

# Making Sense of Imbrication: Popular Technology and “Inside-Out” Methodologies

Nancy Campbell  
Science and Technology Studies  
Rensselaer Polytechnic Institute  
Troy, NY 12180  
+1 (518) 276-6065  
campbell@rpi.edu

Virginia Eubanks  
Science and Technology Studies  
Rensselaer Polytechnic Institute  
Troy, NY 12180  
eubanv@rpi.edu

## ABSTRACT

We describe a model popular technology education program based on feminist and Freirian principles. Participatory design and research methodologies that position facilitators and participants as co-producers were the basis for a series of collective research projects, which we then analyze for their contribution to the field of participatory design. Finally, we suggest that the democratization of technological citizenship can be best extended not through narrowly construed “technology training” programs but through “popular technology,” an empowering and visionary combination of popular education and participatory research and design that emphasizes critical technological literacy.

## Categories and Subject Descriptors

K.4.2 [Social Issues]: Technology literacy and social justice – *computer literacy, collaborative design methodology, participatory design, digital equity.*

## General Terms

Design, Human Factors, Theory.

## Keywords

Popular technology education; participatory action research (PAR); technological citizenship

## 1. INTRODUCTION

Broad collaboration in the design of information and communication technologies (ICTs) generally entails technology training or literacy programs. How these are structured and delivered makes all the difference in whether participants experience the participatory design process as grounded and empowering, or as disorienting or extractive. Derived from our

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four years’ experience building a sociotechnical infrastructure that now serves as a basis for offering popular technology education, we offer a research methodology that turns technology education “inside out” by making sure that all participants occupy overlapping roles as participants, facilitators, and researchers. Finally, we recognize that researchers are themselves constituted through the overlapping processes of facilitation, participation, research, and analysis.

Popular technology education assumes that individuals already possess vast experience with information technologies and thus come to technological literacy programs as knowledgeable and asset-bearing. Most technology training programs assume that those who seek technology education are inexperienced or skill-deficient. Instead we sought to activate participants’ tacit critique of the dominant view that they were technologically “illiterate” and were thus marginalized in the “new economy.” Popular education also assumes that collectively produced analysis of macro-structural conditions and the micro-processes that sustain them can provide new sources of empowerment and knowledge. If scholars are to facilitate popular knowledge production, they must adopt a different stance towards research, education, and design participants so as to occupy different structural positions relative to adult students [11, 12, 13, 14]. Participatory methodologies remain the most significant alternatives to top-down technology transfer models, which present implementation barriers often misread as lack of readiness for or resistance to change. However, certain aspects of participatory approaches make them difficult to conduct and study. This article explores the lessons that came out of our research into our engagement as facilitators, resource providers, and participants in popular technology education. We refer to these lessons as “inside-out” methodologies because we so often had to turn dominant assumptions about technological learning on their heads.

## 2. TURNING PARTICIPATION “INSIDE OUT”

We began participatory research and education projects because we were curious about how “the information economy” shapes local and individual experiences with ICTs. We saw information technology as the material form of what sociologist Dorothy E. Smith refers to as the “ruling relations,” which “coordinate[e] the activities of people in the local sites of their bodily being into relations operating independently of person, place, and time. In putting in question the making of the extra-local and extra-personal ruling relations, women’s standpoint does not proclaim them invalid, but rather recognizes the extra-locality of relations

as itself a social organization of actual people's practices. In these relations, the particularity of individuals, their actual situation and site of work, the ephemerality of the lived moment, and so on, disappear" [38: 76]. We sought to counter that disappearance by turning "ruling relations" inside out.

Participants often came to our programs having directly experienced the "extractive" functions of large-scale technological systems in the workplace, health care settings, or the social and human services sector. Rather than read our collaborators' critical ambivalence towards technology as a sign of resistance or fear--as an individual deficit to be overcome--we recognized it as a sign of incipient analysis. Experiences of the disconnect between the powerful symbolism of IT as an engine of social and economic progress, and low-income women's lived experiences of computers as the face and the heart of "The System" formed the basis for constructing non-extractive relationships and generating structural analyses with participants. Instead of allowing the ruling relations to "extract" people's activities and "subject them to technological and technical specialization, elaboration, differentiation, and objectification" [38: 77], we used participants' insights about their own experiences with technological extraction and subjection as the basis for producing a collective social diagnosis of what might need to change in order for information technology to become an empowering "popular technology."

