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# We Did It Right, But It Was Still Wrong: Toward Assets-Based Design

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## ABSTRACT

HCI interventions often fall short of delivering lasting impact in resource-constrained contexts. We reflect on a project where we followed the "right" steps of needs-based, human-centered design, yet failed to deliver impact to the community. We introduce a framework that evaluates an intervention's potential for sustainable impact by maximizing use of assets in the community and minimizing novelty. We propose assets-based design as an approach that starts with what a community *has*, leveraging those assets in a design, as opposed to a needs-based approach that focuses on adding what a community *lacks*.

## CCS CONCEPTS

• **Human-centered computing** → HCI theory, concepts and models;

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## KEYWORDS

Sustainable impact; resource-constrained; assets-based development.

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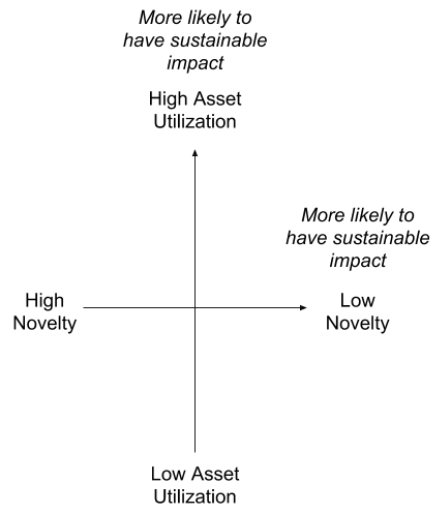
## INTRODUCTION

One way we seek to do good in the CHI community is by conducting research with the aim of lasting positive impact in the real world. Early on, our community recognized the need to practice human-centered design. Norman pointed out that design that does not consider the user does not deliver desired impacts, leaving people in a "neverending fight against confusion, continued errors, frustration, and a continual cycle of updating and maintaining our belongings" [14]. In human-centered design, we conduct needs assessments with users before designing so we can be sure our design fulfills real needs. We iterate based on user feedback to hopefully create something useful and usable at the end [1]. In participatory design and action research, we involve users directly and consistently through the design process and consider users as collaborators [5, 7].

In many cases, this process is successful. In others, it falls short of delivering sustainable impact. "Sustainable" here is the capacity of an intervention to continue to have positive impact after the research team is no longer involved. Participatory design researchers sought to "sustain [participatory design] as a practice after researchers depart" [7]. In action research, "the goal is ultimately to create sustainable change... once the research facilitators leave" [5].

Often sustainable impact is not achieved in resource-constrained situations. In HCI, "resource-constrained" typically refers to constraints of poverty where infrastructures like electricity or literacy are lacking [2]. We use resource-constrained broadly to refer to situations where natural, attentional, emotional, social, and other resources are limited. These resources may address various interventions such as ecological sustainability [16], healthcare [3], and life disruptions, e.g., bereavement [12]. Intervention approaches that may work in a resource-abundant context are often less able to provide sustainable impact when resources are constrained. For example, Hayes reported that a pilot site "did not have the resources available to continue to use the system after the end of the research project", even though the system succeeded at other sites "in which resources were not as constrained" [5].

In this paper we reflect on fieldwork we conducted at a literacy center serving resettled refugees and other adult English language learners. Our first project followed the "right" steps of human-centered design, yet the project failed to deliver the desired impacts to the community. We introduce



**Figure 1: The framework evaluates the potential for an intervention approach to deliver sustainable impact. The horizontal axis represents novelty. Interventions low in novelty are more likely to deliver sustainable impact. The vertical axis represents asset utilization. Interventions high in asset utilization are more likely to deliver sustainable impact.**

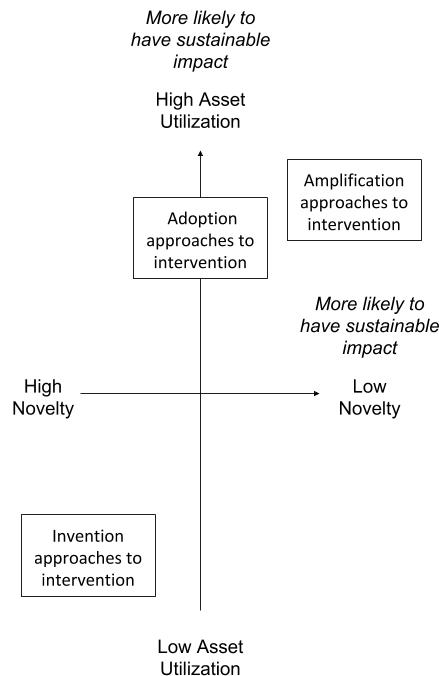
a framework for sustainable impact, using our failed project and a second project that did deliver sustainable impact, to explain it.

