Skid Row Power Now!

A participatory co-design project to power up digital devices in Skid Row

Paulina Lanz
USC-Annenberg
paulina.lanz@usc.edu

Todd Cunningham
Los Angeles Community Action
Network (LA CAN)
toddc@cangress.org

Hoan (Sarah) Nguyen
USC-Annenberg
hoannguy@usc.edu

Pete White
Los Angeles Community Action
Network (LA CAN)
PeteW@cangress.org

François Bar
USC-Annenberg
fbar@usc.edu

ABSTRACT

This case study describes the co-design of Charge ‘n Chill, a charging cart serving houseless residents of Skid Row. This project brought together community activists, Skid Row residents, and university researchers over the course of an 8-week intensive co-design workshop that culminated in the unveiling of a working prototype in the community. Through this case study, we describe the projects’ goals and motivations, as well as the participatory methods which guided our work together. We analyze both our process and its outcome, highlighting lessons we learned and guidelines we offer to others engaged in similar collaborations.

CCS CONCEPTS

• Human-centered computing; • Interaction design; • Empirical studies in interaction design;

KEYWORDS

rapid prototyping, co-design, autonomous power

ACM Reference Format:

Paulina Lanz, Todd Cunningham, Hoan (Sarah) Nguyen, Pete White, and François Bar. 2021. Skid Row Power Now!: A participatory co-design project to power up digital devices in Skid Row. In *C&T ’21: Proceedings of the 10th International Conference on Communities & Technologies - Wicked Problems in the Age of Tech (C&T ’21)*, June 20–25, 2021, Seattle, WA, USA. ACM, New York, NY, USA, 7 pages. <https://doi.org/10.1145/3461564.3461595>

1 INTRODUCTION

Access to the internet may not seem a top priority for people who are houseless¹, when shelter, food, sanitation, medical care, or social support are sorely lacking. Yet through extensive interaction with houseless residents of Los Angeles’ Skid Row, we consistently heard

¹We use “houseless” rather than “homeless”, following the preference of many people who do not live in a house and consider the place where they live their ‘home’.

This work is licensed under a Creative Commons Attribution International 4.0 License.

C&T ’21, June 20–25, 2021, Seattle, WA, USA
© 2021 Copyright held by the owner/author(s).
ACM ISBN 978-1-4503-9056-9/21/06.
<https://doi.org/10.1145/3461564.3461595>

that internet access was important to their survival and to their success [1]. In fact, Skid Row residents devote a remarkably large portion of their resources, energy and time just to get online. They face considerable obstacles to secure digital devices and online services, keep devices functional, and master the ever-changing digital skills required to take advantage of them all. Yet, they deploy innovative approaches to overcome obstacles. From all available evidence, online access is essential.

This case study describes a collaborative project joining together a Skid Row community organization, university researchers, and Skid Row residents to understand why houseless folks devote such a considerable amount of their scarce resources to get online, what obstacles they face, how they overcome these obstacles, and what interventions might alleviate their struggle. From the start, we consciously articulated this project as a hands-on, co-design effort aimed at creating a “facility” (we did not know what at the outset) to make online access easier for houseless residents. We hypothesized there was much to be learned through this creation: While the artifact itself would be important, interaction among the participants would be equally critical. Through collaboration, we also hoped to garner insights about the place of technology, develop a better understanding of the context of its use and the practices that could emerge around it. We hoped each group would acquire valuable skills in the process. Importantly, we structured this project to leverage the multifaceted expertise of a hybrid group including community activists, Skid Row residents, and university researchers. We believed the combination of various skills, grounded in lived experience, in community action and in academic research, would be generative of innovative objects, practices and insights.

