

# Reflections on Assets-Based Design: A Journey Towards A Collective of Assets-Based Thinkers

MARISOL WONG-VILLACRÉS<sup>\*†</sup>, Escuela Superior Politécnica del Litoral, Ecuador and Georgia Institute of Technology, United States

AAKASH GAUTAM<sup>\*‡</sup>, San Francisco State University, United States

DEBORAH TATAR, Virginia Tech, United States

BETSY DISALVO, Georgia Institute of Technology, United States

The field of Computer-Supported Cooperative Work (CSCW) has long recognized a socio-technical gap complicating the design of technologies that can sustainably meet social needs. In response, a growing body of research advocates for assets-based design, an approach that seeks to build upon what the individuals and community already have. The emphasis on positioning assets rather than needs at the center of the process can complicate designers' decisions on what activities to foster, how to conduct them, and what outcomes to expect. In this paper, we reflect on two different assets-based design endeavors with vulnerable populations. Our reflections present assets-based design as an ongoing process that prioritizes the formation and evolution of a *collective of assets-based thinkers* who continually learn about their assets and ways to use them to attain desirable change. From that reflection, we contribute three methodological commitments for assets-based design to the growing CSCW scholarship on supporting vulnerable communities to attain emancipatory transformations: (1) embedding trust-building elements throughout the journey; (2) facilitating the formation of an interdependent collective; and (3) making moves towards incremental transformations. Further, we contribute a discussion on the change of perspective that entails for researchers and designers interested in undertaking assets-based design. In particular, we underscore the need to recognize the value of work before *the* work, to see technology as an intermediary rather than an inevitable end, and embrace impact in the shape of slow incremental transformation.

CCS Concepts: • **Human-centered computing** → **Participatory design**; *Empirical studies in HCI*.

Additional Key Words and Phrases: Asset-based; Capacities; Participatory Design; Vulnerable population

## ACM Reference Format:

Marisol Wong-Villacrés, Aakash Gautam, Deborah Tatar, and Betsy DiSalvo. 2021. Reflections on Assets-Based Design: A Journey Towards A Collective of Assets-Based Thinkers. *Proc. ACM Hum.-Comput. Interact.* 5, CSCW2, Article 401 (October 2021), 32 pages. <https://doi.org/10.1145/3479545>

<sup>\*</sup>Both authors contributed equally to this work.

<sup>†</sup>The research was conducted while the author was at the Georgia Institute of Technology.

<sup>‡</sup>The research was conducted while the author was at Virginia Tech.

Authors' addresses: Marisol Wong-Villacrés, [lvillacr@espol.edu.ec](mailto:lvillacr@espol.edu.ec), Escuela Superior Politécnica del Litoral, Guayaquil, Ecuador, Georgia Institute of Technology, Atlanta, United States; Aakash Gautam, [aakash@sfsu.edu](mailto:aakash@sfsu.edu), San Francisco State University, California, United States; Deborah Tatar, [dtatar@cs.vt.edu](mailto:dtatar@cs.vt.edu), Virginia Tech, Virginia, United States; Betsy DiSalvo, [bdisalvo@cc.gatech.edu](mailto:bdisalvo@cc.gatech.edu), Georgia Institute of Technology, Atlanta, United States.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from [permissions@acm.org](mailto:permissions@acm.org).

© 2021 Association for Computing Machinery.

2573-0142/2021/10-ART401 \$15.00

<https://doi.org/10.1145/3479545>

## 1 INTRODUCTION

Informing processes for designing information and communication technologies (ICTs) that can attain sustained impact in situations where financial, emotional, and social support are scarce remains a significant challenge for the Computer-Supported Cooperative Work (CSCW) and Human-Computer Interaction (HCI) communities [16, 27, 31, 77, 94, 103]. Inspired by work in areas such as education [74, 109], health [11, 89], and community development [63, 72], researchers in CSCW-related fields argue that the problem lies in a historical reliance on a human-centered approach to design that emphasizes meeting users' needs and fixing their privations [18, 29, 45, 95, 103]. The goal of creating ICTs is indeed to support *users* in navigating their challenges. However, to attain that goal, most design processes prioritize finding and addressing *needs* as if these were deficiencies that only new, externally managed ICTs will fix. In doing so, these processes end up creating ICT solutions that downplay users' agency in devising and pursuing transformational pathways and promote users' dependency on others [21, 60, 95]. In response, CSCW researchers and designers are increasingly exploring an *assets-based*<sup>1</sup> approach to research and design. At its core, this approach centers the design process on identifying individuals' and communities' strengths and capacities and exploring feasible ways for users to build on these assets to attain desirable change [3, 18, 45, 53, 60, 77, 99, 102].

In terms of how to conduct assets-based endeavors, existing research in the fields of CSCW and HCI suggests that the *assets-based* qualifier can significantly shape the use of research methods: when qualifying ethnographic fieldwork, an emphasis on assets has fostered a critical grappling with the complexity of how assets came to be, their situated uses, and possibilities of newer uses in light of pervasive, intersecting power structures [60, 64, 103]. However, the field offers few accounts of how such grappling with complexity can shape Participatory Design (PD) methods. The similar philosophies between assets-based approaches and PD's goals (e.g., co-creation is essential for assets-based purposes [63, 72] and PD appreciates local knowledge as a community asset [24, 34, 66]) suggest these ways of working with communities can complement each other. The before-mentioned assets-based ethnographic work suggests [60, 64, 103], though, that using participatory methods for prioritizing—and not only appreciating—assets might demand particular considerations requiring careful understanding.

We attend to the need for such a careful account of methodology by analyzing the separate experiences of Marisol and Aakash, two researchers motivating and facilitating assets-based PD engagements in different contexts and with diverse populations across the globe. Marisol works to generate transferable insights for motivating change in the design of ICTs that mediate the relation between Latin\*<sup>2</sup> immigrant parents and educational systems in the U.S. Aakash collaborates with an organization in Nepal offering shelter to a group of women who are survivors of sex-trafficking, exploring the potential for ICTs to support their reintegration journey. In considering these engagements' commonalities as well as particularities, our analysis highlights that Marisol and Aakash understood assets-based design as an ongoing process of fostering a *collective of assets-based thinkers*. They aspire to create a collective in which participants and designers continuously challenge long-held beliefs about themselves and their environment, appreciate their strengths, and co-construct new knowledge about how these strengths can lead to desired as well as realistic

<sup>1</sup>While “asset-based” is idiomatic and used in community development literature, following [60, 103] we use “assets-based” to highlight that a community possesses multiple assets that can be mobilized in the design process.

<sup>2</sup>Our parents, liaisons, and organization participants used the word Latino to strive for political unity in the U.S. However, we follow the recommendations of [84] and use the term Latin\* to elicit critical thought on the various ways people from the Latin American diaspora in the U.S. might identify. Like in computer search functions, the asterisk in Latin\* signifies options. Thus, it seeks to be a term for recognizing the multiple forms of self-identification that people of Latin American origins might use to highlight their intersecting identities and experiences.

futures. In pursuing such a process, they faced critical methodological challenges such as supporting participants in being resilient enough to both recognize their assets and the structures that limit them. Further, this process necessitates methods that motivate participants to dare using their assets in acts of change, despite risks of failing and a lack of immediate or visible fixes.

In this paper, we contribute to the growing body of CSCW scholarship on supporting vulnerable communities to attain sustainable, emancipatory transformations (e.g., [29, 33, 38, 49, 67]) by presenting the core methodological commitments that guided Marisol and Aakash in their different assets-based design processes. Further, we contribute a rich description of how Marisol and Aakash navigated different contexts to negotiate perspectives on technology, not as a fix for social deficits but as an intermediary that contributes to slow incremental transformations owned and shared by communities themselves. Drawing from the rich understanding of these two similarly guided but differently enacted endeavors, we also contribute a discussion on the high-level implications of an assets-based design approach in CSCW and HCI. We highlight the need to (1) recognize the value of work *before* the work of design; (2) see technology as an intermediary rather than an inevitable end; and (3) and embrace impact in the shape of slow incremental transformation. These contributions offer transferable lessons for future researchers and designers interested in embracing assets-based design within vulnerable communities.

## 2 POSITIONALITY AND REFLEXIVITY

All four authors are based in academic institutions in the U.S. The lead researchers in both the projects, Marisol and Aakash, were international Ph.D. students during the course of the research reported here, and both share cultural and linguistic elements with the participants. Betsy and Deborah are Marisol's and Aakash's advisors. Both are U.S.-born, Euro-descendant women with philosophical commitments to diverse perspectives on PD and extensive experience conducting research in both urban and rural, multi-linguistic settings, including educational contexts.

Marisol is an Ecuadorian mother of two school-aged children whose experience as an immigrant parent motivated her research on parent-education ICTs. However, recognizing that her immigration experience is radically different from the population she works with, Marisol has made active efforts to interpret participants' experiences and assets from their perspective over hers. To that end, she has engaged in multi-faceted volunteer work as an interpreter, facilitator of technology workshops, panelist, and fund-raiser in different institutions supporting Latin\* families, including schools, after-school programs, and churches. Marisol has also continuously discussed her interpretations of parents' realities with institutional actors experienced in supporting Latin\* families and with Betsy, who posed questions that forced Marisol to double-check her assumptions.

Aakash's interest in exploring ways to reduce gender inequality in Nepali society motivated his engagement with an anti-trafficking organization. As a male in a patriarchal society and coming from a relatively privileged family, his position is significantly different than that of the survivors. There is no way for us to know exactly how he was perceived by the sister-survivors or how this developed over time; we assume that his gender and position put some kinds of disclosures out of reach. Nonetheless, he attempted to maintain attention to this issue throughout and took a number of steps to reduce the distance. He attempted to build rapport before and during the study and volunteered for the community partner beyond the project duration such as by helping maintain the organization's website and by raising funds for them. Before each of his field studies, he worked with staff members, exchanged greetings and introductions with sister-survivors<sup>3</sup> in

---

<sup>3</sup>We addressed the survivors as "*bahini*" (younger-sister in Nepali). The survivors addressed each other as sisters as well. "Sister" is an unmarked term in Nepali. To match this nomenclature, we shall henceforth call the group we worked with "sister-survivors."

passing, shared meals, and conversations over tea, a practice common in Nepal. Over time, there were reasons to believe that his attempts to reduce distance were fruitful. For instance, the sister-survivors moved from addressing him as “sir” (as they addressed the male staff members) and started calling him the less formal “*dai*” (elder-brother in Nepali). Aakash’s advisor, Deborah, has been involved throughout the project. She has supported the interpretation of the observations by posing questions and connecting theoretical perspectives from learning sciences and critical computing to center the focus on building towards participants’ enduring strengths.

While Marisol’s and Aakash’s engagements with participants and their contexts helped them grapple with the large distance between them and the participants, the distance was not completely erased. They see themselves as “friendly outsiders” [47] committed to learn from and stand with [93] the participants as the latter reflect on their circumstances to identify their assets and leverage them to move forward.

We, all the authors of this paper, came to write it to attain clarity on how to engage in assets-based design, considering the complex relationship between assets and structural limitations. We acknowledge that we have a partial understanding of the larger systems that are at play in both contexts. For this reason, in this paper, we avoid providing methodological recipes for assets-based design engagements. Instead, we derive transferable insights from our experience and decision-making challenges to add to the growing scholarship within CSCW for researchers seeking to design with vulnerable populations.

### 3 ASSETS-BASED DESIGN IN HCI

#### 3.1 Origins and the State of Affairs

Recognizing ICTs’ growing potential to support social change, CSCW and related communities have increasingly explored design processes and methodologies for ensuring ICTs that sustainably support historically underserved groups [22, 37, 49, 58, 64, 77, 88]. Informed by the long-established Human-Centered Design (HCD) approach, these efforts have produced various novel methodological strategies [49, 50, 56, 64], analytical lenses [33, 73, 80], and participatory perspectives [7, 14, 24, 98]. However, the field continues to fall short in producing socio-technical approaches that ensure lasting impact in contexts affected by intersecting challenges of scarcity [7, 23, 55, 77, 95, 103].

As a response, a growing body of scholars increasingly argues that the problem lies in the field’s prevalent needs-finding and needs-solving view of design [3, 18, 29, 45, 77, 102, 103]. Prioritizing user needs, these scholars argue, promotes a dependency upon outsiders, thereby discouraging vulnerable groups’ ability to act as agents of social transformation. Building from educational perspectives [74, 109] and methodologies like Assets-Based Community Development (ABCD) [63, 72] applied across domains [11, 97, 108], these scholars champion a shift from a focus on needs to one on strengths, or assets. An assets-based approach to design proposes placing the *assets* that individuals and communities already possess (e.g., existing knowledge, strengths, and capacities) at the center of research and design.

