator during the Co-Creating symposium was one of a lot of learning, preparation, and enjoyable participation with different people. An opportunity that I have not had as we did. Each participant was a key point in the process and development, not only because their voice was important, but also because their knowledge was valuable in the process of creating real solutions with the authors of the problem (who live it). The community spoke and told us their perceptions. The participation of young people who seek a promising future for their communities and who see themselves as a model of change in society. The interaction of all the participants flowed in a spontaneous and inclusive way, the opportunity to contribute and have open feedback helped to better express and to feel that we were all fulfilling a significant role in the process. The community enjoyed the space, - virtual space. Comments that motivate and invite us to move forward and adjust more and more. The community also spoke about their perception of the coordination and collaboration between all the participants, the facilitator model. The virtue of the community in which I had the opportunity to participate was their commitment, union and enthusiasm, they were always attentive and eager to contribute their opinion and make us feel part of their community. They taught me that an organized and empowered community is capable of creating change. Currently, they are developing several projects. They have a solar cooperative, botanical gardens in process, and they were able to realize the project that they had been working on as an educational campaign and the Portable Anti-COVID kit, which was the prototype that we worked on during the symposium. Virtual meetings were held to work on the action plan and were able to guide them with their goals. From this experience I learned that all together we can seek solutions with greater impact and that facilitate the way of life for all of us.”

-Nathalia Ospina Uribe, Architect with a Master in Civil Engineering and Construction Management. Participated as mentor in the Co-creating Symposium. IUDC Mentor and Consultant volunteer with experience in participatory action research.

From Corcovada (Community 10):

- “It was something educational, not only did it remain in learning, it took us further, it made our minds fly and the result became part of us, and finally, we managed to do it. We learned about the needs that our community was facing at the time and how? As a community we could come together and look for solutions to transform those needs. In addition, we learned tools to share with other members of the community, the workshop

made us aware. I loved it! This process was different, a lot of collaboration between all the participants, and the most important thing is that this event stayed in our community. Many entities contribute for the well-being and to improve our quality of life. I have been living in this community for 60 years and I have been able to experience the contribution that some agencies have provided us, whether tangible or intangible, we have had the opportunity to take advantage of this aid, we have been organizing over time, for my part I have been able to collaborate for 10 years as president and I feel that interventions like this are seeds that are sown and have emerged. I felt very comfortable interacting with all the participants during and after the event. Now we have become more united and especially this workshop taught us that we have technological tools that can help us to unite regardless of the differences and the knowledge that we have, we can help each other, and thus we were able to participate, and we even created an internal group, "The Chilin girls." My sister, a friend and I, we met at my house to share the internet and help each other, young people with leadership skills joined, community members who today have retired from their jobs, others currently working or with knowledge valuable for our articulation and continuous improvement together, new ties and learning opportunities were created to help us understand the processes that must be followed, such as laws, regulations, the ones we must comply with, in order to generate change and understand the "cases" and obstacles that we face as a community, It helped us understand that if we organize ourselves we can do things the right way, we understand that it is a learning process and it takes time. As a group that we were, we united more - "The tostones dogs of the West" (Giving us a name gave us identity and it felt good). Also, we were able to experience that platforms like Zoom can unite us and that we could be in other places and without being able to have physical contact due to the circumstances of the moment, we had to adapt to the measures implemented to prevent the spread of the Covid-19 Virus. These types of workshops teach us that as a community we can achieve the goals that we set for ourselves, education is important, we were able with the help of funds to build our project which we co-created. Soon we will have a meeting which will be held in our convention center, all the community aqueducts in the western area will have the opportunity to meet in person, with the biosecurity measures, and we are going to inaugurate the sink, our project."

- Iris Nereida Gonzalez, Community leader, President of the Communal Committee of Corcovada.
- Co-creating a sense of community: The Co-creating experience provides the tools to the community so that, autonomously, but accompanied, it is directed in the community processes. Starting the process with a broad openness to the conversation, recognizing the strengths, resources and realities of the communities to focus the group dynamics towards