This case study tells the story of *Charge ‘n Chill*, a mobile, solar-powered, digital device and cellphone charging cart – the artifact our team built together over the course of an 8-week intensive co-design workshop in the heart of LA’s Skid Row neighborhood. It ended up significantly different from anything we had initially envisioned, and that is a key lesson from this case study. Our co-design process left the door open to surprises and learnings that would probably not have emerged from a traditional top-down research approach. The conversations we had during the making of *Charge ‘n Chill*, the practices we developed through repeated testing of prototypes, and the innovations we made to cope with limited resources, are all reflected in the outcome.

This paper first provides a brief overview of the context and relevant literature. It then describes our co-design process, teasing out the key elements of our methods. We unveil *Charge ‘n Chill*, outlining its core features and the practices we crafted around its use. We conclude with lessons we learned that might be of use to others seeking to engage in a similar adventure, whether to provide better connectivity for those who lack the basic essentials to cross the digital divide, or toward other objectives of service to their community.

2 RELATED WORK

Technology overwhelmingly reflects the ideas and goals of those with power to influence its development [2]. The needs of end users, particularly traditionally marginalized users, are most likely to be ignored during the design process, and the resulting products and services are often a poor fit for their circumstances. Participatory design seeks to remedy that situation by involving users from the start in co-creation with designers, aiming to include user input early in the process, in order to create more democratic and better adapted technology [3]. Our project is situated within that tradition. We pursued early engagement with houseless residents of Skid Row to gain better insights into the issues they face and the strategies they develop, to insure their ideas would be valued from the start, and to design a solution that would serve them well. Importantly we believe, participatory design places ownership and project outcomes squarely in the hands of community members, so they are more likely to embrace the result [4-5].

While participatory approaches have used a variety of methods [6], these share an important set of common features: they rely on processes that encourage users to be active creators rather than passive consumers of technology; they put in place bottom-up democratic processes rather than top-down decision making; they foster iterative approaches that include making, prototyping and testing, during which the traditionally separate roles of “developer” and “user” become blurred; they invite joint determination and joint learning, recognizing the value of various forms of expertise and knowledge – from the theoretical to the experiential [3, 6-8].

Previous research has discussed the opportunities and challenges surrounding participatory design with marginalized communities such as low-income migrant workers, refugees, and people of color [9-11] as well as participatory design by non-profit groups [12]. Several projects focused on designing with homeless communities. For instance, Buccieri and Molleson [13] discussed how involving homeless youth in the design and development of a mobile application for other homeless youth provided them a chance to express their perspective while making the lives of their peers better. Le Dantec [14], through interviews and ethnographic research with houseless urban residents, explored the socio-political impacts of technology in their lives and proposed a set of information sharing services that would aggregate information available in the community and provide it via mobile phones.

In addition, our approach also recognizes the potential of technology appropriation [15-16], the process through which users adapt technologies that were made for others and creatively embed them within their own practices, often beyond the original designers’ anticipations. Such appropriation is particularly fruitful

for community-engaged co-design projects because it empowers rapid prototyping by actors of varied technical expertise, letting them tweak and combine ready-made objects into solutions they can quickly deploy.

3 FOUNDATIONS FOR A COLLABORATION

The Los Angeles Community Action Network (LA CAN) is a grass-roots human rights organization based in Skid Row, a downtown-adjacent neighborhood where nearly 5,000 unhoused Angelenos reside on any given night. Through its multiple activities in service of houseless and unstably-housed Skid Row residents, LA CAN has long been keenly aware that limited digital connectivity constrains access to many resources – housing, food, social networks, and livelihood support [17]). A meeting with USC-Annenberg researchers in early 2018 sparked a project to help Skid Row residents get online. During the next six months, we met repeatedly to hammer out a foundation for that collaboration. Relationships between the community and the university have at times been contentious. As a telling anecdote, one researcher recalls that when he introduced himself at an early meeting as coming from USC, a swift response came from a community member: “Last time I was on your campus, I got arrested!”. We believe the lengthy interaction period during which we shaped the contours of our collaboration was essential to overcome that context and build a solid foundation for our work together.