## A FRAMEWORK FOR SUSTAINABLE IMPACT

To more effectively design for resource-constrained settings, we propose a framework to evaluate the potential of an intervention to deliver sustainable impact. The framework consists of two axes, *asset utilization* and *novelty*. *Asset utilization* refers to the extent to which an intervention recognizes and leverages resources already existing in the community, including physical and social infrastructure, skills, knowledge, networks, and environmental resources [20]. Our conception draws from the international development and community development literatures which have criticized the dominant needs-based framework for encouraging communities to see themselves as having "special needs that can only be met by outsiders" [9]. Researchers instead proposed Assets-Based Community Development (ABCD) as an alternative development strategy that "starts with what is present in the community, the capacities of its residents and workers, the associational and institutional base of the area - not with what is absent, with what is problematic, or with what the community needs" [9]. *Novelty* refers to the extent to which an intervention involves invention in technology and practice. Newman noted that "radical solutions might be expected to hinder [design]" [13]. Whittaker et al. criticized excessive novelty for holding back the HCI field from making systematic progress [19]. Suchman and Bishop observed that "innovation and change are inevitably costly undertakings, and require associated commitments to their ongoing, long-term development" [17].

The asset utilization axis (Figure 1) indicates that the more an intervention leverages resources already existing in a population, the more likely the intervention is to have a sustainable impact [9]. For example, deployments of laptops in resource-constrained schools have shown that the success of the intervention depends on sufficient supporting infrastructure [2]. We propose that the design of an intervention should begin with the assets that already exist in even the most resource-constrained communities. Participatory design has advocated for valuing users' "knowledge of the actual use context" [7]. We suggest that beyond understanding context and user knowledge, researchers should also work with communities to understand the social, physical, and psychological assets users possess. An intervention rooted in a community's assets is more sustainable because the intervention can be supported by skills, materials, equipment, facilities, and structures already embedded in the community. In our fieldwork, we built upon community assets including the students' smartphones, their knowledge of how to use their phones, the electricity outlets in the building, and the phones' availability for use at all times.

The novelty axis indicates that the more novel an intervention, the less likely it is to deliver sustainable impact [17]. In assessing novelty, we make a distinction between technology and practices. Invention in practice includes applications of existing devices or software to *new contexts* [13, 17].



**Figure 2: The framework supports the plotting of different types of interventions.** *Amplification* approaches are high in asset utilization and low in novelty. They are the most likely to deliver sustainable impact. *Adoption* approaches are high in asset utilization and medium in novelty. They are likely to deliver sustainable impact. *Invention* approaches are low in asset utilization and high in novelty. They face the highest barriers to sustainable impact.

Technological inventions require new artifact production, training, maintenance, and repair strategies. These additional and often overlooked costs can make invention difficult to sustain [6].

We propose two key uses for the framework. First, interventions can be plotted against the axes to reveal where adjustments might be made to improve the likelihood of achieving sustainable impact. Second, plotting against the axes can help categorize groups of interventions that share common features to illustrate patterns of success in delivering lasting impact.

We will discuss some of the most salient categories of interventions that we encountered in the fieldwork: *invention* of new technology, *adoption* of existing technologies, and *amplification* of practices existing within the community (Figure 2). The *invention* of new technology refers to interventions that are low in asset use and high in novelty. The *adoption* of technologies refers to the introduction of technology novel to the population, but not to the world at large. These interventions are high in asset utilization and medium in novelty. For example, researchers in India leveraged Interactive Voice Response technology to create a portal for low-literate users to share local news via audio recordings on mobile phones [11]. This intervention designed new practices that leveraged existing local assets such as mobile phones. The *amplification* of practices existing within the community refers to interventions that are high in asset utilization and low in novelty. These interventions involve facilitating further uptake of approaches that some members of the community have already adopted.