Assets-based approaches are growing within CSCW and HCI. In working to address technology’s tendency to amplify inequalities [94], existing scholarship has focused on exploring the potential of assets in design [29, 53, 54, 58, 59, 64, 103]. For example, Dickinson et al. [29] analyzed public forums held in underserved communities in the U.S. to learn residents’ perception of how civic technologies could interact with their communities’ assets. Further, a body of work has extended feminist theoretical views to propose lenses for analyzing the use of assets in design and their limitations [54, 60, 64, 103]. Working in diverse marginalized settings (e.g., education, health, and immigration) such investigations have highlighted that, under particular circumstances, seemingly positive traits such as care and solidarity may not be directly amenable to design. The design

potential of these traits depends on the processes and systems framing them: an asset in one context may not be equally accessible in another and, in fact, might impose constraints [59, 60, 99, 103].

Within HCI, some research demonstrates the feasibility of using assets in the design of technology-based initiatives (e.g., [18, 38, 45, 77, 102, 106]). Cho et al. [18], for example, used assets such as social capital for designing ICTs that disseminate educational resources amongst immigrant parents. Similarly, Pei and Nardi [77] used immigrants' and refugees' preferred technological practices as assets to create curriculum resources for teaching advanced technological skills to this population. Even fewer initiatives champion and demonstrate *participatory* approaches supporting communities in defining their own assets-based technology-enhanced transformational paths (e.g., [38, 43, 45, 99, 106]). The methodological challenges of co-designing with communities and their assets are yet to be examined.

### 3.2 Assets-Based Design and Participation

Assets-based approaches such as those undertaken in community development [63, 72] are intrinsically participatory; the intention is to work with communities in co-creating their futures. Given the growing interest in facilitating assets-based design endeavors in CSCW and related fields, it becomes critical to explore: *how does an emphasis on assets shape participation?* More specifically, *how does it shape the use of participatory methods?*

The principles guiding participatory approaches for social transformation within HCI, such as Participatory Action Research (PAR) and PD, already embody an assets-based orientation. These approaches are closely aligned with Paulo Freire's vision of community-led emancipation. For Freire, the historically oppressed live in the here and now, which prevents them from understanding their strengths and the larger systems that keep them trapped. It is vital, thus, for the oppressed to develop a *critical consciousness* that unveils the systems shaping their lives. From there, such consciousness allows those oppressed to use their collective strengths, resources, knowledge, and skills towards actively contesting and transforming the social and political situations that influence and limit their life chances [39, 40]. PAR draws from this view to work with groups in constructing and using their own knowledge, seeing how the establishment exploits local knowledge for its benefit [8, 79]. Focusing mostly on how local knowledge could shape technological innovations, PD's proponents also drew inspiration from Freire [36]. They facilitated industry workers in discovering the tacit knowledge these workers had developed about technologies, critically reflecting on it, and then using it to negotiate work practices and policies with institutional actors (e.g., employers and management experts) [35, 36, 90]. As PD evolved from the workplace to serving communities, it further emphasized the relevance of facilitating an ongoing process that allows individuals to come together as experts, discover unknown issues, and produce social innovations towards healing and empowerment [14, 22, 24, 98].

PAR's and PD's specific articulation of a commitment towards engaging local knowledge for pursuing emancipatory goals, however, does not clarify the methodological particularities that can allow these approaches to identify, explore, leverage, and amplify such knowledge, or assets. Two critical obstacles have hindered such understanding for CSCW and HCI. First, often—especially for PD—the commitment to assets does not necessarily translate to practice. In many cases, design work that promotes the participation of users does not focus on fostering the examination and growth of assets. Rather, stemming from a view of deficits, it involves users with the intention of satisfying needs-gathering and needs-fixing goals [6, 22]. Second, given the long-term nature of many PAR and PD initiatives that have shown a commitment to strengths and existing knowledge, these are often discussed in high-level narratives that lack a detailed description and/or analysis of methodological decisions [67, 79], including those that respond to the appreciation and use of strengths in the design of technologies (notable exceptions include [14, 19, 68, 69]).

Table 1. Timeline of activities Marisol facilitated for Groups A and B

Date	Studies	Participants
Jan 2017 to May 2019	<b>Ethnographic study</b>	Interviewed: 55 parents, 16 liaisons Observed: 300 parents and institutional actors across 16 schools and NGOs
2019 July Week 1	<b>Group A:</b> (LPA1) Tree of life (LPA2) Parenting journey (LPA3) Board of assets and challenges	15 parents throughout
Week 2–3	(LPA4) Photo journal	
Week 4	(LPA5) Booklet with word clouds (LPA6) Information sources chart (LPA7) Speculative design	
2019 July	<b>Group B:</b>	
Week 1	(LPB1) Analyzing parental control apps	
Week 2	(LPB2) Discussing the value of information	
Week 3	(LPB3) Imagining online communities	

However, the effects that the assets-based qualifier has had on ethnographic fieldwork in HCI, driving it to focus on unpacking assets' complex relation with individuals, communities, and the broader context [53, 54, 58–60, 64, 103], suggest that emphasizing assets during a participatory process would also entail supporting participants in grappling with such complexity. Thus, it remains essential to explore concrete assets-based PD examples that can illuminate transferable considerations to CSCW's existing discussions on designers' methodological responsibilities when collaborating with participants as agents of social change [29, 30, 33, 49, 67].

## 4 METHODOLOGY

Marisol and Aakash have separately pursued assets-based research and design engagements over the last four years with two different populations and contexts. They learned of each other's research during an HCI and Sustainability (SHCI) community event and discussed a latent need for more methodological guidance when conducting assets-based PD. They decided to analyze their methodological goals, decisions, and outcomes, unpacking their similarities and differences when pursuing assets-based design and the methodological commitments they had each pursued.

### 4.1 Data Collection

The data that Marisol and Aakash used for their analysis involved different engagements during their assets-based research and design work. This data has already been published individually [41–45, 99, 101, 104, 105] and is recorded in diverse forms—including fieldwork notes, transcripts from audio recordings, videos, and photos—and different languages: English, Spanish, and Nepali.

Marisol's research and design endeavor respond to a historical tendency from educational systems in the U.S. to disregard Latin\* immigrant parents' strengths and rather impose technological, information, and social practices that further hinder these parents' possibilities to support their children's education [15, 26, 61]. Her work explores pathways for parent-education ICTs to uplift and support parents' assets. To that end, she has worked in the city of Atlanta, U.S., first conducting a 2.5-year ethnographic fieldwork and then facilitating two assets-based PD engagements: one



with Latin\* parents and another with institutional actors. In this paper, Marisol specifically draws on data from the one-month PD work with parents (07/19), and the insights gained during the ethnographic fieldwork (01/17-05/19) guiding the engagement (See Table 1 for a timeline). The data collected during the ethnographic fieldwork entails interviews with 16 bilingual parent-education liaisons, 55 Spanish-speaking parents from a low-income background (mothers from México and Central American countries for the most part), and participant observations with over 300 parents and institutional actors across 16 locations including elementary schools and non-governmental organizations (NGOs). The PD engagement took place across four locations with diverse socio-economic characteristics and with two distinct groups (Group A and B) of 15 and 25 parents from a similar demographic to parents in the fieldwork. The inclusion of diversely shaped parenting experiences responded to various community partners' suggestions for enriching the PD engagement and its insights. The work with Group A supported parents in re-imagining parent-education interactions during two three-hour PD sessions and two weeks of remote activities. The work with Group B, which responded to a community partner's request, involved three two-hour sessions supporting parents' learning of new technologies in relation to their assets and parenting goals. This endeavor contributed insights about how ICTs could further work with and support parents' assets.

Aakash's work takes place in the context of human trafficking survivors and their reintegration process in Nepal. Survivors are financially and socially shunned by their families and become highly dependent on the organizations that support them, which perpetuates a deficit-based self-view of powerlessness. Aakash's work explores the roles that ICTs can play to support survivors to achieve what they call "dignified reintegration", that is, to be in a position of greater power when they leave the shelter home. In this paper, Aakash reflects upon his three field engagements working with the sister-survivors to uncover their strengths and build towards more enduring ones (See Table 2 for a timeline). Since the sister-survivors stay in shelter homes for an indeterminate time, Aakash has worked with different groups in each of his studies. The *first* engagement (12/17-01/18) sought to develop a holistic understanding of the condition of the sister-survivors and, building upon it, identify assets that are available to them. The first engagement includes a month-long study of the two largest anti-trafficking organizations in Nepal. This included interviews with 10 staff members, shadowing of three key players at work, group discussions with nine sister-survivors living in three rehabilitation homes, and two photo-elicitation activities with five sister-survivors in one of the organizations. The *second* engagement (12/18-01/19) explored the possibility of building upon the identified assets. It entailed a ten-day workshop with a group of nine sister-survivors, culminating in four two-hour-long future envisioning sessions with the same group. The *third* study (08/19-10/19) sought to build upon the sister-survivors' assets towards broader possibilities and engagement with societal actors and institutions. In this study, Aakash replicated the second study's activities with a new somewhat more literate group of ten participants. To build upon the sister-survivors' technological skills, he facilitated eight additional sessions of computing-based activities introducing the sister-survivors to widely available systems like Google Search and Wikipedia. To support the sisters' perception of the potential and limitations of their assets in engaging with societal actors and institutions, he conducted discussions on societal problems that the sister-survivors had seen in their hometowns and villages.

## 4.2 Data Analysis

For four months (05/20-08/20), Marisol and Aakash met weekly to progressively identify commonalities and particularities in their methodological decisions. Drawing from [5], they first created a shared document describing their methodological paths. To prompt a rich reflection on their endeavors, they defined a set of questions for describing each of the methods they had used. These

Table 2. Timeline of activities Aakash facilitated in his three fieldwork

Date	Studies	Participants
2017 Dec to 2018 Jan	<b>Study 1:</b> (N0) Ethnographic Study (N1) Social Photo-Elicitation	13 staff members, 9 sister-survivors 5 sister-survivors
2018 Apr-Nov	Discussion with staff members	3 staff members
2018 Dec to 2019 Jan	<b>Study 2:</b> (N2) Hamrokala workshop (N3) Future Envisioning	9 sister-survivors throughout
2019 Mar-Jul	Discussion with staff members	2 staff members
2019 Aug-Oct	<b>Study 3:</b> (N2) Hamrokala workshop (N3) Future Envisioning (N4) Discussion on societal problems (N5) Dashain wishes (N6) Google Search and Wikipedia editing	10 sister-survivors throughout

questions included aspects such as the reasons for using a certain method, the struggles facilitating it, the community interactions afforded by it, and the insights learned in terms of the method's opportunities for attaining design goals. Per question, they answered with a description of specific experiences with the participants, which demanded them to go back to their data records and to the papers they had published. Before each meeting, they read the content of the file and left comments and questions, which they later discussed in their meetings. This process prompted further reflections on the nature, value, and implications of their methods and helped them recall and add more experiences with participants.

To formalize the inquiry, they then coded the methodological descriptions thematically through an inductive and interpretive process. They discussed and combined the codes in the subsequent video meeting. From this process emerged themes such as "critical questioning of technologies," "promoting a sense of control," and "supporting participants' mutual learning of assets." These themes suggested methodological commitments towards facilitating a community of learners, where members actively worked to become a collective of assets-based thinkers, continuously unpacking how their assets operate in relation to their environment and goals for change. The data under these themes highlighted important differences in how Marisol and Aakash had enacted those commitments not only because their endeavors were different but also as the result of navigating differing contexts, audiences, and structural relations.

For example, although Marisol and Aakash had both encouraged participants to reflect on technology and its role in their lives, they pursued this goal differently based on their relationship with communities and their environment. The knowledge that Marisol had gained about the complex ways school technologies perpetuated inequities against immigrant parents made her hesitant in promoting the design of yet another technology. Thus, when engaging in PD with parents, she promoted an analysis of the social factors that allow the use of certain information and technological practices over others. In contrast, it was key for the sister-survivors to leave their shelter with skills enabling them to eventually make an independent living. Adding to that was the limited time that Aakash could spend with the sister-survivors during field study periods and the low probabilities of working with the same participants in the next visit. Technology use



emerged as one component of mechanisms to develop assets, one that was of particular interest to the organization and seemed to spark curiosity in the sister-survivors. As the research unfolded, it became important that while each PD engagement supported developing awareness about their assets more generally, a component of it involved cultivating both technical skills and a critical view of how such skills could support them in the future.

## 5 A SHARED VIEW OF ASSETS-BASED DESIGN: CORE COMMITMENTS

Marisol and Aakash's analysis highlighted a common understanding of assets-based design as the process of working with participants in co-constructing *collectives of assets-based, critical thinkers*. Their data suggested that these collectives engage in an ongoing process of collaboratively developing a critical consciousness, reflecting and learning about their situation of oppression and marginalization [40]. We now describe how the lens of assets shaped Marisol's and Aakash's view of critical consciousness and collectivity. We also provide an overview of the three methodological commitments that both Marisol and Aakash enacted to foster collectives of assets-based thinkers.