Beyond getting to know and trust each other, we worked to draft a Memorandum of Understanding (MOU) that spelled out how responsibilities, resources, learnings, and control would be shared. We insisted that the different kinds of expertise on both sides would be equally recognized and we committed to joint ownership and publication of our findings (as in the present article). An important requirement we wanted for our collaboration was that once completed, the project would leave behind meaningful benefits for the community – objects, services, resources, skills and capabilities that would persist after the researchers moved on. In parallel with the negotiation of this MOU between the two group leaders, LA CAN’s Human Rights Committee repeatedly vetted the research team through extended presentations and Q&A sessions, before giving the go-ahead to the collaboration. This thorough vetting of our project by the community partner paralleled the academic partner’s Institutional Review Board (IRB) process. While academia acknowledges important ethical concerns when research involves vulnerable populations, the university’s IRB process does not include representatives from these populations. LA CAN believed it essential to conduct its own “IRB review” through a perhaps less formal, but no less rigorous process comprised of a series of interviews and conversations that forged a trusted safe space within which our collaboration could unfold. Notably in the end, we never felt the need to finalize and sign the MOU: the process of exploring potential conflicts and playing out their resolution proved more important than the document.

Our plan for this project emerged over that six-month period. We would strive to develop a nuanced understanding of internet access and use in Skid Row. We believed that participatory co-design of a facility aimed at improving internet access would be both a productive way to generate that understanding, and a good approach to

make a difference. And we thought that rapid-prototyping, within a fast-paced workshop, would be a good fit for community members whose lives are unstable and who would have a harder time sustaining extended participation. We therefore began to plan an eight-week participatory workshop that would research, build and test successive prototypes, culminating in the unveiling of a working solution in the community.

4 OUR CO-DESIGN PROCESS

4.1 The Participants

We wanted our participatory process to draw on the expertise of three categories of participants. Community organizers (from LA CAN) and researchers (from USC), who had conceived the project would respectively bring a deep knowledge of the socio-political context and substantial familiarity with co-design methods and theory. Most importantly however, our project would not be possible without the lived experience and expertise of community members. Of course, there would be overlap between the groups – for example, some community organizers had lived experience with housing instability, and some researchers were familiar with community activism. But participation by people currently experiencing homelessness would be critical to inform our design, prototype solutions adapted to their circumstances, and test these prototypes in real-life settings.

LA CAN led the all-important recruitment of community members, bringing about twenty interested candidates representing a broad range of affinities and experiences for a preliminary meeting to brainstorm possible ways to organize a sustainable effort. Several concerns emerged, including adjusting attendance expectations at weekly meetings for eight straight weeks, recognizing the need to make our gatherings welcoming and inclusive, while making it easy for those who might have missed a meeting to catch up and ‘plug in’. All these concerns informed the structure of our process. We would start each meeting with a recap of the previous one to include those who missed it, and would devote a portion of our funding to providing nutritious food and drinks during the workshops – these might be the only meal some participants had on that day. We were not always successful in meeting all concerns, but we acknowledge the strong commitment from community participants. Most notably, we could not achieve gender balance among our group. While all our workshops did include women, our group was predominantly male, reflecting Skid Row’s houseless population.

In the end, our group’s membership fluctuated over the course of the project, from about ten to twenty participants. While all members strongly committed to participate regularly, some faced considerable challenges, such as travel distance (one participant rode the bus 15 miles each way to come from Venice Beach), unavoidable time conflicts and the complexity of life on the street. Nevertheless, a core group of about eight participants, roughly a third from each category, was able to consistently attend the meetings. One notable characteristic of our group was that technical skills were equally present among the three categories. In particular, some houseless participants had professional experience as technicians for utility companies.

4.2 The Workshops

With our participants signed-up, we scheduled eight two-hour workshops, meeting weekly in October and November of 2018. LA CAN organizers and USC researchers met before each workshop to carefully craft a curriculum that would involve a mix of free-ranging conversations and focused hands-on activities. We kept an eye on the overall sequence, so as to end up with a prototype ready to be unveiled and tested in the community by the end of the eight weeks. This was a tall order, but would serve a vital forcing function – we wanted to guard against frittering precious time away, ending up with many ideas but no concrete solution to roll out.