We—an RPI graduate student, a faculty member, and several dozen collaborators--set out to construct and sustain a sociotechnical infrastructure to support technology training through participatory programs that emphasize peer education and the political and economic context of knowledge work, technological design, and political decision-making. We conducted this work through a "community-university partnership" with the Sally Catlin Women's Resource Center, and, later, its associated Technology Lab. Both are housed in the YWCA of Troy-Cohoes, a residential facility for about 90 highly resourceful women living in transitional circumstances and seeking to craft the lives they want for themselves. Our programs served as the basis for participatory action research (PAR) on how adult women learn, interpret, and incorporate basic concepts of technological literacy, and make sense of their social worlds in the process. Our main data source consists of meeting notes from ongoing design sessions, process notes, semi-structured interviews with participants and non-participants, and program-specific evaluations.

Our stance is similar to Smith's idea of a "reconstructed sociology" that starts from the "standpoint of women, [which] establishes a place to open inquiry that begins with a consciousness located in a particular local site" [38: 74]. It builds on feminist sociologies of knowledge and studies of the organizational and social contexts in which information system design takes place (e.g. "situated actions" in [40] and "situated design" in [17]). We advance new concepts of "situated expertise" and "situated knowledge work" because we have found that contextualizing personal experiences offers a route to a macro-structural analysis of the "Information Age" [3] We found that technological literacy or, better yet, technological affinity and facility were by-products of the far more important process of personal and political transformation. Initially we differentiated "literacy" from "training," adopting the emphasis on adult literacy

central to popular education [14, 15]. This exchange from Eubanks' interview with filmmaker, media educator, and YWCA volunteer Penny Lane distinguishes the very different thrust of "literacy" and "training":

VE: *Sometimes the distinction we make between technology and media literacy isn't a good one. Because technology literacy tends to be about skill and competence and media literacy tends to be about...*

PL: *...ideas?*

VE: *But fact is that technology in general plays such an important role in our lives that having a critical knowledge of it, how it works...Like when the police run my drivers license, where does that information come from, and where does it go? Does it ever disappear? Do I ever get out the system? How did I get in it? Thinking of "technology training" in terms of media literacy becomes really important. Understanding how it works - not just being competent in it - but understanding what role it plays in our lives...*

PL: *Absolutely! And the same issues come up in media education. Are we teaching video or are we teaching media literacy? And we decided [at the Children's Media Project in Poughkeepsie, NY] that we were doing media education, and that was both. And that's what technology education should be.*

*It feeds itself - when you understand how to make a database, you understand how databases work. And then when you're confronted with the technology...you just get it. If you know how to edit, and you've ever just cut video for 5 minutes, you get what happens when you watch the news. You get it. You know what a cut-away is. You know why they're doing it - and you know they're trying to manipulate you, which is what you were trying to do when you were editing (PL 7/7/03: 55.0).*

For Paulo Freire, the goal of critical literacy is to create more coherent understandings of the world by linking "self-contained areas of expertise" to the "social and political realities" that frame participants' understandings and enable them to integrate their ideas and artifacts into the world. Specialist knowledge, on the other hand, has low coherence and little criticality. In his posthumously-published work *Pedagogy of Freedom: Ethics, Democracy, and Civic Courage*, Freire illustrated the limitations of such technicist knowledge by describing the failure of the advanced techniques of reading specialists to reach millions of children who remain illiterate by virtue of their race, ethnicity, gender, and class. Improving linkages requires thinking about ideology, ethics and education, but institutional curricula tend to favor a decontextualized form of technological training over the generalized, problem posing education espoused by critical theory (Macedo in [14]: xii-xiv). Similarly, traditional technology training does *not* necessarily, or even commonly, lead to economic, social, or political empowerment of marginalized populations [8, 25: 95]. As power is increasingly routed through IT networks, it is increasingly imperative to foster and facilitate participation in the design and use of more flexible, open, inclusive, and just sociotechnical systems. The double challenge this presents for adult technological education, particularly for women and the economically exploited, is that:

1) Technological training programs on their own only prepare adult learners for employment in the IT industry with short career ladders and

limited sustainability, particularly as data entry keyers or computer operators [26].