### FIELD SITE: THE LITERACY CENTER

We draw on fieldwork the first author conducted at a community literacy center in a medium-sized Midwestern city in the USA. The center served adult English language learners from various socioeconomic backgrounds and regions around the world. Many students were resettled refugees or asylum seekers. Some had lived in refugee camps for decades in areas with protracted conflict such as the Congo and Nepal. They had little formal education and were financially vulnerable. Other students were highly educated and had had professional careers before fleeing conflict, with only a few years spent in disruption. These students often came from the Middle East and Latin America. They had greater financial and social resources to help with their transition. Some well-off students had immigrated to help care for their grandchildren. These students often came from China or Russia.

Newly resettled refugees were enrolled in classes as part of formal resettlement processes. Many working age students stopped taking classes after finding a job. Some students continued to take classes while working a job, coming to night classes after their shift was over. Older students often continued to take classes for years. The center's open enrollment policy led to varied attendance and tenure at the center. The students came with varied goals. An older Chinese student told us that she considered coming to class as much a social opportunity as an educational investment. Most students would gather to chat with classmates both within and across language groups during break times, providing each other support and advice. Students who knew little to no English often relied

on the classes for basic English to help them write their name in English, provide information about themselves, and navigate the bus system. Many students hoped to gain enough basic English to get a job, while others hoped to become eligible for better employment opportunities. Students who had left behind a professional career often hoped to be able to transition into community college.

We first encountered the literacy center through participation in a research team where we had evaluated a digital platform on which students could practice teacher-generated content embedded in games. Two years later, when catching up with a teacher at the center, we learned that the center had just received a donation of three iPads. The staff lacked the time and confidence to use the iPads, so the devices were locked in the teacher's office. We began to work with the center to facilitate meaningful use of technology. As we started the initial task to "put the iPads to use," we became interested in the reasons that some interventions led to sustainable impact while others did not.

## **METHODS**

The first author conducted participant observations over 16 months at the center. Observations and snippets of conversation were recorded in detailed field notes. Once a week she held one-hour walk-in sessions to work with students to practice English using technology. She taught 42 two-hour advanced classes and observed 40 classes taught by other teachers. She met with other teachers regarding technology issues. She mostly communicated with students in English. For students who spoke minimal English, communication involved gestures, demonstrations, guesswork, translation from other students, and occasionally digitally mediated translation. The first author speaks Chinese and Spanish fluently and had in-depth conversations with some students in their native languages. We transcribed field notes and coded them in a bottom-up approach to reveal themes and patterns.

## **INVENTION**

Our first project involved technology invention, making it high in novelty. Engagements with the users focused on needs rather than assets, and the platform was unable to deliver sustainable impact. Following traditional HCI methodologies, we conducted a needs assessment before designing software. We found there was a need for students to practice vocabulary beyond constraints of class time, a need that we determined could be fulfilled with a digital platform for use on computers.

User testing with the platform showed that our intervention succeeded in responding to the community's need. We observed that students smiled and laughed while using the platform and celebrated when they reached a new level in the game. Survey data indicated that students enjoyed using the platform. When we later returned to the literacy center, the teachers remembered the platform and said they would like to use it with their students. We prepared for this, only to find that the platform could not be made available due to copyright complications. Despite its success in producing an appealing, useful, and useable prototype, the intervention failed to deliver any impact.



**Figure 3: This is the first page of a printed story that the students would receive. Students who were unfamiliar with the English alphabet were unable to use this print-out to practice outside of classtime.**

Although the platform was never deployed for long-term use, we encountered challenges during the on-site testing that foreshadowed other barriers to sustainable impact. The custom-built software would be difficult for the teachers or students to maintain after researchers left the site. Students' unfamiliarity with mouse and computer navigation made it unlikely that students would be able to use the platform independently. Many students did not have access to computers at home, and the center's computers had limited availability. These resources were prerequisites for use of the platform and simply did not exist for most in the community. Interactions with the field site focused first on needs, and then on how to continue to customize the invention for usability and engagement. This focus missed many of the assets that could have supported an intervention and that we capitalized on later to deliver sustainable impact in the second project.