Supporting a critical consciousness is a goal that most participatory approaches such as PD and PAR already pursue. Marisol and Aakash's analysis suggests that an emphasis on assets, however, leads towards ensuring such consciousness stems from and prioritizes a rich understanding of assets. To do so, they both used strategies that supported participants in gradually becoming *assets-based thinkers* who continuously foster a critical attachment [24, 71] to their available and attainable assets, identifying them and incrementally valuing them as a source of power from within.

In particular, Marisol and Aakash emphasized methods that fostered collectives of assets-based thinkers. Fostering collective formation is also a common participatory goal [24, 90]. However, Marisol's and Aakash's experiences suggest assets-based PD emphasizes such collectives as communities of learners (e.g., [12, 13, 82, 86]). In such communities, members could collaboratively define and pursue shared learning goals about their assets, act as learning resources to others, and value the incremental process of reflecting on and forming attachments to their assets.

*Commitment #1: To Co-Navigate a Trustworthy Process.* In facilitating participants' critical awareness of assets, Marisol and Aakash learned that it entailed considering the emotional state of participants. For both Marisol and Aakash, supporting participants in trusting and co-navigating the emotionally complex process of becoming an assets-based thinker was crucial. To unveil the *whys* and the *hows* of assets and their limitations, participants had to be open to reflecting on their experiences with assets—and perhaps even past struggles—and sharing them with others. This placed a demand on them to trust other participants, the designers, and the process. Moreover, forming attachments to assets may not have yielded immediate visible results for participants to appreciate, and required continuous negotiation throughout the journey about what they expected and what an assets-based design process could offer. Such an emotional demand might not arise in other design approaches that work with participants in exploring what they need and, from there, envision how to fulfill those needs [97]. In some cases, the participants might even have needed to experience a certain level of discomfort. *Co-navigation* meant that this demand could not overwhelm the possibility of participation.

*Commitment #2: To Co-Build An Interdependent Collective.* When describing participatory methods and their use, most literature in fields like PD centers on the methods' opportunity for designer-participant mutual learning; while the designers learn "the realities of the users' situation," the users learn "to articulate their desired aims and learn appropriate technological means to obtain them" [90, pp. 2]. In Marisol's and Aakash's cases, they both rather emphasize the importance of movements towards collectives of assets-based thinkers. Further, they highlight how to foster such movements in situations where the movement itself may constitute an achievement. To do this,

Marisol and Aakash resorted to methods fostering participant-to-participant mutual learning of how to critically analyze the assets available to them. As such, Marisol and Aakash used methods that could help participants explore how individuals' assets operate in relation to the collective, how certain power structures limit these assets' use, and the implications of these limitations moving forward. Moreover, Marisol and Aakash both shaped their methods to ensure that different individual voices around assets could be heard equally.

*Commitment #3: To Co-Experience An Incremental Assets-Based Transformation.* A body of PD scholars has increasingly promoted participation in design as a process that goes beyond technology creation [24, 66]. However, in practice, a significant number of PD engagements—especially in the industry, emphasize solving a known issue by generating a materially fixed product, often championing technological innovation [6, 21, 34]. Tangential to this, there is a generalized tendency in CSCW and HCI to value the efficacy of technology-oriented design endeavors based on the visible and measurable changes these endeavors motivate [10, 91]. In contrast, Marisol and Aakash practiced assets-based design as an approach that not only avoids “focusing solely on proximate concerns,” [24, pp. 242] but that appreciates small incremental transformations—even if these are not visible or measurable—happening over a long period. These transformations have both included individuals developing an appreciation towards their own assets and collectives discussing a problem and envisioning new perspectives about the future. These incremental gains enabled pathways for change to emerge organically and, thus, helped participants to see their circumstances “not as a static reality, but as a reality in process, in transformation” [39, pp. 83].

## 6 COMMITMENTS FOR ASSETS-BASED DESIGN: TWO EXAMPLES

Marisol's and Aakash's efforts to foster a collective of assets-based thinkers entailed the pursuit of three core commitments: co-navigating a trustworthy process, co-building an interdependent collective, and co-experiencing an incremental assets-based transformation. Now, we describe the particular methodological decisions each person enacted to pursue these commitments. We also reflect on how our decisions illuminate transferable lessons about the different shapes that assets-based commitments can take when responding to contexts, communities, and goals. These descriptions and reflections can illuminate other designers' decision-making processes when prioritizing assets with communities.

### 6.1 Case 1: Re-imagining ICTs for Latin\* Immigrants Parents in the U.S.

Latin\* are the largest group of immigrants in the U.S. [76]. However, the U.S. educational system has historically deemed Latin\* immigrant families' linguistic, cultural, and socio-economic differences from the norm as deficiencies. As a result, Latin\* immigrant parents are continuously pushed to the margins of their children's education [15, 17, 51]. The introduction of parent-education ICTs further hinders these parents' opportunities to support their children. These ICTs impose information and technology practices that profoundly disregard parents' existing practices and knowledge, and thus, exacerbate the gap that parents already experience when trying to connect with schools' resources [46, 61, 78]. Inspired by anti-deficit work on education [48, 74], for four years Marisol has worked with diverse Latin\* communities in the city of Atlanta, in the U.S., devising possibilities for change. In particular, she has explored the design of parent-education ICTs that do recognize and support Latin\* immigrant parents' practices and knowledge as critical strengths or assets.

Marisol's initial, three-year multi-sited ethnographic fieldwork unearthed parents' skillful use of apps that can help them attain everyday goals (e.g., YouTube and Google Maps) [101, 104]. The fieldwork also highlighted that, for several reasons, parents struggle to use the apps that schools mandate (e.g., distrust towards new apps, low familiarity with installing apps, and vague notion

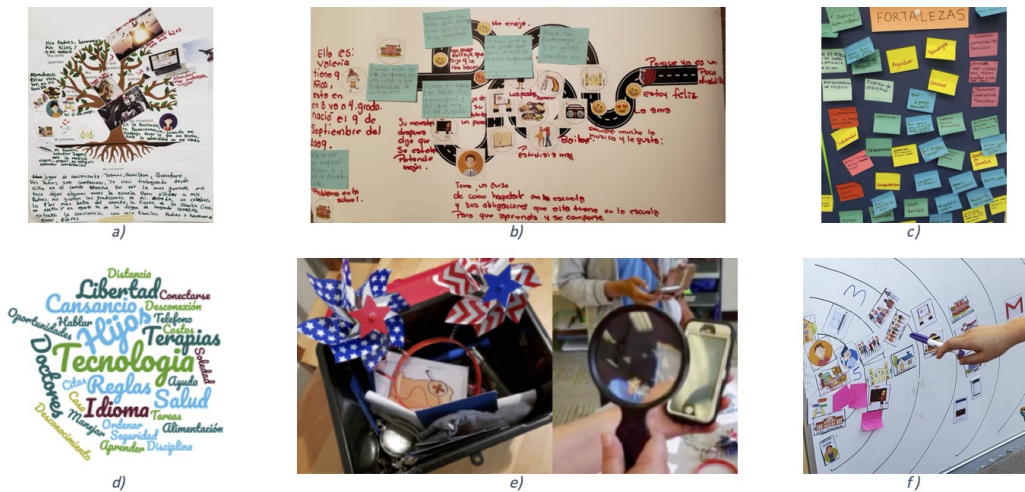


Fig. 1. Participatory activities that Marisol facilitated: a) the tree of life; b) the parenting journey; c) a board of assets; d) a word cloud with assets and challenges; e) speculative design; f) the information sources chart

of each school app’s purpose). Such struggles further feed institutional visions of the parents as deficient, which in turn affects how parents see themselves [105]. With this rich understanding of parents’ information and technology practices, Marisol proceeded to engage in participatory design with various of the fieldwork’s communities. Specifically, she facilitated a one-month PD engagement with two groups of parents (15 in Group A and 25 in Group B) that envisioned assets-based changes in the parent-education relation [99]. Knowing the often-negative role that parent-education apps had on parents’ ability to navigate the educational system [100], Marisol planned the engagement to prioritize participants’ understanding of their assets over the development of technological products or skills. In essence, the engagement focused first on motivating participants to perceive, consider, and respect their individual use of assets in the past, then to consider these matters collectively, and eventually to develop an understanding of why those assets failed or succeeded.

Next, we describe how the methods that Marisol presented to each group of participants (A and B) supported them to begin developing into a collective of assets-based thinkers. Further, we reflect on how these methods enact assets-based design commitments.

**6.1.1 Group A: Using Assets to Devise New Parent-Education Interactions.** Marisol presented participants in Group A with three stages leading them to imagine uses for their assets that could change the traditional parent-education relation. First, a stage for recognizing and appreciating their assets. Second, a stage for critically exploring how their assets operate within their larger contexts. Third, one for envisioning how to use their assets towards redefining parent-education interactions. These stages illuminate how methodological decisions around materiality, experience-sharing, and the unpacking of assets and larger systems can promote a collective of assets-based thinkers.

*Stage 1: Appreciation of Assets.* To introduce an assets perspective to the participants, Marisol presented them with two paper-based activities. In each, she provided participants with a wide range of cultural elements and information resources—which drew from Marisol’s previous ethnographic engagement—for identifying and representing their assets. The first activity was the *tree-of-life* envisionment [83], which offered them the possibility of identifying their assets from an open-ended

view. They could decorate different tree parts to describe various aspects of their lives: the roots represented their origins, the trunk represented their present, and the leaves their desires and aspirations (Fig. 1.a). Next, the *parenting journey activity* asked them to identify their assets from the more particular perspective of a past parenting struggle (Fig. 1.b). Marisol then asked participants to share their creations and annotate Post-it notes with the assets and challenges they heard in other participants' narratives. With this, she aimed at motivating participants to reflect on individuals' assets collectively. Since this was the first time participants had engaged in conversations about their assets, Marisol offered different support types to minimize the risk of discomfort. For example, she showed participants samples of artifacts created by her and others to guide them throughout the process and offered to handwrite and present their ideas herself if they felt it was needed.

Giving parents the time and resources to individually retrieve their memories helped them decide the aspects of their lives—including struggles and acts of resilience—that they found valuable to share. The emerging assets included stories of family support, sacrifice, survival, perseverance, and attainment of aspirations. They also involved strategies that the participants used on an everyday basis to protect their families. Sharing how they dealt with highly personal problems such as autism, learning disabilities, bullying, and racism also allowed them to explore the complicated relationship between their parenting abilities and the systems surrounding them. For example, some parents explored how failures in the system (e.g., delays in providing support to children) had often pushed them to mobilize parenting abilities they did not feel they had before (e.g., connecting with other parents, reaching out to teachers despite not speaking English, and going to the school more often).

This open discussion also created a space for Marisol to share her experience as a Latin\* mother facing teachers who insisted that her son was disengaged but offered no concrete pathways to support him. Participants reacted by offering advice. Such personal interactions between designer and participants were critical for fostering a long-term community relationship; to this day, Marisol and parent participants have a WhatsApp group for sharing parenting resources. Towards the end of the session, all participants pasted the Post-it notes to a large board for everyone to see (Fig. 1.c). Creating such a collective summary of the experiences they had shared helped many parents realize that they face a lot of challenges, many of which are similar, but that the strategies they use to face such struggles are also abundant and as worthy of sharing as the challenges themselves.

### **On Commitments**

*To Co-Navigate a Trustworthy Process:* Since this stage was the participants' first encounter with an assets-based approach, it needed to foster a sense of trust in the process. Presenting participants with a careful selection of abundant familiar materials helped provide them with a sense of control when looking at their past to notice and share their assets. Giving participants the responsibility of analyzing other participants' experiences—identifying them as assets or challenges—also contributed to trust-building goals: they could own the process, making critical decisions about how to represent their collective assets.

*To Co-Build An Interdependent Collective:* Given that participants in this engagement did not know each other, it was critical to support a path towards becoming a collective, appreciating their assets and interconnections. Asking them to share their individual experiences with the group helped in that regard: they learned about each other's strengths and struggles and found support in their peers. In being attentive to when and how to act to encourage *equal but different* participation, Marisol also maximized opportunities for mutual learning.

*Stage 2: Critical Analysis of Assets.* After inviting participants to share their assets individually, Marisol presented them with a series of activities for analyzing their assets collectively and critically. This entailed unpacking how their assets operate within broader systems. To that end, she again encouraged participants to see their assets from many different perspectives, from the open-ended to the particular. For example, two consecutive activities around an open-ended view of assets helped participants to discuss the systemic factors shaping how their assets operate. Specifically, a two-week photo diary activity allowed the parents to identify the assets they mobilize individually for addressing a wide range of purposes, including learning, supporting their children, and accessing information. From there, the participants moved to collaboratively analyze all the assets and challenges they had identified so far by discussing word clouds that aggregated all these data (Fig. 1.d). Such a collaborative exercise allowed them to find unexpected contradictions in how their assets behaved (e.g., the words 'Comunidad' (community) and 'Hijos' (children) were in both assets and challenges clouds). This, in turn, led participants to theorize about the systemic reasons limiting the potential of their collective assets (e.g., the distrust between community members due to classism and society's low support towards fostering in children an empowered image of their immigrant parents).