Within this overall constraint, we remained flexible and chose to design each workshop ‘just-in-time’, so we could adjust each week’s plans to the outcome of the previous week. This turned out to be critical, as the next section will describe. Nevertheless, our plan for each workshop included several consistent components:

- *Check-in*: Participants shared the previous week’s events, focusing on experiences with internet access.
- *Creativity prompts*: Quick (5-10 min) run through various approaches to the issue we were tackling that day – these ranged from slide shows to passing around objects we collected between sessions.
- *Hands-on activities*: In small groups of 3-4, we actively explored and prototyped objects and practices. These included making ‘paper prototypes’ with cardboard, pipe-cleaners, fabric and scotch-tape, and staging improv skits exploring how things might work out in real life.
- *Reporting back*: Small groups would share their learnings with the broader group, often in active ways (e.g. performing a skit, play-acting the use of a prototype) rather than formal presentations.
- *Homework*: At the end of each session, participants left with a ‘mission’ – test a device from our ‘lending library’, or capture pictures of folks performing a particular activity, then report back the following week.
- *Food break*: We shared food and drinks each week. This ritual of breaking bread together built trust and community amongst our team as the work continued through conversations and reflections.

4.3 First Workshop: Reality Check

While we tried our best to craft a process that would not pre-empt the outcome, we did have some ideas about the kind of facility we expected might come out of our workshops. Most of them revolved around some sort of WiFi device, whether embedded in Skid Row’s urban furniture, provided by the area’s many community-serving organizations, or carried in backpacks by community members. Much of our vetting with LA CAN’s Human Rights Committee had revolved around related issues of surveillance, privacy, and data ownership: what data would be gathered? Who would own it? What would be done with it? We had even acquired a few mobile hotspots, which we brought to the first workshop both as ‘creativity prompts’ and to serve as components of a prototype. However, community participants swiftly disabused us of the notion that WiFi was the key.

Figure 1: Group presentation of “paper prototypes”: Wesley demonstrates a ‘hat turbine’, Wendy describes an ice cream charging cart, David shows a solar visor.

Figure 2: Sharing power on a park table in Skid Row; a ‘liberated’ outlet in a downtown Starbucks; the only public charger in a Skid Row park (it failed only a few weeks after installation).

Our first workshop’s hands-on activity split us into three groups, each provided with various craft materials and a task to imagine an object that might help a houseless person access the internet. Groups were asked to fashion a “paper prototype” out of materials at hand, and enact a brief skit demonstrating how it would be used (fig 1). When reporting back, none of the three groups mentioned WiFi. All three presented some clever way for folks to recharge their phone – using wind turbines, hand-cranked dynamos, publicly accessible electric outlets, etc.

The message was unmistakable and was quickly reinforced through the many anecdotes surfaced in the ensuing conversations: The lack of charging options is the biggest initial hurdle houseless folks face to get online. They own digital devices and they can find WiFi at the library or outside of Starbucks, but a discharged phone is of no use. Having learned that critical fact from our community participants, we pivoted and re-thought the remaining seven weeks around this new objective: How to facilitate charging for houseless people?

4.4 Skid Row Power

It had become clear that we needed to design a facility bringing electrical power to the street, but many questions remained. While the electrical grid runs throughout downtown Los Angeles, it remains largely inaccessible to those living on the street. In their check-ins, our participants told countless stories of “power denied”: there are three outlets in the lobby of the Midnight Mission, but each always has a long line of folks waiting for their turn and women tend to be elbowed out the way by men; the library has outlets, but it only opens at 10am; coffee shops have plugs, but many now cover them up to prevent non-customers from hanging out; there are electrical outlets on the Metro platforms, but the police gives tickets for “electricity theft”. One homework assignment was to collect examples of

creative ways in which people overcame these hurdles. A prevalent hack was to rig a long extension cord from a friendly location to a shared spot in a park where people could juice up their devices. Participants reported some hidden outlets that had been “liberated” as someone broke through the cover plate (fig 2).