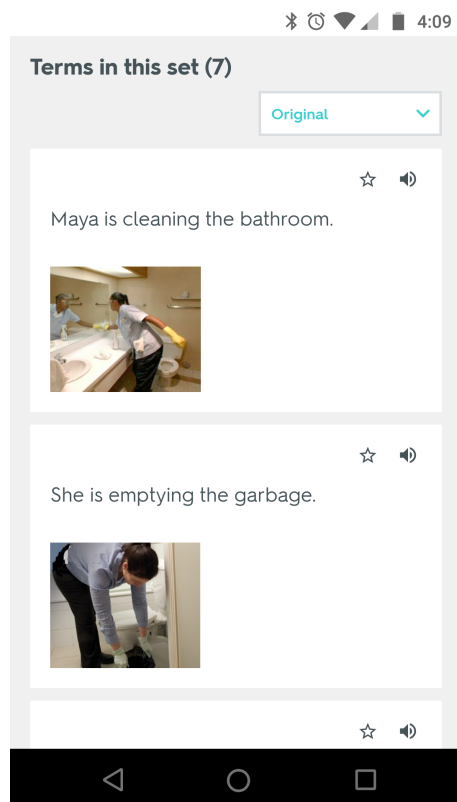
### ADOPTION

In contrast to invention, we delivered sustainable impact using an adoption approach to introduce the digital platform Quizlet at the literacy center. Using Quizlet, teachers can upload sets of vocabulary including words, images, and audio. Students access content as flash cards, matching games, and dictations. Although Quizlet was not designed for students with low levels of literacy, it was a mature product available online for free. We adopted it to help students practice class content outside of class time, a major goal of the platform we had invented but could not use.

Beginner level classes focused on stories that consisted of a series of images paired with simple sentences (Figure 3). The stories contextualized vocabulary and sentence structures, while the images reinforced comprehension. Stories covered topics relevant to students' lives such as going to the doctor or working as a housekeeper. Students received paper handouts with black-and-white photos along with the text of the story. However, students who were not familiar with the English alphabet could not use the handout to practice outside of class. We uploaded the stories' text and images to Quizlet. (Figure 4). The first author recorded herself reading each sentence of the story out loud. By directing the students to view the content in Quizlet and teaching them to use the sound icon, we enabled them to practice the stories outside of class.

Quizlet was an existing technology, but one that the community had not encountered before. That Quizlet already existed and was free meant that we at the literacy center did not face any hurdles with developing, releasing, or maintaining the platform. However, the platform's newness to the literacy center did incur some costs. Students had to learn to navigate the app. Teachers had to learn to keep content updated. The popularity of Quizlet outside of the literacy center ameliorated some of these costs as we were able to find support on existing websites and forums. For example, we consulted forums to overcome difficulties organizing content.

Our use of Quizlet took an increasingly assets-based approach as we came to understand what the students wanted and what assets they already had. Although we had planned for students to use the



**Figure 4:** This phone screenshot shows the Quizlet version of the worksheet on the previous page (Figure 3). Students could scroll down to view each sentence and image pair from the story in order. By tapping the sound icon in the upper right corner of each card, students could practice pronunciation, reading, and comprehension.

center's iPads to access Quizlet, nearly all of the students asked to use Quizlet on their own phones or tablets. They all had mobile devices and some knowledge of how to use them. The center had wifi. Many students had wifi at home or at work. There were electrical outlets to keep devices charged. Leveraging these assets made our Quizlet intervention sustainable.

There were some unanticipated advantages of the assets approach. Students gained new technical skills such as internet searching, scrolling, and navigating apps by using Quizlet on their own devices. For example, one student had dozens of tabs showing the same webpage open on her tablet's browser. In addition to practicing English, this student learned how to navigate among tabs on her device.

By increasingly leveraging assets at the literacy center and minimizing novelty, we were able to create sustainable impact. At the time of writing, six months after we left the literacy center, we logged onto the literacy center's Quizlet account and observed that it was still in use.

