

## Dispatches from the Digital Frontier

A Blog from New America's Open Technology Initiative

# Collaborative Design Strategies for Community Technology

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Organizations designing for marginalized populations have many design approaches to inform their efforts to enact lasting change. Some are adapted from first-world commercial processes, and others were actively developed in the field by teams directly involved in empowering communities lacking access to many modern technologies. A few of the approaches born from particularly successful or educational projects have influenced wide movements and inform many successful projects.

This comparison focuses on three “brand-name” approaches to designing for communities lacking access to first-world commercial technology solutions. **Human-centered design** is an approach the business world has used for decades to inform their design process. **Appropriate technology** focuses on a set of guidelines for technological innovation that holds paramount the need for solutions to be relevant to and affordably produced and maintained wholly by the local population. **Participatory technology design** is a specific application of the participatory design philosophy, which emphasizes the active involvement of all stakeholders in the design process of technological solutions.

These and many other common approaches to social justice design have a variety of names. After researching and discussing them with activist designers who ground their work in these philosophies, it is clear that they largely intersect as a complementary framework for design development. The descriptive banners emphasize particular aspects of design, and once the activist understands how they fit together, she can construct an integrated approach that is both appropriate and scalable. Furthermore, a common understanding of these philosophies and the language describing them as building blocks for coordinated development programs facilitates positive exchange among the activist community.

## Human-Centered Design

Human Centered Design (HCD) has roots as far back as the 1940s, when aircraft designers studied how pilots interact with systems in the cockpit. Their research influenced aviation systems design and was later described as “Human Factors Engineering” and “ergonomics.” These design philosophies, along with the later cognitive psychology and human-computer interaction design, formed the pillars of what became user- or human-centered design. HCD guidelines have been used for decades by multi-national corporations to produce services and product design solutions.

In late 2009, the design firm IDEO, in conjunction with the [Bill and Melinda Gates Foundation](#), [International Development Enterprises](#), the [International Center for Research on Women](#) and [Heifer International](#), released the [Human-Centered Design Toolkit](#), which adapts HCD for social enterprises and NGOs working with impoverished communities. The toolkit presents an informative, highly adaptable and extensible framework for program development from identifying a challenge to executing and tracking implementation. It is not meant to be read by all participants in a project, but to be analyzed by a project’s facilitator to determine which parts of the process will be used in developing a design solution.

The first phase of development, “Hear,” is about interacting with end-users to learn the community’s situation, gathering stories to determine what problems need to be solved and how, understanding how influence and power are structured in the client community, and planning for recruiting team members. Phase two, “Create,” concerns the synthesis of data to determine opportunities and design prototype solutions to test with the end-users. “Deliver,” the third and final phase of

HCD, covers implementation, creating sustainability models, and measuring and monitoring feedback and performance.

In its interpretation of HCD, the toolkit regularly emphasizes the importance for established teams and designers to incorporate practices and methods that delivered success in previous efforts. It is full of helpful reminders and tips regarding the tactics of execution of each stage, such as not to conduct interviews with an audience since the presence of friends and family can influence a person's feedback. The guiding points tend to call to mind the tenets of other active development philosophies, inviting seasoned activists to recall previous experiences and apply them to a new venture. This subtly influences the facilitator to bring together the complex and lengthy lessons she has learned and act on them.

Perhaps the clearest advantage of the HCD toolkit is that it provides several ways to accomplish each step in the design process. These alternatives encourage a team to look at their challenge from different viewpoints, and they establish several points of entry for other philosophies to play a part in creative synthesis. When your challenge is technological and involves working with a population that happens to be crafty, the tenets of appropriate technology become a clear idea partner to the development process. Gathering stories and learning from the locals is an invitation to think critically about how participatory design and popular education can fit into obtaining the data you need to create a solution. The HCD toolkit thus evolves from a program development guide to a substrate for the skills and experiences of the whole team to grow a sustainable solution.

## Appropriate Technology

Appropriate Technology (AT) focuses on finding solutions that consider the needs of the community and the environmental sustainability of the product. It is more about inventing technological tools and processes than all-purpose development.

The cohesive philosophy we now call AT was developed by the British economist E. F. Schumacher from his "intermediate technology" theories. Schumacher advocated for industrial development to be concentrated in smaller regions than large nation-states, so simpler technologies and systems can be utilized by a regional economy to meet the material and economic needs of the local population. The loss of productivity in this economic model, he reasoned, would be offset by an increase in employment to meet local economic demand, and the tools needed to power a local economy would be cheaper and require less expertise than the computers and transport systems necessary to globalization. Hence the term "intermediate technology:" not as advanced as our cutting-edge tools, but sophisticated enough to accomplish great things for local communities.

The [Appropriate Technology Collaborative](#) of Ann Arbor, Michigan is a firm built on AT principles dedicated to finding technological solutions that are cheap and easy to maintain for the needs of communities with the least access to wealth. They focus on ensuring their products can be completely constructed in or near the community where they will be utilized.