Through these stories, it became clear that our charging solution had to be autonomous and mobile. We could not rely on guaranteed access to the grid, and would need a way to bring power to the people where they lived. As the creativity prompt for our next workshop, we gathered images of various approaches to that challenge: power pack ‘vending machines’ in China, solar panels built into bus stops and park benches, various forms of mechanical contraptions including power-generating exercise equipment in a park and hand-cranked generators sold for emergency kits. We brainstormed a shopping list: various capacity power banks; diversely sized solar panels, both rigid and flexible; some integrated contraptions combining solar panel and power bank sold to backpackers; a hand-cranked generator sold by the red-cross; a portable wind turbine aimed at campers. Participants checked them out from our lending library for field-tests, then reported to the group. One key lesson emerged: solar is the only workable solution. We learned from our Venice Beach participant, who tested the wind turbine with ocean breezes, that positioning the device properly to catch enough wind was impractical for someone living in a tent. Those testing the hand crank reported sore wrists after 15 minutes of frantic cranking, for a meager 3% battery charge gain. Solar, on the other hand, had potential, thanks also to LA’s sunny climate.

Related questions concerned the context within which our contraption would be used and the community practices we would want to develop around it. We explored various options, from the individual (a personal solar charger and battery for each – convenient, but expensive to scale) to the collective (a community facility

Figure 3: Participants sketched possible cart designs during an ideation workshop.

Figure 4: Charge n' Chill: successive stages of construction and street testing.

where folks could bring their devices – more scalable, but raising many questions about deployment). Our hands-on activities included drawing sketches of possible ways to do this (fig 3), and play-acting situations and practices surrounding each of them. Our participants surfaced concerns including security (Is this thing safe for my device? Might your cable damage my phone? Could it get stolen when charging?) and associated activities (Do I need to hang around while my phone is charging? What else can I do while I wait?).

5 CHARGE 'N CHILL

As time progressed, our group converged on the concept of a charging cart that could be pulled behind a bicycle and brought to various Skid Row locations where residents would bring their devices for charging. Informed by our experimentation, we purchased various components, assembled them into a working prototype which we first tested on the sidewalk outside of LA CAN's headquarters, and later took on rides through Skid Row for more extended testing. Many features of the cart emerged from early workshops. Some were rethought to match our making skills and tools, others were adapted to work on a movable cart and be "street-tough", and all were tweaked in response to several rounds of urban testing. The final version, built around a ready-made bicycle trailer, included

four key components: an autonomous power system, a sound system – for both music and public address– distinctive branding, and guidelines for community interaction (fig 4).

Power system: After testing various battery options, we chose a high capacity 288Wh battery pack integrating solar controller and inverter, with multiple USB, 12v, and 120vA/C outlets. We learned from backpacking and campers DIY sites, and we appropriated for our own ends a power pack advertised as "handy and good for your travel, outdoors, camping or hurricane emergency". We attached a thin-film 50W solar panel to extend its charge throughout the day. It has reliably powered our many community outings.

Sound system: LA CAN's community action experience taught us that music mattered to create a festive welcoming atmosphere as we ride through the neighborhood and advertise our presence where we park the cart. A microphone and PA system are essential to be heard on the city's noisy streets. We learned how to build an efficient light-weight sound system from bike activists.² Our field testing yielded an important insight: while folks wait for their phone to recharge, they essentially are a 'captive audience'. Phone charging thus complements LA CAN's community organizing mission, and the cart's PA system serves to conduct trainings,

²For example: <https://www.instructables.com/Battery-Powered-Mobile-Party-Sound-Systems/>

community outreach and organizing campaigns. More than just a side aspect of our design, the cart's sound system supports core aspects of our community practice.