In the next activity, the participants saw their collective assets from a parent-specific perspective. Marisol asked participants to line up the resources that the larger Latin\* community uses to support their children's education. The participants first lined these resources up in terms of their preference for navigating parenting issues. Then, they rated the resources' effectiveness. This process unearthed further contradictions in how assets operate, but this time with a specific focus on the educational system. This, in turn, led to a collective reflection on the various factors shaping—and often limiting—the community's ability to mobilize its assets. Some parents discussed, for example, that while they often see teachers as a preferable resource, it can be hard to reach them. In contrast, many commented how having a bilingual school liaison who could support them right away had often proved to be a life-saver.

The role, potential, and limitations of technology for supporting the participants' assets also emerged from these conversations. Raul, for example, reflected on the reasons why technologies such as YouTube could be a key asset for addressing parenting challenges, but currently are not: "When you can actually find something that aligns with what the children need, then YouTube videos are great. The problem is that it gives you a ton of results, and then it is super hard to find the video that does help." This excerpt from the discussion between Raul, who grew up in México, and Eliza, who grew up in the U.S., exemplifies the kind of critical discussions around technology and assets that took place during this stage.

RAUL: *The way people use technology in this country is not similar to the way we [Latin\* immigrant parents] use it. They use it all the time to solve any problem. Since you grew up here, you have that as an advantage. You understand how to filter out information for helping our children.*

ELIZA: *Not really, I know the language, that is true, but their practices [the school's] and how to move around to get what our children need, is still a challenge for me.*

### **On Commitments**

*To Co-Build An Interdependent Collective:* Collective activities for generating visual representations of a group's assets helped participants further explore their interconnections. As participants contrasted their experiences, they challenged assumptions—often deficit-based—of themselves and Latin\* immigrants in general, further realizing the interconnections between their different assets and challenges.



*To Co-Experience An Incremental Assets-Based Transformation:* The participants' work visually representing the interaction between larger systems and their collective assets led them to engage in assets-based thinking progressively. They questioned their preference for certain assets, considered new perspectives for their problems, and began suggesting pathways to change their context. We argue that this change in thinking already represents an incremental transformation that designers could value more and foster as part of a long-term engagement in realizing social transformation.

*Stage 3: Imagining New Uses of Assets.* After unpacking assets and challenges, Marisol presented participants with a final stage. The goal was to support the parents in imagining assets-based changes for the parent-education relation. Knowing from previous fieldwork that parents often felt disempowered to critique and change the school system's policies and rules, Marisol lowered design demands and instead promoted free imagination. She proposed a culturally situated Fictional Inquiry activity [32] using a mash-up of *El Chavo del Ocho* and *El Chapulin Colorado*, two Mexican TV shows with high cultural impact across Latin America [52]. These shows, originally produced for children, portrayed stories of superheroes, magical objects, family, and friendship in the context of socio-economic inequities. As such, they allowed Marisol to craft a fantasy-based setting where parents could make free use of their imagination. Specifically, she presented them with a narrative where a character from the show, Don Ramón, would reach out to them as parenting experts and ask for their help. He would send them a group of magical objects and a letter asking them for a vital favor: to assign the objects magical powers that could help him address his parenting problems. By "othering" the problem—making it Don Ramón's and not the parent participants'—and positioning the participants as experts, they were free to choose the challenges they wanted to address and explore how the assets they had identified so far could be of help.

For example, many parents' designs suggested a desire for schools to offer the community more resources about family-oriented activities rather than information only. Others, such as Luisa, proposed to lift the systemic barriers (e.g., schools' privacy policies) preventing parents from mobilizing their assets to connect with each other as a parenting community. She proposed a magical magnifying glass for expanding parents' chances to help each other (Fig. 1.e).

*If Don Ramón uses the magnifying glass to read the email that the teacher sends to all parents, he will be able to see a mark on the email address of parents who have the same concerns he has. The fact that the email is coming from the teacher, who is a form of authority, can help Don Ramón feel safer in contacting these other parents.*

### **On Commitments**

*To Co-Navigate a Trustworthy Process:* Engaging participants in using their assets to challenge oppressive systems entailed using methods that could maintain and further support their trust in the process. Marisol's case suggests that culturally situated contexts and narratives that *other* participants' problems can foster the needed trust, especially in cases where over-emphasizing technology design—rather than change—might reinforce defect-based self-views.

*To Co-Experience An Incremental Assets-Based Transformation:* While the PD engagement that Marisol presented to the parents did not produce a technological app that would change their lives, it did support participants in taking an incremental step towards becoming assets-based thinkers. Specifically, in lowering technical demands, this stage allowed participants to challenge deficit-based views that deem them information-poor and to identify systemic problems in critical need of change.



**6.1.2 Group B: Rethinking Technology in Relation to Assets.** As mentioned above (Section 4.1), activities for Group B responded to a community partner’s request for developing parents’ technological skills. The community partner—who was not a participant in the PD engagement, but was a participant in the overall endeavor—felt those skills were essential for helping parents to better cope with their children’s more advanced technological practices. Given Marisol’s knowledge about parents’ complex relationship with technology, she expressed her concern that skill-teaching alone could hinder opportunities to illuminate the parents’ already existing assets, technical and non-technical. Marisol and the community partner then decided that the workshop would promote critical learning of assets in relation to the technologies that parents had identified as relevant to them, including parental control apps, information searching systems, and community-building tools.

Similar to the work with Group A, each session engaged participants in appreciating, critically analyzing, and using their assets. For example, the session exploring parental control apps began by prompting parents to individually reflect on their feelings towards children’s technology use. Marisol then gave parents visual resources to collaboratively create a paper-based ad representing how they would use their assets to motivate children in following their technology use rules. Once the participants had presented their ads to their peers, Marisol proceeded to teach the parents about parental control apps. Finally, the participants engaged in a group discussion about how these apps aligned with their assets and goals. Having reflected on their assets beforehand helped parents like Mariana to make informed decisions on how to introduce parental control apps in their lives. For her, it was critical to prioritize family negotiation over using technology to control their children: *“I will try to decide new rules with the children and my husband, and then put the rules next to the dinner table so that everybody remembers our decision.”*

#### **On Commitments**

*To Co-Navigate a Trustworthy Process:* Promoting an assets-based perspective may be in tension with the participants and community partners’ goals. Marisol navigated this tension by expressing her concerns to the community partner about possibly limiting the parents’ assets growth. Such negotiations with participants and community partners are critical in supporting them to see the process as trustworthy. However, the negotiations themselves require a high level of trust, which Marisol was able to build during her extensive ethnographic work.

*To Co-Experience An Incremental Assets-Based Transformation:* Technologies have a strong potential for supporting social transformation. However, their introduction, especially if presented as a potential solution, can lead participants to disregard their existing assets. In facilitating a critical understanding of assets in relation to technology, Marisol supported participants’ incremental steps towards sustainable social transformations.

## **6.2 Case 2: Building Towards Dignified Reintegration with Sister-Survivors in Nepal**

Human trafficking has been a major problem globally, including in Nepal, where an estimated 15,000 girls and women are trafficked annually; upwards of 2000 people were rescued from trafficking in 2020 [28, 70]. Anti-trafficking organizations are the major actors involved in the prevention as well as repatriation, rehabilitation, and reintegration of survivors [62, 65]. In the last four years, Aakash has been working with an anti-trafficking organization that was founded and is being led by a group of sex-trafficking survivors—henceforth, called “Survivor Organization” (SO)—and the sister-survivors living in SO’s shelter homes. Based on what staff and sister-survivors said in initial investigations, his goal emerged as the exploration of ways to support the “dignified reintegration”

of the sister-survivors into society. Aakash chose to pursue an assets-based approach to counteract the state of dependency that anti-trafficking organizations appeared to perpetuate for survivors as these organizations seek to secure funding from external donors [2, 62, 65]. Focusing on what the sister-survivors already have rather than what they do not have can support them in drawing power from within.

From the outset, SO and the sister-survivors shared their interest in exploring roles for technology to support the sister-survivors' reintegration journey. The interest formed the basis of SO's relationship with Aakash. Yet, while as a computer scientist, Aakash brought technological skills and personal inclination to the project, ironically, he saw the role of technology as potentially more difficult and challenging than did many people in SO. Aware of the ways technology can be perceived as a charismatic panacea [4], Aakash attempted throughout to utilize technology as a means to build upon the sister-survivors' existing assets rather than towards an end goal of becoming a technology user.

Aakash's work entailed three field studies with activities supporting the sister-survivors to appreciate and build upon their assets, and with it, be at a position of slightly greater power when they leave the shelter home. Specifically, the *first* study involved the sister-survivors to uncover their assets, the *second* focused on supporting them to reflect on their existing assets and explored a potential direction to build upon the assets, and the *third* supported the sister-survivors to incrementally build upon their assets towards more enduring ones. There was a significant time between each field engagement that allowed the research team to reflect on the observations and discuss the findings with the staff members at SO. These reflections and discussions informed the design of subsequent approaches. However, due to sister-survivors' turnover, in each field study, Aakash worked with different groups of participants. For this reason, each study sought to provide concrete gains for individual sister-survivors, assuming that they might not be present to benefit from future participation. Further, given that the assets available to one group may not be available to another, the turnover led Aakash to always begin his studies by discussing his prior work and findings with the sister-survivors. This helped promote collective reflection and was instrumental in situating, justifying, and adapting the activities.

Besides the time invested in PD activities (Section 4.1), three factors stand out as different from Marisol's work. *First*, the nature of the groups differed in terms of number, locations, and the kinds of attachment members had with one another. While Marisol worked with different groups across locations in an urban setting, Aakash worked with sister-survivors living in one specific setting, sharing the challenges of living in a shelter home with a shared awareness of each others' past. Thus, they held strong bonds with each other, yet these bonds were temporary since the sister-survivors moved out of the shelter home at an indeterminate time. *Second*, motivating participants to recognize assets by reflecting on their past was not feasible. The sister-survivors shared that they found it very painful to recall their past and would prefer to move away from it. Aakash thus focused on activities that positioned on the present or the future. *Third*, each of his studies involved a technological component that was structured as a small exploration to understand both the potential and the limitations of the socio-technical systems in facilitating assets-based engagement. This entailed detailed discussions with the staff members on the findings from the field studies and collectively charting approaches for the subsequent study, including the way any technology would be presented.

We now present Aakash's methodological decisions across the three field studies he facilitated, emphasizing how the particularities of the context he worked in shaped his enactment of assets-based design commitments.



Fig. 2. Participatory activities that Aakash facilitated: a) photo elicitation; b) Hamrokala workshop; c) future envisioning; d) Dashain wishes; e) Google search and Wikipedia editing; f) discussing societal problems

**6.2.1 Study 1: Uncovering Existing Assets.** The goal of the first study was to develop a holistic understanding of the anti-trafficking organizations’ operations in Nepal and the circumstances surrounding reintegration, and to identify factors that can influence Aakash’s engagement with the sister-survivors. To this end, Aakash began with an ethnographic inquiry of two of the largest anti-trafficking organizations in Nepal. The initial ethnographic inquiry revealed a salient deficit-based discourse; the survivors were seen by the staff and themselves as passive beneficiaries of the organization. Staff members developed and implemented rehabilitation programs with limited input from the sister-survivors, highlighting tensions between the vision of the future that the sister-survivors held for themselves and the goals set for them by the staff members [41]. Critically, these practices placed the sister-survivors as service recipients with limited power. The sister-survivors were asked by SO to share stories of abuse and violence that they had endured before they were repatriated, further perpetuating deficit-based perspectives. The sister-survivors mentioned the pain they had felt in recalling the past events, *“I had already forgotten it [the past events] and being reminded of it was hard. I was so sad for 2-3 days. We have left that place and moved on.”* Despite that, these stories were widely shared, such as in the organization’s annual report. Dignified reintegration constitutes elements of power: the sister-survivors having power over their lives and power to engage with societal actors and institutions. To push back on the deficit-based discourse, Aakash sought to support the sister-survivors in uncovering and reflecting on their assets.

The noticeable distance between Aakash and the sister-survivors complicated the feasibility of engaging them in activities for reflecting on assets in their everyday lives; to open up and share their experiences, participants need a space for trusting each other and the designer. Aakash’s repeated visits to the shelter allowed him to identify the sister-survivors’ poster-crafting work for SO’s awareness-raising programs as an activity that could create the familiar trusting space the sister-survivors needed. He proposed the sister-survivors collectively use an instant print camera over two days for taking photos of their surroundings, discuss the photos, and agree on a summary text to describe the photos on the poster (Fig. 2.a).

An important component of the activity was its focus on the sister-survivors' present life in the shelter home and their vision of the future. Giving sister-survivors full control over the photos was another important component. The materials conveyed that the sisters could tear them up or even burn them if they wanted. Another important component was how the photos fit into a collective understanding of contribution. Inviting participants to comment on all of the shared photographs, not just the photographs they had taken as individuals, supported different amounts and kinds of participation (e.g., one could add to someone else's story or share their own story). The open-ended subjectivity of the photographs also contributed to an atmosphere of easy flexibility, drawing out plural voices as everyone had different experiences within the same setting. In general, the playful experience that the activity facilitated, as evident in the laughter throughout the sessions, suggests the activity helped in reducing the distance between Aakash and the sister-survivors and eliciting trust towards an assets-based process.