[John Barrie](#), the founder and executive director of the ATC, was traveling as an architectural designer in Latin America when he developed the idea for the Collaborative. He figured out a way to redesign the homes of Ecuadorian mountain natives, who had to wear parkas during the freezing nights, to offer more warmth and comfort while using the same materials from their old, colder housing. Following this success came the question: "In what other ways can we improve the quality of life here?"

"The design pyramid is the opposite of the economic pyramid," says Barrie. "There are too many designers designing for the very few rich people. At the bottom of the pyramid, there are billions of people with relatively few people designing full-time for that group. To me, that's four billion clients with relatively little competition." He is quick to point out that the ATC is non-profit and funded by grants, and is staffed by designers from client countries and students from [Michigan State University](#) and the [University of Michigan](#) who work in client countries on these projects.

The design process involves spending time in the undeveloped world -- Barrie lives part of every year in the mountains of Guatemala -- and developing relationships with slum dwellers, isolated villagers, and local designers. Barrie described one

of the most talented designers he has ever worked with as a man who was selling textiles in an open market in Guatemala until an NGO that started working in the area learned about his inventive talent. The NGO engaged in participatory design and thereby gained a talented local inventor, who may otherwise have never gotten to exercise his talent on a wider scale, to work on many ATC projects. Barrie says the ATC “gain(s) inspiration and design guidance from the client base. We also work with student groups and there is an incredible value with bringing together a group of American students with stakeholders in the client country and working on a specific design task together. Many great ideas come out of that.”

When asked about how the ATC integrates other design philosophies, specifically HCD and participatory design, Barrie describes them as “probably academic delineations, as far as they are considered different approaches.” He said that HCD is an important component of their design process, as is regular field testing. Their process overview is listed on their website, and looks similar to the steps in IDEO’s HCD toolkit. While they do practice participatory design in deciding which projects to undertake, educating their clients about the solutions they will develop and recruiting local designers, ATC also maintains a base of designers in the USA who prototype before conducting field-testing.

Once the prototype works, ATC focuses on re-designing their solution to ensure it can be produced cheaply and on a large enough scale to create impact beyond the client’s country. “The hardest part is deciding what to design,” relates Barrie. “A great deal of our time is spent working with people to see what their needs are. Sometimes our designs are a one-off for a particular group, but we try to focus on designs that are more universal.” He describes how a few years ago, ATC’s designers were working on [LED lighting fixtures](#). Most of their clients did not realize an alternative existed to kerosene or battery-powered lighting. The idea for cheap LED lighting fixtures came through a series of questions that arose while Barrie lived with a client community. The first response from the local clients was “There’s nothing wrong with the lighting.” Even once ATC explained how the LED fixtures would be priced and how they would work logistically, the clients were reluctant to implement a change, and were afraid of making payments despite the lower cost of the fixtures per week than their old lighting methods. Thus, designers also need time to encourage clients to make a change that improves their lives and can be mostly produced and maintained locally.

A project’s completion is only the beginning of making an impact. After the design is finalized and successfully produced, [ATC puts all design schematics up for free download online](#), to be used and modified by anyone. Barrie said that over fifty organizations have contacted ATC to discuss their ideas for implementing ATC’s designs. Some fishermen in East Africa augmented ATC’s [solar vaccine refrigerator](#) to serve as a fish refrigerator, for example. Barrie conservatively estimates that several tens of thousands of ATC-derived devices have been created from the online schematics, and notes that they are seeking better metrics and feedback mechanisms on how their devices are used and how to improve them. Their [treadle pump](#) is the most downloaded design.

## Participatory Technology Design

Participatory Design (PD) is best described as a process development / design philosophy, rather than a specific multi-step program. Its core tenet is that contributors should immerse themselves in their clients’ environments and interact with all stakeholders, rather than study and work separately from other stakeholders. This way, the resultant product will be much more relevant to clients’ needs. PD started in the 1970s in the Scandinavian trade union movement, identified then as the “collective resource approach.”

Proponents of PD view systems as fundamentally made up of human networks and practices rather than hardware and software tools. PD describes the clients and developers as similarly expert, with no one’s views more worthwhile than those of anyone else, for the needs and desires of the community represent the goal of the project. Efficiency and productivity take a backseat to relationship-building and the enjoyment and well-being of the participants and clients throughout the design process.

[VozMob](#), short for “Voces Moviles / Mobile Voices,” is a Los Angeles-based platform that engages immigrant communities

to tell stories using technology available in their cell phones. [Sasha Costanza-Chock](#), a community board member and technology coordinator for VozMob, describes PD, HCD and AT as weaving together from “...parallel trajectories. One strand comes from the corporate sector... another trajectory for tech design has its roots in the history of the social justice movement and even in decolonization. How does tech design intersect with race, class, gender, sexual identity and mental and physical ability? It’s another trajectory of people from movements as opposed to people from capital.”