### AMPLIFICATION

We observed that some students had developed a variety of practices around technology to help with their learning, such as taking photos of class materials. We amplified these practice by encouraging more students to engage in these practices, incorporating them into the classes, and providing support where needed. Some students took photos of the whiteboard and class activities to take notes for reviewing later. To amplify this practice, the teachers began to ask if anyone needed to take a photo before erasing the whiteboard. Teachers prompted students to take photos during matching activities where vocabulary slips were paired with printed images. Students who were unfamiliar with the English alphabet could not take handwritten notes, but they could take photos, and this improved their learning. Taking photos of class materials capitalized on several key local assets. Every student had a smartphone and brought it with them to class. Most students already knew how to take photos and view photos they had taken. The few students who did not know how to take photos received help from other students. The teacher did not need to invest resources in helping students document information in a useful way, since the activity of matching word slips to images was already embedded in the way that class was conducted, and the materials had already been created.

We amplified the practice of using photos on students' phones to illustrate information that students had difficulty conveying. Ming, a middle-aged student from China, had proudly shown the teacher a photo she had taken on her phone of a lampshade she had made at work. In a later class, the teacher asked each student to share what they did for a job. Ming did not know how to express that she made lampshades. The teacher prompted her to share the photo with the class to explain. Ming passed her phone around the table so that her classmates could see. The teacher amplified the practice by encouraging more students to share photos, such as a pastry chef's baked goods.

To facilitate image sharing, teachers had considered buying projectors. However, they did not have time to set up a projector and learn to use it. The center would have had to spend additional

resources to protect expensive digital equipment from being stolen or damaged. Projectors were never acquired during our time at the center, despite grants being available for technology purchase. Rather than treating the lack of projectors as a need, we amplified practices that leveraged assets already embedded in the center to achieve similar ends. In expanding existing practices without adding new technology, we avoided costs that prevented other intervention approaches from being successful. Best of all, since some of the students had already adopted the practices we amplified, they were able to serve as teachers and maintainers embedded in the community to sustain impact.

## DISCUSSION

*When you do it right, but it's still wrong.* Even when designing an intervention the "right" way by engaging with a local community, an emphasis on needs and invention can impede a project's impact. For example, Jackson et al. worked with local communities in Namibia to understand their needs before designing and implementing a telecenter intervention. The intervention used "new components chosen specifically to match the needs of Namibian education institutions" [6]. However, the researchers soon learned that the system could not be repaired locally, and the "performance and efficiency gains ... [were] quickly neutralized by the slightest maintenance issue" [6]. The design ignored assets of local repair skills for commonly-used digital equipment and instead depended on repair resources the community lacked. Even when interventions are customized to the community's "needs," the intervention may fall short by not addressing the larger environment, by not leveraging available assets, or by depending on infrastructure that is not available in the community. In using new components over more widely used and adopted options, the researchers in Namibia failed to consider the costliness of novelty. The project "did it right" with respect to conventional needs-based methods, but could not deliver sustainable impact. Jackson et al. remarked that there was "insufficient attention to ... hard problems of maintenance and repair [that] undermine[d] the program's goals" [6].

In our own case, we saw that despite following conventional HCI methods to do the right thing and engage with users through needs assessments and user testing, our first invention failed to deliver impact. When we turned to the adoption approach of using Quizlet, and the amplification approach of leveraging students' phone use during class time, we were able to deliver sustainable impact.

*A hard habit to break.* The invention of new technology is commonly accepted as the default for conducting HCI interventions [13, 19]. As Whittaker et al. pointed out, over-valuation of novelty can lead to "radical solutions to things that users do not consider to be major problems," or simply the design of solutions that are not able to deliver sustainable impact [19]. Almost twenty years after the publication of [19], our community still skews towards producing research high in novelty, inventing even without considering, as Light et al. and Kirman et al. have noted, whether the inventions will benefit humanity [8, 10]. Suchman and Bishop observed that although discrete,



discontinuous change in organizations is more costly, it is valued over incremental change because someone in the organization can take ownership of a noticeably new change [17]. Our research community may also overvalue a new invention that is easily recognized as a researcher's publishable contribution, leading to the perpetuation of excessive invention at the cost of sustainable impact.

Powerful institutions may have a stake in continuing a needs-based focus [9]. Funders often seek the "neediest" communities for their projects, or are dedicated to funding a specific need. For example, the literacy center applied for several local philanthropic organizations' grants earmarked for fulfilling technological needs. Even outside resource-constrained situations, designs must satisfy a user need to be marketable. While the needs-based orientation remains dominant, a few researchers have sought to learn from what communities are doing well. In a study of infrastructure in Haiti, Patterson "framed [the research] as trying to learn from Haitians rather than trying to fix problems for them" [15]. By studying productive local practices, Patterson took an assets-based orientation.