Naming and Branding: We devoted substantial workshop time to naming our overall project. A wordplay, Skid Row Power, connected our project with LA CAN's "power" T-shirt. We workshopped logo options, looking for one that unified our project with LA CAN's identity. We produced side panels for the cart, stickers and a website. To name our first cart (one of several future outcomes of the overall project, we hoped) we returned to collective learnings from the Human and Civil Rights initial conversations. Homeless folks live with chronic health conditions, inadequate access to nutritious food and clean drinking water, compromised immune systems and a severe lack of sleep each day brought on by systemic racist laws and policies. While the cart's name had to reference the cart's function (charging), we intended to call attention to the restorative benefits we hoped community use of the cart would bring (chilling). Thus, Charge 'n Chill was born, and officially launched in January 2019.

Practice and rules: We pre-tested Charge 'n Chill during LA CAN's weekly farmer's market in the patio. Community members embraced it, eager to charge their phones and to understand how it worked. We quickly discovered that charging more than a dozen devices at once resulted in tangled wires. We sometimes struggled to remember which phone belonged to whom. Some folks wandered away, leaving us with a few "orphan" phones at the end of the day. We tried adding Post-It stickers and giving out matching tickets. In the end, we re-designed the cart's deck as a whiteboard 'parking lot' with 14 slots to organize devices and write down each owner's name. We also noted the phone's charge status and the starting time, to keep track of how well this worked. We learned we could not rely only on solar power and needed to start with a fully charged battery pack. With these refinements, Charge 'n' Chill was ready for its street debut a few blocks from LA CAN. The community's enthusiastic response made it clear this filled a critical need. From this first street test, we evolved a practice. We needed at least two LA CAN staff members for each outing –one minding the phones, one engaging with the community. A poster spelled out our "phone charging rules":

1. Share the power! 45 minutes maximum unless nobody else is waiting
2. When 100% charged, let someone else have a turn
3. Don't use your phone while charging (turn it off to charge faster)
4. Stay close-by and keep track of your phone. We are not responsible for loss or damage

6 LESSONS LEARNED AND KEY TAKEAWAYS

Participatory co-design as successful research practice. Through this co-design process, our various groups shared and learned from each other while getting a better understanding of the obstacles community members face to get online. Participatory design brought community needs in much sharper focus than would have traditional more distant methods, like surveys or interviews. Sustained collaboration over two months helped us understand obstacles and carefully craft best practices –especially as our initial

focus shifted. Our community-centered practices proved essential for meaningful and effective change. In the end, community engagement mattered as much to our purpose and vision of as the solution we created.

"Making" as method. The process of "making" something troubles existing hierarchies: from playful hands-on exercises to discovering how solar panels work, everyone brings expertise to the process. "Making" creates new spaces for conversations around physical engagement with tools and objects that are generative of surprises and insights. Hands-on making and testing were deeply intertwined in our process and collaboration. Importantly, this allowed us to level the playing field and overcome pre-existing town-and-gown tensions. As we started making something together, university members were no longer "experts" bringing academic knowledge to the field, community members were no longer "subjects" of a study – we all strived together to learn new skills and create an object that worked. As a result, "making" was more than a research method, it also served as a levelling and connecting practice.

Setting constraints. Structure forces productive interaction and prevents drifting. Setting up a fast-paced process, with carefully planned activities and deliverables, over a very short time span, turned out to be very productive. Eight weeks was short enough so participants could commit to sustained participation, yet rapid enough that no time could be wasted. As a result, it kept us moving forward so we could fulfil the commitment we made to each other that we would have something ready to unveil by the end of those eight weeks. Important constraints were enforced through carefully planned workshop facilitation. This involved alternating responsibilities between academic and community participants to keep the process moving, and detailed preparation before each meeting. This regular planning not only kept us moving, it also became another important community building mechanism as we convened between workshops to assess the previous session and prepare the next.