From the activity, the sister-survivors' crafting practice and their mutual bond with one another emerged as important assets that could support them during their reintegration journey. The activity's emphasis on collective ownership also facilitated discussions on the complexity of the sister-survivors' collective assets and struggles with a vision of what could be in the future. For example, the sister-survivors valued handcrafting as an opportunity to become financially independent in the future, as heard in Anita's remark, "*... because if we learn all these skills [different handicraft], in the future, we can make these at home and sell it outside [market]. That's why I think everyone should learn Pote [glass bead necklace] making.*" More than this, crafting was also seen as a means to become independent and bring families together. At the same time, limitations around crafting emerged. The sister-survivors had noticed the declining sales of handicrafts in the local market. Many also found crafting boring. They expressed a desire to learn other skills.

Their mutual bond with one another also emerged as an asset that can support them throughout their journey, including when learning about crafting and managing moments of frustration. However, they acknowledged that they were very likely to lose connection with one another once they leave the shelter home to live in different places across the country.

### **On Commitments**

*To Co-Navigate a Trustworthy Process:* Moving away from the trafficking past was a critical decision taken to promote comfort. Using materials that were familiar to the participants facilitated in promoting a sense of control and trust. The social sharing and ludic nature of the activity further created a space that was within the sister-survivors' realm of comfort. The social and open-ended activity supported the participants to take control over the process and decide collectively how the tangible outcome could be shared with others outside the space.

*To Co-Build An Interdependent Collective:* While the participants shared a strong bond with one another, they had not previously discussed each others' strengths. Discussion about the photographs made the familiar setting strange in a convivial way. It invited the participants to reflect on what the things depicted in the photographs meant to them and learn what it meant to others. This led to a critical analysis of the value of crafting in the long run. Presenting the individually-created photographs as being collectively owned and using the individual stories to come up with a summarized text created an opportunity to show how individuals can be of value to the collective.

**6.2.2 Study 2: Building Upon Identified Assets.** The main outcome from the first study was the identification of crafting and mutual bonds as important assets on which to build. The second study sought to promote a deeper reflection on those two assets, supporting them to envision alternatives

and engage in rich discussions about existing constraints and possibilities to navigate them. To that end, two activities were designed as part of this study: a ten-day workshop involving a tailored web application called Hamrokala and a future envisioning exercise.

*Hamrokala Workshop.* A past failed experience in introducing computing to the sister-survivors had eroded their and the staff members' confidence in the feasibility of this path; nonetheless, sister-survivors expressed openness and curiosity during Study 1 about learning to use computers. This suggested that computer use could be a component of building on their assets if it was done carefully in small exploratory increments that could mitigate failure.

In between Study 1 and 2, Aakash drew upon the assets identified so far to create Hamrokala ("Our Craft" in Nepali), a web application contextualized around crafting. Hamrokala opened up the possibility of extending the sister-survivors' crafting-related assets beyond making, towards sales and marketing. The application allowed participants to upload and describe photos and drawings of their crafts as selling items (Fig. 2.b). Harnessing the sisters-survivors' mutual bond as an asset, the application allowed them to share comments on their creations. Also, acknowledging that many sister-survivors have limited text and digital literacy, the design included voice annotations in a female voice speaking in Nepali, emulating the type of social support that participants gave each other.

The web application was introduced through a ten-day workshop. In presenting the application to the sister-survivors, Aakash discussed findings from the first study and invited the sister-survivors to explore computing and Hamrokala as a means to build skills for the future. As the participants collaboratively explored the application and analyzed Aakash's proposal, they unpacked the learning implications of using technology as well as entering the crafting industry. In terms of technology learning, the scaffolded interactions with the web application helped participants to overcome their initial apprehension. They shared pride in being able to use computers and expressed a desire to learn how to use technology towards more immediate aspirations, such as connecting with their families. While the activity also prompted ideas for operating a crafting business in the future, it fostered a rich discussion about the learning they needed to undergo to become independent craft sellers, such as learning to better communicate their handcraft to a potential buyer. Further, participants like Bina and Manshree, who had worked on crochet scarfs, shared they were unaware of the selling price of the scarf and needed to learn more about these topics, "*It felt really nice being able to put crafts that I have made for sale. It was easy. Initially, I didn't know how to establish the price. Now I know a bit.*"

*Future Envisioning Exercise.* Throughout this study, Aakash also worked to promote a deeper reflection on how the sister-survivors' participation was shaping their vision of the future—including the use of technology—and suggesting possible changes to their surroundings. To work towards the first goal, after the Hamrokala workshop, Aakash introduced a future envisioning exercise that elicited the sister-survivors' values around six aspects of their lives: "me", "my family", "my society", "my crafts and skills", "my source of income", and "me and my technology" in time spans of one, three, and five years into the future (Fig. 2.c). The activity elicited expression of the sister-survivors' desire for financial independence and social acceptance but also shed light on the limitations of the programs available to them to achieve their aspirations. In learning from each others' aspirations, like how many children they wanted to have, and building on the trust that the previous activities had fostered towards the process, the sister-survivors created a convivial space that motivated them to ask Aakash to share his vision too. Such invitation allowed to further illuminate interconnections for fostering mutual learning.

To facilitate the sister-survivors' knowledge that their assets could shape their surroundings too—in this case, SO's operations—Aakash shared with participants his interpretation of the implications that crafting had for their lives. This included his sense that participants' lack of control over their crafting process was prominent. The sister-survivors agreed with this interpretation. They used this knowledge as a resource in a discussion with the handicraft trainers to identify different ways to gain more control over crafting practices. Sharing the insight helped switch the power roles. Aakash and SO went from being in charge of the engagement to show themselves in need of sister-survivors' knowledge. Further, it allowed the sister-survivors to chart possible ways to support each other moving forward.

### **On Commitments**

*To Co-Navigate a Trustworthy Process:* The design of Hamrokala demonstrates again the critical role that observations of participants' assets can have in devising activities and choosing contexts and resources that encourage participant control. Control can build trust along different dimensions (e.g., self-trust, trust in the process). A sense of control was also fostered by cultivating practices of disclosure, even facilitating a space for participants to inform the operations of the NGO, helping to challenge deficit-based views and power dynamics.

*To Co-Build An Interdependent Collective:* Combining a collaborative technology-based experience with mutual reflection about the future enabled individuals to contribute to the collective analysis of the implications of using assets for learning. Aakash's engagement as a participant also suggests that, in the face of large power differences, designers seeking to unearth interconnections with participants need to invest in trust-building activities where participants can decide when and how to include them.

*To Co-Experience An Incremental Assets-Based Transformation:* This study highlights how a piece of technology can be a scaffold to attain a small incremental transformation that does not prioritize a technological outcome. Hamrokala supported the sister-survivors in developing awareness of their existing crafting practices and realize themselves as capable of attaining futures they had not considered feasible before. While this change in thinking might not be visible or measurable, it is critical when moving towards assets-based possibilities.

**6.2.3 Study 3: Leveraging Assets to Explore Broader Possibilities.** In Study 2, Hamrokala and the accompanying workshop suggested the utility of building on existing assets to create new ones. Furthermore, the sister-survivors seemed ready and able to explore broader possibilities—with their assets including their technological skills—that could endure beyond the shelter home. Study 3 started by replicating the Hamrokala workshop and then moved to replicate the future envisionment activity with some changes. Additional activities involved important discussions of societal problems that the sister-survivors had seen in their community and a good-wishing exercise contextualized around an upcoming festival. Aakash then went on to enable the sister-survivors to participate more actively in explorations of world knowledge drawing upon the Internet. These activities incrementally built upon the sister-survivors' assets and supported them to envision and reflect how they could leverage their assets in engagements outside the shelter home.

*Hamrokala Workshop and Future Envisioning.* Similar to the second study, the third study began with a ten-day workshop using the Hamrokala web application. It was followed by the future envisioning exercise. Pleasingly, the participants challenged the notion of imagining the future in terms of one-, three-, and five-year spans (as we had asked during the second study): “We may



*be hit by a truck tomorrow and be gone [dead]. Who knows what is going to happen in five years?"* After discussing how looking into the future could help them identify their existing knowledge, they decided to change the method. Rather than asking about their future in a fixed number of years, the activity now asked them to imagine how they saw themselves at relatable life stages (when they are about to leave the shelter home, when they feel they are successful, and when they become old).

*Discussion on Societal Problems.* The future envisioning exercise supported the sister-survivors to share two problems that were prevalent in their communities and were affecting young women like them: child marriage and human trafficking. To continue fostering participants' reflections about the assets available for engaging with the outside world in the face of these societal problems, in the following two sessions, Aakash prompted discussions around factors that cause those problems (Fig. 2.f). Given the gravity of the issues in Nepali society, Aakash invited the sister-survivors to think about concrete scenarios of how these issues affected young women in their hometowns and villages. The participants were able to envision the possibility of using the skills and knowledge they had gained so far to engage with local actors and institutions in mitigating the problem, as heard in Sajala's plan on raising awareness:

*I will bring in the police or NGOs or other people like teachers, who can help, people who can advise families ... I have learned a bit about what needs to be done like if I go there [home] and see that child marriage is happening, I feel like I can probably do something. I feel I can at least counsel and advice.*

*Dashain Wishes.* The discussion also drew out limitations on their capacity to bring about change, especially in terms of attaining a non-discriminatory society. To support them in developing a sense of control that could, in turn, allow them to dare to imagine assets-based futures, Aakash proposed a culturally-grounded activity where they could "other" their problems for a while. He used the upcoming festival of Dashain—a Hindu celebration of the victory of good over evil that includes a good-wishing tradition—as the background to suggest the sister-survivors engage in good-wishing to each other. The festival provided a context full of positive, familiar experiences where they could face the uneasiness of the future. By focusing on others' futures, this good-wishing narrative helped participants imagine changes beyond their limitations, learning from the many possibilities others saw for them (Fig. 2.d). In the activity, all the sister-survivors wished for a family and caring society and expressed a view of knowledge of computers (e.g., becoming a computer trainer) as a means to integrate into society and be in a position of dignity and respect: "*She is learning computers now, tomorrow [in the near future] may she be able to teach computers.*"

*Incremental Exploration of World Knowledge Through Technology.* With this rich understanding of assets in the future, the sister-survivors then moved to an exploration of broader possibilities that could endure beyond the shelter home. Across sessions, the sister-survivors had expressed a strong interest in learning to type and use the Internet as means to gaining an office job while studying. Thus, in the following sessions, Aakash introduced the Internet and incrementally built activities to introduce Internet-based tools that the sister-survivors could use to amplify their assets outside the shelter home. Aakash proposed to use their everyday experience as a resource for drawing the collective to discuss concepts like websites and navigation, and to produce desirable practices such as rules to remain safe when navigating the Internet. From there, they moved to engage in unstructured Internet use in groups. Noticing that the sister-survivors once again used their mutual bond as an asset for supporting their search interests, Aakash introduced an activity where all the sister-survivors came up with keywords to search for answers to questions, such as "Who is

the author of Cinderella?” and “What documents are required to open a bank account?<sup>4</sup>” In the process, Aakash also introduced Google Translate as a way for the sister-survivors to translate the keywords and search results from Nepali to English and vice versa (Fig. 2.e). The collective Google search activity encouraged the sister-survivors to share their knowledge, often swapping roles as help seekers and providers. It also sought to elicit reflections on ways they could use their knowledge to engage with actors and institutions outside of the shelter home.

*Not all will know English, but many know Nepali. If we make it in Nepali, many people can understand it. It is for others, it will be easier for others. In English, you don't know what is going on. Others may feel the same way as we did today with a lot of things to do before understanding it.*

Aakash then facilitated an activity where the sister-survivors could use their assets for exploring their curiosity. This entailed, first, selecting topics of their interest to search in Wikipedia English. Then, they used Google Translate to make sense of the Wikipedia English article, compared the information with that in Nepali Wikipedia, and added new information to Nepali Wikipedia (Fig. 2.e). Beyond learning to type, translate, and search and discern information online, the activity seeded discussions on alternative futures and possibilities. For instance, the sister-survivors selected articles about their aspired professions, discussed the pathways to achieve their aspirations, and contrasted the earning they could make between the aspired profession and crafting. It also led to discussions on learning online using YouTube and Wikipedia. Both the Google Search and Wikipedia editing exercise also fostered discussions on the limitations of gaining information and the need to bring their knowledge in verifying information. This was most notable when Palasa searched for her hometown, a district that has a famous national park, and found images where she saw that “... *there are only animals. No houses. I knew it [about the national park] but this was ... I see only animals and animals.*” This led to a discussion between Aakash and the sister-survivors on how the photos emerge and whose photos are often depicted in the search (in this case, of tourists who visit Bardiya National Park).