effectiveness, spontaneity and creativity. Where all the members felt an essential part of the processes. My experience was of great benefit to continue to explore possible development spaces and enable the channel to discover the next growth opportunities that can be adopted within the community. This with mentors who, instead of being managers in the process, maintained a collaborative and close attitude, with the intention of learning from the communities. In other words, they separated themselves from the role of experts to validate that the best people who can know the community is the community itself. As a young man I realized that, within these very important spaces, there were few people my age participating in these spaces created for communal growth. It is understandable that our society has moved to more individualistic areas that minimize the importance of the community impact on people's lives and the high possibility of change when they are generated from the community. Communities like Corcovada have for years managed to have very important leaders who have fought as a group to guarantee such basic elements as water, electricity and access to roads. This is history caused by young people who someday got up, saw the need, came together and created the organizational opportunity to supply what they had identified. In short, this experience was one of reflection, knowledge and personal and community growth. It gave me the opportunity to get a closer look at the needs of the group and to be a voice in spaces that provide the opportunity for problem resolution. Learning that there is nothing more rewarding than collective celebration when the fight is made from union, empathy and commitment fused with others.

- Fernando A. Cuevas Quintana, young community leader, Social worker with a minor in human rights and autism certificate. Currently pursuing graduate studies in clinical social work.

Images of the 2020 Co-creating Symposium and project continuation efforts:

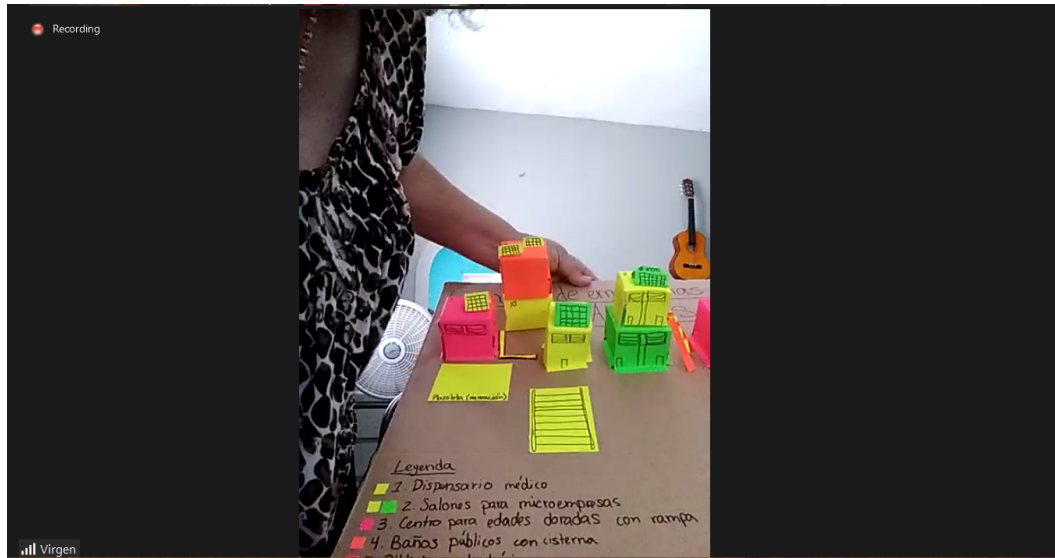


Image 1: Sketch model of a community emergency center prepared by residents of the Arenas community in the 2020 Co-creating Symposium.

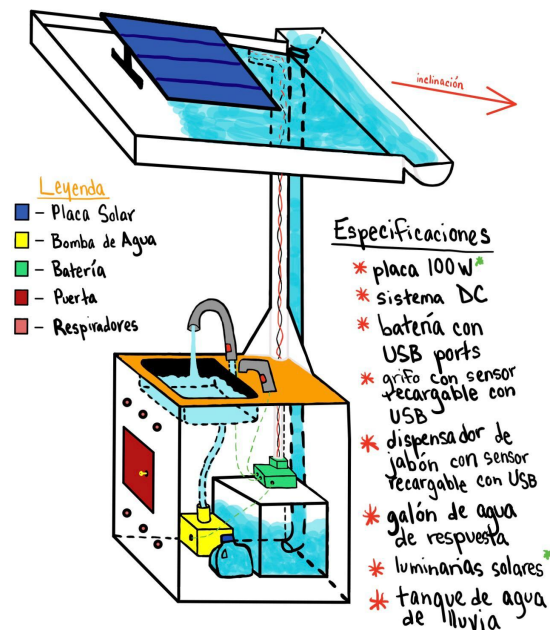


Image 2: Design of stand-alone hand-washing station conceived by the Culebra community in the 2020 Co-creating Symposium.



Image 5: Community center hand-washing station, in the community of Corcovada, designed during the 2020 Co-Creating Symposium and materialized thanks to funding and implementing partners.