Community-building rituals. The regular workshops quickly became an important community-building ritual. From sharing a meal to engaging in playful brainstorm activities, learning to assemble prototypes and taking them out in the community, all our activities became opportunities for interaction. We learned as much through regular engagement with one another, as from the intentional purpose of our research and testing. LA CAN leader Pete White likes to say there should be "nothing about us without us," emphasizing that the process is as important as the product. By inscribing community-building rituals within our process, we were able to create a better product.

Decision-making. Managing partnership resources often can be a source of tension. Academia's bureaucratic oversight constrains purchasing and spending decisions, in ways that community organizations are not always equipped to handle. After initially struggling to justify every single project expense, we decided to simply transfer half of the project's resources to LA CAN as discretionary funds, while USC retained the remaining half to purchase supplies needed for the workshop sessions. This allowed us to coordinate spending while each retaining autonomy. Compensating participants in such a joint project can be particularly thorny. Academics are automatically compensated since research is part of their job responsibilities.

Compensation for community partners came in various forms: from fees for workshop space rental and facilitation, to incentives for survey respondents or healthy food for workshop participants. Finding the right balance requires on-going and open communication between partners.

7 FUTURE WORK

Since our launch, several iterations of Charge ‘n Chill have shown up across Los Angeles. Inspired by the cart’s straightforward utility, flexibility and the community’s receptivity, the “Streetwatch LA” coalition created PowerUp tables. They told us Charge ‘n Chill was “a huge inspiration for PowerUp”, building from LA CAN’s organizing and leadership as part of the “Services Not Sweeps” coalition’s work in LA’s Echo Park neighborhood. To help others join this effort, we have published instructions and a parts list on our website (www.skidrowpower.com).

While this initial phase of our project focused on charging, we do believe that, once that first barrier is removed, people still face numerous obstacles to getting online. These include connectivity hurdles (access to better devices, reliable connections), services that address their needs, and needed skills to better harness the opportunities. Tackling these challenges remains among our goals for the next phases of our collaborative work. We also know from our initial year of deployment that various alternative designs might better serve other segments of our community. For example, we heard frequent requests for a taller version of the cart, more accessible to people in wheelchairs. We were planning to pursue these avenues in early 2020, when the Covid-19 pandemic struck. Instead, we pivoted to designing much needed hand-washing stations, following a similar rapid-prototyping co-design approach [18]. Deploying them in the community, we learned they could provide another charging platform, sorely needed while the pandemic has shuttered libraries and cafes, where folks no longer can turn to power their phone. From phone-charging to water, a common theme emerges from our work: the co-design of bottom-up alternatives to the electrical and water infrastructures that are everywhere within our city, yet too often inaccessible behind gates and doors that place them out of reach for houseless residents.

ACKNOWLEDGMENTS

Special thanks to our co-design team: Adelene Bertha, Annette Kim, Big Joe, Craig Roberts, Curt, David Martinez, Eddie H., Elliott Katz, François Bar, General Dogon, Hoan Nguyen, Ignacio A, Jojo Smith, Kaleb Havens, Kei Utsumi, Linus Shentu, Lydia Trejo, Michael Pazsoldan, Michelle Autry, Monique Noel, Paul Freedman, Paulina Lanz, Pepper, Pete White, Theresa Hwang, Todd Cunningham, Wendy Brown and Wesley Walker. We dedicate this report to Wesley Walker and Eddie H, two members of our co-design team who passed away and helped shape Charge ‘n Chill for the

Skid Row community. Rest in Power. This project is supported in part by a grant from the USC Price Center for Social Innovation (<https://socialinnovation.usc.edu/>)