Costanza-Chock explains that those trajectories fuse to establish VozMob’s operating methods. After considering how tech design can reinforce power inequalities, the VozMob team moved beyond mere design to apply concrete action in building technology for the communities they interact with.

“We get developers in concrete face-to-face action with the communities they work with. The tools they develop will be better that way because they have a more concrete understanding of the use case. Meeting actual users and hanging out with them and watching how they do things is much more important to grounding your possibilities, and it generates new ideas. It also produces better relationships between the developers and the community they work with; everyone is happier that way,” Costanza-Chock relates. He says that if the relationship is just contractual or money-based and development work is done apart from the community of use, the human relationship is reduced, and it is not as enjoyable or rewarding to work that way.

Engagement with the community is taken seriously at VozMob. Although much code development for their SMS-based data collection platform is done remotely, code sprints are done face-to-face with end users. The VozMob team collects stories and needs from the user base in normal human language, and the developers work to establish those features until the user community is satisfied with the result. Costanza-Chock admits that it can be challenging to find local, bilingual developers who can work with the community and are appropriately skilled. “Part of it is in terms of how people are taught to develop and design. It’s encouraging that within the open source community there is a history of people willing to do design who lean more closely to the needs of the grassroots, but it’s still a minority.”

Costanza-Chock describes other design philosophies which influence how VozMob, a project of the [Institute for Popular Education of Southern California](#), organizes and develops its platform and community. He says that the main framework which forms the VozMob ethos is not PD, it is popular education, a philosophy of critical pedagogy most influenced by the Brazilian educator [Paulo Freire](#). Freire contrasted the “banking method” of education with the “popular method.” In the banking method, the educator holds the knowledge and deposits it into the mind of the student in a one-way transfer; the popular method starts with the assumption that everyone has some knowledge and, by coming together and respecting others’ input, the community can develop both knowledge and concrete plans for action to meet their needs.

VozMob applies popular education methods in everything they do, including making and telling stories and how they think about technology design. “When we developed the graphic design for our website, we worked with the [Design Action Collective](#),” says Costanza-Chock. “We all learned together about the principles of web design - we did it with print graphics, everyone came with printouts of web sites they liked, then cut them up on paper and pointed out what features they liked.” When an organization engages communities with popular education, “the assumption is not that you will give something to the community, it’s that by focusing together and sharing knowledge you will come up with new knowledge and action plans... It’s not ‘people need to learn these technical skills.’ We think that people will be most excited to learn digital literacy if it’s in the context of the skills of organizing their community to accomplish goals. Our work with VozMob has indicated that this thought is true.”

Agile development, a method from the software development community which originated in 2001, also influences VozMob’s development process. The [Agile Manifesto](#) states that the method promotes “Individuals and interactions over processes and tools, working software over comprehensive documentation, customer collaboration over contract negotiation, responding to change over following a plan.” These principles favor active interaction between the team and the clients, which well complements VozMob’s work ethic. When VozMob gathers stories to incorporate new platform

features, they use agile development principles to prioritize stories for their code sprints. Costanza-Chock says this is more open, participatory and efficient than the standard process of developing specs with extensive feature sets and coding to meet those specs.

Free and open source software is essential to Participatory Technology Design. “It’s been so obvious to use free software,” Costanza-Chock says. “Why would you want to use PD and popular education and apply it to a proprietary platform?”

Whatever you generated together, you would not be able to share fully with others and have them modify it to their own needs.” He says that the basic functionality of VozMob could be achieved with Twitter and Facebook, but “we wanted to have responsive tools for what people need and want. Thus our systems have to be open.” That open attitude allows for a healthy fusion of the appropriate technology of VozMob’s SMS platform, the human-centered design and participatory design of their development process, the popular education philosophy that provides their operational foundation and modern software development methods that establish an easy-to-use and accessible tool for community organizing and social justice.

## Conclusion

Social justice activism is practiced by so many people and organizations, often fragmented and always solving problems with new twists, that communication and sharing experiences with peers can be challenging. Most activists and organizations working with disadvantaged populations almost certainly practice several of the concepts discussed above, though perhaps by a different name. A common language among activists, facilitated by the grouping of concepts into widely accepted names, is integral for activism to advance in scope and effectiveness. This common language should also aid idea exchange with non-activist organizations; human-centered design, after all, originated from military aircraft designers.

Human-centered design, appropriate technology design, and participatory technology design stem from origins different enough to group their concepts under separate names. However, to choose a single design philosophy for a project is to fundamentally limit the relevance of that project’s ability to respond to new developments. This includes factors inherent to the working style of the design team revealed only during the development process. The wise activist unlocks their utility by examining their similarities and understanding the places where they can mutually inform design development. She will then be ready to develop technology that makes a difference and empower the people who had a say in their solution.

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