Toyama has recently noted that needs have a negative orientation and can easily be projected to produce inappropriate development interventions [18]. He proposes "aspiration-based development" as an alternative framing for ICTD projects in order to orient projects to the longer-term, human-centered, and positive connotations of aspirations. We hope that design, and the communities it serves, can benefit from drawing on both on the aspirations and assets of communities.

*Toward Assets-based design.* Our framework and case studies illustrate the ways that maximizing asset utilization and minimizing novelty in interventions can facilitate sustainable impact. We hope researchers will use the framework alongside other design approaches that promote sustainable impact, such as community-led intervention [4] and co-designing "interventions and change *with* community partners, not *for* them" [5].

Assets-based design overcomes a key flaw with a needs-based orientation in resource-constrained contexts. A focus on needs primes design to be additive. If the population needs something, we should add something to fill that need. But as we have seen, the costs of deploying and sustaining additive interventions weaken the likelihood for sustainable impact in resource-constrained contexts. Beginning with what is in the community instead of what is missing both validates the community's strengths and encourages interventions that will not just disappear after researchers move on.

Assets-based design recognizes the costs of invention and thus seeks to minimize novelty. Suchman notes that artful integration involves "ways in which new things are made up out of reconfigurations and extensions to familiar environments and forms of action" [17]. Costs of invention can be avoided by reconfiguring things that already exist within and beyond the community rather than inventing something new. By avoiding novelty and leveraging assets already embedded in resource-constrained communities, the HCI community can use assets-based design to create sustainable impact.

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# Commentary

For alt.chi paper

*We Did It Right, But It Was Still Wrong:  
Toward Assets-Based Design*

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The paper argues that HCI interventions often fail to achieve sustainable impact because of a focus on novelty and needs; designers overvalue creating new technology, and often base designs on users' deficiencies ("needs") instead of their assets. In this view, HCI projects can have more sustainable impact, especially in low-resource settings, by focusing less on novelty and needs and more on assets. The argument is illustrated with fieldwork and a general framework is offered.

The paper builds on and fits with HCI research on non-use, sustainability, ICTD, "when not to design," and low-resource settings. It contributes to the perspective in HCI that the role of HCI researchers should not only be to seek situations in which computing can "solve problems" but also to know when the appropriate action is to refrain from building or using technology, to simplify rather than extend existing technology, or to use old technology rather than innovate.

Arguably, HCI has always prioritized "human values," but this debate seems perennial. (Liam Bannon published a paper in 1992 called "From human factors to human actors" and another in 2011 called "Reimagining HCI: toward a more human-centered perspective." Both are well-cited.) But the "human-ists" have two problems. First, the technology industries have grown powerful. They have an incentive to proliferate technologies — even if they do not really benefit users (indeed even if they harm them), and, at the same time, to claim that they are improving the world. There is a need for evidence-based knowledge to check these tendencies, but HCI both supports and benefits from — indeed arguably exists to serve — these industries. Second, a call to "decenter" novelty or innovation may run up against the question of where HCI ends and where other fields such as STS, business ethics, or public policy begin.

While this paper does not raise these questions explicitly, it "walks up to" them. By using the word "novelty" instead of "innovation," it avoids calling one of HCI's holiest of holies into question. But the paper could have been titled "Innovation is overrated." It should therefore stimulate interesting, important discussion at alt.chi — as long as the audience is awake and reads between the lines.

In 2011 I worked as a programmer for a startup created by founders who had worked with the originators of asset-based community development (ABCD). They wanted to use "asset mapping," part of ABCD, to support sharing between small nonprofits. The founders had talked about this with nonprofit workers and there was a lot of excitement about it. Despite this, the founders, one of whom moved to Silicon Valley to raise money, were eventually drawn away from the concept by various tech luminaries and funders who did not find it exciting enough. I left when the founders started building a Facebook-integrated dating app. In some ways this story is about the impressionability of young founders, but it also supports this paper's argument: the road to sustainable impact may be signposted by values other than the ones computing as a culture tends to value most.