### **On Commitments**

*To Co-Navigate a Trustworthy Process:* The study further demonstrates the importance of eliciting trust in an assets-based process. Sometimes it can entail repeating the entire methodology of a previous study. Other times it includes dealing with tensions between how an assets-based method is proposed and participants' realities, possibly leading to a co-adaptation of the method. Finally, it can entail a careful selection of contexts and narratives that support participants' sense of control such as by *othering* their immediate limitations.

*To Co-Build An Interdependent Collective:* Introducing moments for reflection and collective discussion across the field study allowed participants to support each other in situating their assets within their broader context, even when this context entailed discussions on problems that are highly sensitive to them such as human trafficking.

*To Co-Experience An Incremental Assets-Based Transformation:* While technology was at the center of the study, it was presented as a means to amplify existing assets and make moves to more enduring ones. Activities around Google Search and Wikipedia, which were designed based on the observations from the sister-survivors' practices, facilitated in conveying the incremental nature of building assets.

<sup>4</sup>Obtaining a citizenship certificate, which, among other things, is necessary to open a bank account, remains a challenge for many female trafficking survivors in Nepal. Refer to Richardson, Poudel, and Laurie [81] for a deeper discussion.

## 7 DISCUSSION

The field of CSCW has long recognized that addressing the socio-technical gap “between what we know we *must* support socially and what we *can* support technically” (emphasis in the original text) [1, pp. 179] is an ongoing challenge. Further, when designing within the intersecting complexities of low-resourced settings [23], the socio-technical gap should be considered a deep and wide “chasm” [31]. To address this chasm, CSCW and related fields have traditionally championed design approaches that frame intersecting complexities as problems of lacks and lags, thus generating technologies for “catching up.” These approaches leave no room for communities to consciously and critically recognize their abilities and define their visions of well-being. When solutions stem from this deficit-fixing perspective, they impose outsider-defined ideas of a *problem*, thereby perpetuating disempowerment. Assets-based design proposes to shift away from the notion that there are universal problems to fix where technology is the inevitable solution to those problems. Such a shift can help in addressing the socio-technical chasm. However, it is unclear how to pursue research while ensuring that the assets remain at the center of the design process. In particular, it is critical to explore how an emphasis on assets shapes the selection and use of the research methods.

Marisol and Aakash facilitated two differently motivated assets-based endeavors taking place in two distinct contexts, leading to diverse methodological decisions. In both cases, they sought to identify and foster an attachment to assets. But while Marisol promoted reflections on the past for participants to identify and analyze their assets, Aakash specifically moved away from the participant’s past, focusing on explorations of assets in the present and the future. Marisol fostered a collective by first facilitating an individual-to-collective appreciation of assets whereas Aakash, acknowledging the pre-existing mutual bond between the participants, sought to strengthen the group-based nature of activities throughout. While Marisol facilitated an incremental analysis of assets, participant turnover required Aakash to create continuity by discussing earlier findings and repeating prior methods with different groups. Marisol facilitated technology insights via fiction and magic and Aakash supported direct engagement with technologies as a mechanism in strengthening the participants’ connection with assets.

As different as they are, Marisol’s and Aakash’s cases demonstrate how pursuing an assets-based approach to design entails specific methodological commitments that designers need to consider beforehand. Indeed, these commitments align with traditional participatory principles (e.g., building trust with participants [19, 20, 25, 67], supporting them in becoming a community of practice [9], and engaging in long-term work with them [19, 24]). However, they require designers to emphasize particular aspects of those principles so as to facilitate a collective of assets-based thinkers. For example, Marisol and Aakash fostered participants’ trust towards the designers but also the other people in the community and a process that demanded recognition of assets despite existing constraints. They also worked to facilitate a community of learners that collectively engaged in understanding, leveraging, uplifting, and reflecting on the assets. Further, their work underscores the importance of engaging in a long-term process that moves beyond the promise to provide immediate fixes towards supporting the participants to incrementally explore the assets available to them.

Three critical implications follow from reflecting on Marisol and Aakash’s shared but differently enacted commitments: *First*, recognizing the relevance of doing work *before* the work of design. *Second*, positioning technology as an intermediary in facilitating attachments to assets. *Third*, cultivating multiple perspectives about assets in a slow incremental process. Next, we discuss each of these implications and what they entail for the fields of CSCW and HCI at large.

## 7.1 Work Before Work

Participants' trust is critical for giving designers permission to design. As such, work in PD has extensively explored how to build trust [96, 107]. Most of these explorations, however, have focused on supporting trust among the designer-participant dyad [19, 20]. Marisol and Aakash's account stresses that a critical methodological need for assets-based design is to foster participants' trust in the designer, between the people in the community, and in the assets-based process itself. Specifically, their different engagements highlight that assets-based design can be an emotionally arduous process for participants. It needs to encourage participants to challenge their own beliefs and see the world from a different, unexpected perspective. One that appreciates their assets holistically without dismissing their limitations. Such a process proposes participants imagine changes using their existing capacities while still considering the possibility of failure, which is not necessarily something they do on an everyday basis. Fostering trust towards people (e.g., the designer) can support these complex ends only to a certain extent.

For Marisol and Aakash, emphasizing the co-construction of trust in the process meant continuously promoting safe spaces where participants could feel in control. Creating these spaces needed careful articulation work [87, 92], entailing assets-based actions *before*, *in-between*, and *during* design sessions.

**7.1.1 Assets-Based Actions Before Design Sessions.** To support participant reflection on their experiences, assets, and the situations that limit these assets, both Marisol and Aakash resorted to *materiality* and *narrative* as methodological resources. Existing work highlights how selecting materials for a design workshop is critical for eliciting participants' trust [20]; the inappropriate materials can erode the participants' confidence in a PD endeavor [49]. Both of their engagements illustrate the relevance of careful anticipatory work when choosing materials that foster trust in an asset-based design process. Specifically, designers must spend the time to develop a rich understanding of how materials and narratives inhabit the contexts that participants navigate.

Marisol's previous ethnographic work informed an in-depth understanding of the actors, information sources, and cultural practices familiar to participants. This knowledge, in turn, informed the wide range of visual resources she presented to parents for reflecting on their assets and the narrative she later used for a speculative design activity that helped participants challenge the educational system. On the other hand, Aakash spent extensive periods volunteering at the shelter home where the sister-survivors lived, learning about their day-to-day experiences in the shelter home and their views on speaking about the past. This initial rich understanding led him to propose a photo-elicitation activity that motivated the participants to collectively represent and reflect on the assets available to them on navigating their day-to-day life. Later, the awareness of the cultural practices familiar to the participants enabled Aakash to envision Dashain as a context for helping participants to "other" their views of the future.

Working for communities *before* engaging in design with them is not an implication exclusive to assets-based design [67, 75]. However, both Marisol's and Aakash's cases demonstrate how investing in this time, where designers do not take explicit action towards design goals, can critically inform subsequent assets-based methodological decisions. Such time enables designers to envision methods that can motivate participants in seeing, discussing, and using their assets.

**7.1.2 Assets-Based Actions In-Between Design Sessions.** Presenting activities for participants to collaboratively unpack the complexity of their assets within their broader contexts and limitations was another common strategy that Marisol and Aakash used for allowing participants to develop control over the process. This strategy entailed inviting participants to continuously see their experiences from many different perspectives, incrementally uncovering new ways of understanding

themselves, individually and collectively. Methodologically, however, engaging participants in this type of collective analysis entailed a great deal of labor in-between design sessions. Specifically, it required the researchers to draw connections across different sessions' insights and find ways to present those connections to participants in approachable and digestible ways while also leaving space for participants to challenge them.

For example, Marisol used the assets and challenges that participants had identified in one session to craft word clouds showing a collective view of assets and challenges for the next session. In discussing these word clouds and the contradictions they suggested about their collective assets, the participants expanded their understanding of what is an asset and how and when it can be of value. Aakash shared findings on the sister-survivors' assets and challenges to the sister-survivors. Together, they discussed the contradictory ways in which some of their assets behaved (e.g., crafting) and the implications of these contradictions for their present and future possibilities. Throughout each one of these cases, having the opportunity to connect insights across sessions allowed each community to expand the understanding of their assets and their surroundings.

The need for designers to use the insights of past sessions as input for new ones is well-reported [24, 38, 85]. However, in the case of assets-based design, this type of "stitching" serves a rather particular and critical goal: that of continuously fostering critical consciousness around assets. Stitching assets-based insights in-between design sessions can help designers and participants keep an important balance between acknowledging the complexity and limitations of assets and daring to use them to imagine new futures.

*7.1.3 Assets-Based Actions During Design Sessions.* Finally, Marisol and Aakash also encouraged participants' sense of control by negotiating the methods they presented to participants. Both faced moments where the methods they presented did not necessarily align with participants' understanding of their reality or goals. Those times required an in-the-moment articulation work to balance participants' perspectives and designers' assets-based goals.

To promote such negotiation and possibilities for adaptation, Marisol and Aakash first explained the goals behind the methods, discussing how they may further the participants' engagements with assets. In both cases, participants reacted positively; these explanations offered them more insights into how the process worked and thus, fostered a higher level of trust. Both Marisol and Aakash then gave the control back to participants, engaging them in discussions about how to cater the method to satisfy both participants' and assets-based purposes. Work with communities is not a straightforward endeavor; it involves complexity and messiness [19]. The negotiation of methods is part of that messiness: there is no recipe nor guarantee that we will find the right balance between a sense of control and assets-based goals. However, Marisol and Aakash's experiences demonstrate that promoting such negotiation is critical for an asset-based design endeavor.

## 7.2 Role of Technology in an Assets-Based Journey

Marisol and Aakash's work facilitated communities [82] that developed a critical consciousness of assets. As their analysis shows, in such communities, members progressively prioritized supporting each other in realistically learning how to grow their assets. Technology tended to emerge as either a community's asset or a factor shaping existing assets. However, technology's presence and the aspiration it usually entails can often drive designers and communities to define technology production, not assets growth, as their final goal. Thus, Marisol and Aakash made particular methodological decisions to prevent technology development from becoming an inevitable and deterministically positive end goal. Their experiences suggest at least three possible approaches for designers to grapple with utilizing technology in a PD engagement while still prioritizing other assets. First, introducing technology-based systems as a feasible option to navigate challenges, but



only after participants' have explored their assets. Second, introducing technology-based systems as a resource for participants to learn about their assets. Third, offering an introduction to relevant technology as a support for participants to further grow their assets. While these are not the only possible approaches, it is critical to consider them when reflecting on technology's role in community-based efforts.

*7.2.1 Assets First, Technology Afterwards.* Introducing new technologies to vulnerable groups can amplify inequities, especially if it is done outside of participants' zone of comfort [94]. New technologies can also undermine the participants' assets and erode their sense of control. Consciousness of their assets can help participants see themselves as decision-makers in control of their reality [40]. Both Marisol and Aakash presented technology as a viable option only *after* the participants had engaged in work that helped them own their assets. Even better is if technological introductions happened as a result of the participants recognizing the assets available to them and the ways technology could interact with the assets.

For example, Marisol introduced parental control apps only after the parents had reflected on their assets for managing a safe use of technology at home. Aakash introduced Hamrokala to the sisters-survivors only after they had gone through discussions about crafting and community, and had positively expressed the idea of technological knowledge as a potential asset. Such approaches gradually brought the participants closer to the possibility of evaluating technological uses in light of their assets instead of purely accepting technology as a fix-all to their challenges. This approach to technology introduction suggests designers working towards assets-based design need to be mindful of the time they allot for assets' exploration. Further, they need to find ways for relating technological introductions—and their effects—to the knowledge that participants already have on their assets.

*7.2.2 Technology As a Means to Learn About Assets.* Forming collectives that can critically reflect and challenge technologies is necessary to ensure participants have control over their technological future [7]. To that end, many of the activities Marisol and Aakash conducted around assets and technology treated technology as a means to learn about assets. Such learning includes recognizing and exploring the many contradictions that emerge from the interaction of assets, technology, and other surrounding systems. For example, Marisol's workshop with Group B and Aakash's Google and Wikipedia sessions did not prioritize teaching participants how to become technology users. Instead, they treated technology as a means to elicit participants' reflections on either parental assets or the sister-survivors' potential to engage with individuals and institutions in the larger society.

*7.2.3 Technology as A Support for Assets' Growth.* Finally, Marisol and Aakash also approached technological introductions as a support for the collectives and their members to grow their assets. In this case, the goal was to help participants incrementally grow agency and develop a consciousness of what technologies can and cannot do towards the attainment of desired futures. For example, the Latin\* parents' speculative designs allowed them to reflect on how community-building was one of their strongest assets but a hard one to secure. Similarly, in envisioning the possibility of earning a living from home using a computer, the sister-survivors were both seeing newer possibilities around crafting as well as limitations of their existing crafting skills.