REFERENCES

- [1] Galperin, H., Bar, F., & Nguyen, H. 2020. The power divide: Mobile communication in Los Angeles’ Skid Row: Mobile Media & Communication. <https://doi.org/10.1177/2050157920932608>
- [2] “Bijker, Wiebe E. 2006. Why and how technology matters. Oxford University Press..
- [3] Asaro, Peter M. 2004. Transforming society by transforming technology: the science and politics of participatory design. *Accounting, Management and Information Technologies* 10, 4, 257-290.
- [4] Yoo, Daisy, Alina Hultgren, Jill Palzkill Woelfer, David G. Hendry, and Batya Friedman. 2013 (April). A value sensitive action-reflection model: evolving a co-design space with stakeholder and designer prompts. In *Proceedings of the SIGCHI conference on human factors in computing systems*, 419-428.
- [5] Zamenopoulos, Theodore, and Katerina Alexiou. 2018. Co-design as collaborative research. *Bristol University/AHRC Connected Communities Programme*.
- [6] Spinuzzi, Clay. 2005. The methodology of participatory design. *Technical communication* 52, 2, 163-174.
- [7] Byrne, Elaine, and P. M. Alexander. 2006. Questions of ethics: Participatory information systems research in community settings. *Proceedings of the 2006 annual research conference of the South African institute of computer scientists and information technologists on IT research in developing countries*.
- [8] Simonsen, Jesper, and Toni Robertson, eds. 2012. *Routledge international handbook of participatory design*. Routledge.
- [9] Fisher, Karen E., Katya Yefimova, and Eiad Yafi. 2016. Future’s butterflies: Co-designing ICT wayfaring technology with refugee Syrian youth. In *Proceedings of the The 15th International Conference on Interaction Design and Children*, pp. 25-36.
- [10] Brough, Melissa, Charlotte Lapsansky, Carmen Gonzalez, Benjamin Stokes, and Francois Bar. 2018. Mobile Voices: Design as a method to explore the possibilities and limitations of community participation. *Mobile Media & Communication* 6, no. 2, 247-265.
- [11] Dearden, Andy, and Haider Rizvi. 2008 (October). Participatory design and participatory development: a comparative review. In: *PDC’08: Experiences and Challenges, Participatory Design Conference*, Indiana University, Bloomington, Indiana, USA.
- [12] Benston, Margaret, and Ellen Balka. 1993. Participatory design by non-profit groups. *Canadian Woman Studies* 13, 2.
- [13] Buccieri, Kristy, and Gina Molleson. 2015. Empowering homeless youth: building capacity through the development of mobile technology. *Journal of Community Practice* 23, 2, 238-254.
- [14] Le Dantec, Christopher A. 2010. Exploring mobile technologies for the urban homeless. In *CHI’10 Extended Abstracts on Human Factors in Computing Systems*, 2883-2886.
- [15] Michael Muller, Katja Neureiter, Nervo Verdezoto, Alina Krischkowsky, Anna Maria Al Zubaidi-Polli, and Manfred Tscheligi. 2016. Collaborative Appropriation: How Couples, Teams, Groups and Communities Adapt and Adopt Technologies. In *Proceedings of the 19th ACM Conference on Computer Supported Cooperative Work and Social Computing Companion (CSCW ’16 Companion)*. ACM, New York, NY, USA, 473-480. <https://doi.org/10.1145/2818052.2855508>
- [16] Bar, F., Weber, M. S., & Pisani, F. 2016. Mobile technology appropriation in a distant mirror: Baroquization, creolization, and cannibalism. *New Media & Society*, 18(4), 617-636. <https://doi.org/10.1177/1461444816629474>
- [17] Hoan Nguyen. 2020. ICTs Use for Mitigating Social Exclusion in the Lives of Homeless Women. In *Proceeding of the 48 Research Conference on Communications, Information, and Internet Policy*. Washington DC. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3747797
- [18] Cerianne Robertson, Francois Bar, Graham Diguiseppi. 2020 (July). How can the houseless fight the coronavirus? A community organization partners with academics to create a grassroots hand-washing infrastructure. The Conversation. Retrieved from <http://theconversation.com/how-can-the-houseless-fight-the-coronavirus-a-community-organization-partners-with-academics-to-create-a-grassroots-hand-washing-infrastructure-135624>