This approach implies that the outcome of an assets-based endeavor is not a precise point when technological artifacts are designed or adopted but rather the ongoing process of action and reflection towards collective growth. In doing so, the design process gives control back to the collective so that they can define their transformation in their own terms, based on their understanding of their assets and their vision of the future.



### 7.3 Slow Incremental Transformation

Scholarship in both PAR and PD speak of their practice as an ongoing engagement that operates in small increments [8, 24, 50, 57]. Marisol and Aakash abided by that view but prioritized a particular type of incremental change over others: a change in perspective on what is feasible with the assets. As a community of learners that emphasize the learning process rather than fixed outcomes [82], participants progressively unpacked systems and societal problems via their assets, leaving room for new perspectives about their current situation and, thus, pathways for change to emerge. To promote this type of change, both Marisol and Aakash supported participants to see their realities from different perspectives. Marisol worked with the parents to iteratively revisit their past and present problems, progressively seeing their assets from many different perspectives. In Aakash's case, he undertook a future-based approach where the shift in perspectives encouraged participants to envision and analyze different assets-based futures.

Working towards a shift in perspectives, engaging in work before the work of design, and positioning the design of technology not as a heroic solution but as an intermediary, suggest that assets-based design necessitates incremental changes to take place slowly. Slow transformation, however, raises tensions with the different communities where researchers and designers participate. First, it does not respond to the often-critiqued but often-used publish-or-perish model within academic research. Second, it also challenges the idea of measuring the success of an intervention [7, 10] for there might be much time until the attained changes become visible for assessment. Finally, the idea of slow transformation can also add challenges in working with the communities; vulnerable populations face issues that require urgent attention and may expect design endeavors to be a sure path towards immediate solutions [7, 49].

By no means Marisol's and Aakash's perspective of assets-based design advocated overlooking the needs or problems present in the community. Problems are the realities of the ground and stem from the larger systems in which the community is situated. But in undertaking an assets-based approach, it becomes critical to be mindful of the implications of such a slow process. In avoiding drastic moves, working towards slow transformations provides participants with time and space to trust the process and the designer. More crucially, it allows participants enough time to decide whether and how they want to continue in the process. As such, it avoids placing goals beyond the reach of the participants. However, it also poses critical challenges to designers, who will need to reconsider their notions of productivity, progress, and growth and thus, reassess how they see and measure the impact of their work. Furthermore, as Marisol and Aakash's work suggests, designers and researchers will need to continuously foster spaces for participants to recognize and value the incremental changes.

## 8 CONCLUSION

Assets-based design is increasingly being explored as an approach to achieve sustained social change. This approach involves identifying the users' assets and exploring ways to support users to build on these assets to attain their desired futures. In this paper, we presented assets-based design as an ongoing process of forming a collective of assets-based thinkers. We reflected on two different assets-based design endeavors with vulnerable populations across the globe—a group of immigrant parents in the U.S. and a community of sex-trafficking survivors in Nepal—to draw out the common commitments that supported the participants and designers in developing a critical understanding of their assets, how they work in relation to their larger contexts, and how to expand them for pursuing transformational goals. The commitments entail the designer to (1) embed trust-building elements throughout the journey; (2) facilitate the formation of an interdependent collective; and (3) make moves towards incremental transformation to contend with future issues. Discussing

the implications for the commitment, we urge designers to consider the following three elements before undertaking an assets-based design project: acknowledging the significant effort needed in work before *the* work, seeing technology as an intermediary facilitating the ongoing journey, and embracing slow incremental work toward reflection and action.

## REFERENCES

- [1] Mark S Ackerman. 2000. The intellectual challenge of CSCW: the gap between social requirements and technical feasibility. *Human-Computer Interaction* 15, 2-3 (2000), 179–203.
- [2] Laura María Agustín. 2007. *Sex at the margins: Migration, labour markets and the rescue industry*. Zed books.
- [3] Veronica Ahumada-Newhart, J Maya Hernandez, and Karla Badillo-Urquiola. 2021. A Call for Action: Conceptualizing Assets-Based Inclusive Design as a Social Movement to Address Systemic Inequities: An Assets-Based Inclusive Design Framework. In *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems*. 1–4.
- [4] Morgan G Ames. 2015. Charismatic technology. In *Proceedings of the fifth decennial Aarhus Conference on Critical Alternatives*. 109–120.
- [5] Yaw Anokwa, Thomas N Smyth, Divya Ramachandran, Jahanzeb Sherwani, Yael Schwartzman, Rowena Luk, Melissa Ho, Neema Moraveji, and Brian DeRenzi. 2009. Stories from the field: Reflections on HCI4D experiences. *Information Technologies & International Development* 5, 4 (2009), pp–101.
- [6] Jeanette Blomberg and Helena Karasti. 2012. Positioning ethnography within participatory design. *Routledge international handbook of participatory design* (2012), 86–116.
- [7] Susanne Bødker and Morten Kyng. 2018. Participatory design that matters—Facing the big issues. *ACM Transactions on Computer-Human Interaction (TOCHI)* 25, 1 (2018), 4.
- [8] Orlando Fals Borda. 1988. Knowledge and peoples power. *New York, NY: New Horizons* (1988).
- [9] E Brandt, T Binder, and EB Sanders. 2006. Tools and techniques. *Ways to telling, making and enacting*. IN (2006).
- [10] Tone Bratteteig and Ina Wagner. 2016. What is a participatory design result?. In *Proceedings of the 14th Participatory Design Conference: Full papers-Volume 1*. 141–150.
- [11] Fiona Brooks and Sally Kendall. 2013. Making sense of assets: what can an assets based approach offer public health?
- [12] Ann L Brown and Joseph C Campione. 1994. *Guided discovery in a community of learners*. The MIT Press.
- [13] Ann L Brown and Joseph C Campione. 2002. Communities of learning and thinking, or a context by any other name. *Contemporary issues in teaching and learning* (2002), 120–126.
- [14] Alice V Brown and Jaz Hee-jeong Choi. 2018. Refugee and the post-trauma journeys in the fuzzy front end of co-creative practices. In *Proceedings of the 15th Participatory Design Conference: Full Papers-Volume 1*. 1–11.
- [15] Gustavo Pérez Carreón, Corey Drake, and Angela Calabrese Barton. 2005. The importance of presence: Immigrant parents' school engagement experiences. *American Educational Research Journal* 42, 3 (2005), 465–498.
- [16] Ruy Cervantes, Mark Warschauer, Bonnie Nardi, and Nithya Sambasivan. 2011. Infrastructures for low-cost laptop use in Mexican schools. In *Proceedings of the SIGCHI conference on human factors in computing systems*. ACM, 945–954.
- [17] Gabriela Chavira, Catherine R Cooper, and Yolanda Vasquez-Salgado. 2016. Pathways to achievement: Career and educational aspirations and expectations of Latina/o immigrant parents and early adolescents. *Journal of Latinos and Education* 15, 3 (2016), 214–228.
- [18] Alexander Cho, Roxana G Herrera, Luis Chaidez, and Adilene Uriostegui. 2019. The "Comadre" Project: An Asset-Based Design Approach to Connecting Low-Income Latinx Families to Out-of-School Learning Opportunities. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. 1–14.
- [19] Rachel Clarke, Jo Briggs, Ann Light, and Pete Wright. 2016. Situated encounters with socially engaged art in community-based design. In *Proceedings of the 2016 ACM conference on designing interactive systems*. 521–532.
- [20] Rachel Elizabeth Clarke, Jo Briggs, Andrea Armstrong, Alistair MacDonald, John Vines, Emma Flynn, and Karen Salt. 2019. Socio-materiality of trust: co-design with a resource limited community organisation. *CoDesign* (2019), 1–20.
- [21] Sasha Costanza-Chock. 2018. Design Justice: towards an intersectional feminist framework for design theory and practice. *Proceedings of the Design Research Society* (2018).
- [22] Sasha Costanza-Chock. 2020. *Design justice: Community-led practices to build the worlds we need*. MIT Press.
- [23] Kimberle Crenshaw. 1990. Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stan. L. Rev.* 43 (1990), 1241.
- [24] Christopher A Le Dantec and Carl DiSalvo. 2013. Infrastructuring and the formation of publics in participatory design. *Social Studies of Science* 43, 2 (2013), 241–264.
- [25] Andy Dearden and Haider Rizvi. 2008. Participatory IT Design and Participatory Development: A Comparative Review. In *Proceedings of the 10th Participatory Design Conference*. 81–91.
- [26] Concha Delgado-Gaitan. 1991. Involving parents in the schools: A process of empowerment. *American journal of Education* 100, 1 (1991), 20–46.

- [27] Nicola Dell and Neha Kumar. 2016. The ins and outs of HCI for development. In *Proceedings of the 2016 CHI conference on human factors in computing systems*. 2220–2232.
- [28] Shuvam Dhungana. 2020. 12 trafficking victims, including three minors, rescued in past three months. <https://kathmandupost.com/national/2020/06/24/12-trafficking-victims-including-three-minors-rescued-in-past-three-months>.
- [29] Jessa Dickinson, Mark Díaz, Christopher A Le Dantec, and Sheena Erete. 2019. "The cavalry ain't coming in to save us" Supporting Capacities and Relationships through Civic Tech. *Proceedings of the ACM on Human-Computer Interaction* 3, CSCW (2019), 1–21.
- [30] Tawanna R Dillahunt, Sheena Erete, Roxana Galusca, Aarti Israni, Denise Nacu, and Phoebe Sengers. 2017. Reflections on design methods for underserved communities. In *Companion of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing*. 409–413.
- [31] Tawanna R Dillahunt, Vaishnav Kameswaran, Desiree McLain, Minnie Lester, Delores Orr, and Kentaro Toyama. 2018. Entrepreneurship and the socio-technical chasm in a lean economy. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*. 1–14.
- [32] Christian Dindler and Ole Sejer Iversen. 2007. Fictional inquiry—design collaboration in a shared narrative space. *CoDesign* 3, 4 (2007), 213–234.
- [33] Lynn Dombrowski, Ellie Harmon, and Sarah Fox. 2016. Social justice-oriented interaction design: Outlining key design strategies and commitments. In *Proceedings of the 2016 ACM Conference on Designing Interactive Systems*. ACM, 656–671.
- [34] Pelle Ehn. 1988. *Work-oriented design of computer artifacts*. Ph.D. Dissertation. Arbetslivscentrum.
- [35] Pelle Ehn. 2008. Participation in design things. In *Proceedings of the tenth anniversary conference on participatory design 2008*. Indiana University, 92–101.
- [36] Pelle Ehn. 2017. Learning in participatory design as I found it (1970–2015). In *Participatory Design for Learning*. Routledge, 7–21.
- [37] Sheena Erete, Aarti Israni, and Tawanna Dillahunt. 2018. An intersectional approach to designing in the margins. *Interactions* 25, 3 (2018), 66–69.
- [38] Sarah Fox and Christopher Le Dantec. 2014. Community historians: scaffolding community engagement through culture and heritage. In *Proceedings of the 2014 conference on Designing interactive systems*. ACM, 785–794.
- [39] Paulo Freire. 1970. *Pedagogy of the oppressed* (MB Ramos, Trans.). New York: Continuum 2002 (1970).
- [40] Paulo Freire. 2000. *Pedagogy of freedom: Ethics, democracy, and civic courage*. Rowman & Littlefield Publishers.
- [41] Aakash Gautam, Chandani Shrestha, Andrew Kulak, Steve Harrison, and Deborah Tatar. 2018. Participatory Tensions in Working with a Vulnerable Population. In *Proceedings of the 15th Participatory Design Conference: Short Papers, Situated Actions, Workshops and Tutorial-Volume 2*. ACM, 26.
- [42] Aakash Gautam, Chandani Shrestha, Deborah Tatar, and Steve Harrison. 2018. Social photo-elicitation: The use of communal production of meaning to hear a vulnerable population. *Proceedings of the ACM on Human-Computer Interaction* 2, CSCW (2018), 1–20.
- [43] Aakash Gautam and Deborah Tatar. 2020. p for political: Participation Without Agency Is Not Enough. In *Proceedings of the 16th Participatory Design Conference 2020 - Participation(s) Otherwise - Volume 2*. ACM, 45–49.
- [44] Aakash Gautam, Deborah Tatar, and Steve Harrison. 2019. Adding Voices to Support Web Navigation Among a Low Digital Literacy Group. In *Companion Publication of the 2019 on Designing Interactive Systems Conference 2019 Companion*. 165–169.
- [45] Aakash Gautam, Deborah Tatar, and Steve Harrison. 2020. Crafting, Commuality, and Computing: Building on Existing Strengths To Support a Vulnerable Population. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. 1–14.
- [46] JS Goodall. 2016. Technology and school–home communication. *International Journal of pedagogies and learning* 11, 2 (2016), 118–131.
- [47] Davydd J Greenwood and Morten Levin. 2006. *Introduction to action research: Social research for social change*. SAGE publications.
- [48] Kris D Gutiérrez and Barbara Rogoff. 2003. Cultural ways of learning: Individual traits or repertoires of practice. *Educational researcher* 32, 5 (2003), 19–25.
- [49] Christina Harrington, Sheena Erete, and Anne Marie Piper. 2019. Deconstructing community-based collaborative design: Towards more equitable participatory design engagements. *Proceedings of the ACM on Human-Computer Interaction* 3, CSCW (2019), 1–25.
- [50] Gillian R Hayes. 2014. Knowing by doing: action research as an approach to HCI. In *Ways of Knowing in HCI*. Springer, 49–68.
- [51] Diley Hernandez, Shaheen Rana, Meltem Alemdar, Analia Rao, and Marion Usselman. 2016. Latino parents' educational values and STEM beliefs. *Journal for Multicultural Education* 10, 3 (2016), 354–367.

- [52] David González Hernández. 2019. El Chavo del Ocho: la dinámica de la vecindad en la comedia de situación televisiva. *Comunicación y sociedad* (2019), 1–25.
- [53] Azalea Irani, Kriti Nelavelli, Kristin Hare, Paula Bondal, and Neha Kumar. 2018. Refuge Tech: An Assets-Based Approach to Refugee Resettlement. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems*. 1–6.
- [54] Azra Ismail and Neha Kumar. 2018. Engaging solidarity in data collection practices for community health. *Proceedings of the ACM on Human-Computer Interaction* 2, CSCW (2018), 1–24.
- [55] Ole Sejer Iversen and Christian Dindler. 2014. Sustaining participatory design initiatives. *CoDesign* 10, 3-4 (2014), 153–170.
- [56] Gereon Koch Kapuire, Heike Winschiers-Theophilus, and Edwin Blake. 2015. An insider perspective on community gains: A subjective account of a Namibian rural communities’ perception of a long-term participatory design project. *International Journal of Human-Computer Studies* 74 (2015), 124–143.
- [57] Helena Karasti and Karen S Baker. 2004. Infrastructuring for the long-term: Ecological information management. In *37th Annual Hawaii International Conference on System Sciences, 2004. Proceedings of the. IEEE*, 10–pp.
- [58] Naveena Karusala, Apoorva Bhalla, and Neha Kumar. 2019. Privacy, Patriarchy, and Participation on Social Media. In *Proceedings of the 2019 on Designing Interactive Systems Conference*. ACM, 511–526.
- [59] Naveena Karusala, Isaac Holeman, and Richard Anderson. 2019. Engaging Identity, Assets, and Constraints in Designing for Resilience. *Proceedings of the ACM on Human-Computer Interaction* 3, CSCW (2019), 1–23.
- [60] Naveena Karusala, Aditya Vishwanath, Arkadeep Kumar, Aman Mangal, and Neha Kumar. 2017. Care as a resource in underserved learning environments. *Proceedings of the ACM on Human-Computer Interaction* 1, CSCW (2017), 1–22.
- [61] Vikki S Katz and Carmen Gonzalez. 2016. Community variations in low-income Latino families’ technology adoption and integration. *American Behavioral Scientist* 60, 1 (2016), 59–80.
- [62] Michelle R Kaufman and Mary Crawford. 2011. Research and activism review: Sex trafficking in Nepal: A review of intervention and prevention programs. *Violence against women* 17, 5 (2011), 651–665.
- [63] John Kretzmann and John P McKnight. 1996. Assets-based community development. *National civic review* 85, 4 (1996), 23–29.
- [64] Neha Kumar, Naveena Karusala, Azra Ismail, Marisol Wong-Villacrés, and Aditya Vishwanath. 2019. Engaging Feminist Solidarity for Comparative Research, Design, and Practice. *Proceedings of the ACM on Human-Computer Interaction* 3, CSCW (2019), 1–24.
- [65] Nina Laurie, Diane Richardson, Meena Poudel, and Janet Townsend. 2015. Post-trafficking bordering practices: Perverse co-production, marking and stretching borders. *Political Geography* 48 (2015), 83–92.
- [66] Christopher A Le Dantec. 2016. Design through collective action/collective action through design. *interactions* 24, 1 (2016), 24–30.
- [67] Christopher A Le Dantec and Sarah Fox. 2015. Strangers at the gate: Gaining access, building rapport, and co-constructing community-based research. In *Proceedings of the 18th ACM conference on computer supported cooperative work & social computing*. 1348–1358.
- [68] Ann Light. 2011. Democratising technology: Making transformation using designing, performance and props. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. 2239–2242.
- [69] Ann Light and Yoko Akama. 2012. The human touch: participatory practice and the role of facilitation in designing with communities. In *Proceedings of the 12th Participatory Design Conference: Research Papers-Volume 1*. 61–70.
- [70] Chandan Kumar Mandal. 2019. Nearly 1.5 million Nepali at risk of human trafficking, report says. <https://kathmandupost.com/national/2019/08/06/nearly-1-5-million-nepali-at-risk-of-human-trafficking-while-35-000-trafficked-last-year-nhrcc-report>.
- [71] Noortje Marres. 2007. The issues deserve more credit: Pragmatist contributions to the study of public involvement in controversy. *Social studies of science* 37, 5 (2007), 759–780.
- [72] Alison Mathie and Gord Cunningham. 2003. From clients to citizens: Asset-based community development as a strategy for community-driven development. *Development in practice* 13, 5 (2003), 474–486.
- [73] Samantha Merritt and Erik Stolterman. 2012. Cultural hybridity in participatory design. In *Proceedings of the 12th Participatory Design Conference: Exploratory Papers, Workshop Descriptions, Industry Cases-Volume 2*. ACM, 73–76.
- [74] Luis C Moll, Cathy Amanti, Deborah Neff, and Norma Gonzalez. 1992. Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms. *Theory into practice* 31, 2 (1992), 132–141.
- [75] Bonnie A Nardi and Yrjö Engeström. 1999. A web on the wind: The structure of invisible work. *Computer supported cooperative work* 8, 1-2 (1999), 1–8.
- [76] United Nations. 2017. International Migration Report 2017. <https://tinyurl.com/y75wafgz>
- [77] Lucy Pei and Bonnie Nardi. 2019. We Did It Right, But It Was Still Wrong: Toward Assets-Based Design. In *Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems*. 1–11.
- [78] Fred Ramirez. 2001. Technology and parental involvement. *The Clearing House* 75, 1 (2001), 30–31.

- [79] Peter Reason. 2004. Critical design ethnography as action research. *Anthropology & Education Quarterly* 35, 2 (2004), 269–276.
- [80] Lizette Reitsma, Ann Light, Tariq Zaman, and Paul Anthony Rodgers. 2019. A Respectful Design Framework Incorporating indigenous knowledge in the design process. *The Design Journal* 22, sup1 (2019), 1555–1570.
- [81] Diane Richardson, Meena Poudel, and Nina Laurie. 2009. Sexual trafficking in Nepal: constructing citizenship and livelihoods. *Gender, Place & Culture* 16, 3 (2009), 259–278.
- [82] Barbara Rogoff, Eugene Matusov, and Cynthia White. 1996. Models of teaching and learning: Participation in a community of learners. *The handbook of education and human development* (1996), 388–414.
- [83] Mariana Salgado, Helena Sustar, and Michail Galanakis. 2015. Designing With Immigrants—When Emotions Run High. In *11th Academy of Design Conference. The Value of Design Research. Paris, France*.
- [84] Cristobal Salinas Jr. 2020. The complexity of the “x” in Latinx: How Latinx/a/o students relate to, identify with, and understand the term Latinx. *Journal of Hispanic Higher Education* 19, 2 (2020), 149–168.
- [85] Elizabeth B-N Sanders and Pieter Jan Stappers. 2012. *Convivial toolbox: Generative research for the front end of design*. BIS Amsterdam.
- [86] Marlene Scardamalia and Carl Bereiter. 2007. Fostering communities of learners and knowledge building: An interrupted dialogue. *Children’s learning in the laboratory and in the classroom: Essays in honor of Ann Brown* (2007), 197–212.
- [87] Kjeld Schmidt and Liam Bannon. 1992. Taking CSCW seriously. *Computer Supported Cooperative Work (CSCW)* 1, 1-2 (1992), 7–40.
- [88] Bibiana Serpa, Imaira Portela, Mariana Costard, and Sâmia Silva. 2020. Political-pedagogical contributions to participatory design from Paulo Freire. In *Proceedings of the 16th Participatory Design Conference 2020-Participation (s) Otherwise-Volume 2*. 170–174.
- [89] Patricia A Sharpe, Mary L Greaney, Peter R Lee, and Sherer W Royce. 2000. Assets-oriented community assessment. *Public Health Reports* 115, 2-3 (2000), 205.
- [90] Jesper Simonsen and Toni Robertson. 2012. *Routledge international handbook of participatory design*. Routledge.
- [91] Rachel Charlotte Smith and Ole Sejer Iversen. 2018. Participatory design for sustainable social change. *Design Studies* 59 (2018), 9–36.
- [92] Anselm Strauss. 1988. The articulation of project work: An organizational process. *Sociological Quarterly* 29, 2 (1988), 163–178.
- [93] Kim TallBear. 2014. Standing with and speaking as faith: A feminist-indigenous approach to inquiry. *Journal of Research Practice* 10, 2 (2014), N17–N17.
- [94] Kentaro Toyama. 2011. Technology as amplifier in international development. In *Proceedings of the 2011 iConference*. 75–82.
- [95] Kentaro Toyama. 2018. From needs to aspirations in information technology for development. *Information Technology for Development* 24, 1 (2018), 15–36.
- [96] Laura Warwick. 2017. Designing Trust: the importance of relationships in social contexts. *The Design Journal* 20, sup1 (2017), S3096–S3105.
- [97] Lisa Whiting, Sally Kendall, and Wendy Wills. 2012. An asset-based approach: an alternative health promotion strategy. *Community practitioner* 85, 1 (2012), 25–28.
- [98] Heike Winschiers-Theophilus, Nicola J Bidwell, and Edwin Blake. 2012. Community consensus: Design beyond participation. *Design Issues* 28, 3 (2012), 89–100.
- [99] Marisol Wong-Villacres, Carl DiSalvo, Neha Kumar, and Betsy DiSalvo. 2020. Culture in Action: Unpacking Capacities to Inform Assets-Based Design. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. 1–14.
- [100] Marisol Wong-Villacres, Upol Ehsan, Amber Solomon, Mercedes Pozo Buil, and Betsy DiSalvo. 2017. Design Guidelines for Parent-School Technologies to Support the Ecology of Parental Engagement. In *Proceedings of the 2017 Conference on Interaction Design and Children*. ACM, 73–83.
- [101] Marisol Wong-Villacres, Hayley Evans, Danielle Schechter, Betsy DiSalvo, and Neha Kumar. 2019. Consejero automatico: chatbots for supporting Latino parents’ educational engagement. In *Proceedings of the Tenth International Conference on Information and Communication Technologies and Development*. ACM, 53.
- [102] Marisol Wong-Villacres, Aakash Gautam, Wendy Roldan, Lucy Pei, Jessa Dickinson, Azra Ismail, Betsy DiSalvo, Neha Kumar, Tammy Clegg, Sheena Erete, Emily Roden, Nithya Sambasivan, and Jason Yip. 2020. From Needs to Strengths: Operationalizing an Assets-Based Design of Technology. In *Companion of the 2020 ACM Conference on Computer Supported Cooperative Work and Social Computing*. ACM.
- [103] Marisol Wong-Villacres, Arkadeep Kumar, Aditya Vishwanath, Naveena Karusala, Betsy DiSalvo, and Neha Kumar. 2018. Designing for intersections. In *Proceedings of the 2018 Designing Interactive Systems Conference*. 45–58.

- [104] Marisol Wong-Villacrés, Neha Kumar, and Betsy DiSalvo. 2019. The Parenting Actor-Network of Latino Immigrants in the United States. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. ACM, 684.
- [105] Marisol Wong-Villacrés, Neha Kumar, and Betsy DiSalvo. 2019. The work of bilingual parent-education liaisons: Assembling information patchworks for immigrant parents. *Proceedings of the ACM on Human-Computer Interaction* 3, CSCW (2019), 1–24.
- [106] Ying Xu and Carleen Maitland. 2019. Participatory data collection and management in low-resource contexts: a field trial with urban refugees. In *Proceedings of the Tenth International Conference on Information and Communication Technologies and Development*. 1–12.
- [107] Joyce Yee and Hazel White. 2016. The Goldilocks Conundrum: The ‘just right’ conditions for design to achieve impact in public and third sector projects. *International Journal of Design* 10, 1 (2016).
- [108] Mulu Yeneabat and Alice K Butterfield. 2012. “We Can’t Eat a Road.” Asset-Based Community Development and The Gedam Sefer Community Partnership in Ethiopia. *Journal of Community Practice* 20, 1-2 (2012), 134–153.
- [109] Tara J Yosso. 2005. Whose culture has capital? A critical race theory discussion of community cultural wealth. *Race ethnicity and education* 8, 1 (2005), 69–91.

Received October 2020; revised April 2021; accepted July 2021