2) Technological training programs are generally designed to be appropriate for particular computer hardware or software, but are less often designed to create critical technological citizenships in ways that are relevant and contextually sensitive to the community they are serving.

How might “technology training” look different if it was designed to enable people to discern their structural locations in information economies, or to see themselves collectively as members of an exploited class of “situated knowledge workers”? If technology training was reconceived as training for critical technological citizenship it would look and feel different.

Differentiating “literacy” from “training” was crucial for developing a strong relationship with women in the YWCA community. Some participants felt forced by the larger society to become technologically literate: “When society mandates that you have to use technology -- they want society to be constructed around it for whatever reason -- then [to] adults that are already established and in adulthood without that...it seems like a chore” (ZR 10/4/2003: 17.3). We soon found that this set of critical positions were not reducible to women’s race, gender, age, or social class, but instead exemplified their analysis of the extractive role that technology had played in their lives to that point. Being reluctant to allow technology education to play a similarly extractive role, we sought to value women’s contribution of time and energy and counter feelings of devaluation, which we did through use of consensus process; paid stipends for work inside and outside the classroom; and the intangible forms of validation that convey respect that are so essential to participatory design practices.

We developed “inside-out” methodological principles to increase these intangible forms of validation and enhance research validity and immediate relevance. They include: 1. situation as a form of “meeting people where they’re at”; 2. collaborations in which community members become researchers, raising questions of interest to them; 3. scale change, which combines a politics of day-to-day survival with a politics of social change and structural transformation [37]; 4. greater flexibility and variety in data collection methods, including production of composites, parables, or “reconstructed stories,” and incorporation of narrative modes of analysis [11, 30, 35]; and 5. social justice goals, the scope of which vary widely [39: 71-95].

*Situation.* Feminist science and technology studies (STS) offers two kinds of knowledge practices useful for thinking through the dilemmas of participatory design: standpoint epistemology [20, 21, 38] and “situated knowledges” [18, 19]. Both share the commitment to research starting from a heterogeneous panoply of “nonstandard positions (positions that don’t fit but within which one must live)” [19: 269]. A “standpoint” is a cognitive, emotional, and political achievement “crafted out of located social-historical-bodily experience—itsself always constituted through fraught, noninnocent, discursive, material, collective practices” [19 304-305, n32]. Achieving a standpoint can empower the production of more adequate and relevant knowledge according to the standards of “strong objectivity” set forth by Harding. “Such a standpoint,” Haraway writes, “is the always fraught but necessary fruit of the *practice* of oppositional and differential consciousness. A feminist standpoint is a practical technology rooted in yearning, not an abstract philosophical

foundation” [19: 199]. The important point is that a standpoint is the *outcome* of an analytic and social process rather than a precursor to it. As a form of historical consciousness, a standpoint cannot be assumed or inferred in advance on the basis of demographics or membership in a social category. Rather a standpoint is a place to which people come as they make practical sense of their experiential location in social space.

However, standpoint epistemology has tended to be read not as a place from which to open inquiry, but as a way to shut it down through the assertion of identity. Thus its utility is more limited for our purposes than the sister-concept of situation. We take seriously Haraway’s claim that standpoint is the wrong metaphor for situatedness, and reach instead for other metaphors of location or locatedness [16: 71]. We borrow from Haraway’s thinking on “partial, located, critical knowledges” [18: 191], upon which Lucy Suchman based her concept of “located accountabilities” as a principle of participatory design. “As Haraway makes clear, the fact that our knowing is relative to and limited by our locations does not in any sense relieve us of responsibility for it. On the contrary, it’s precisely the fact that our vision of the world is a vision from somewhere – that it’s based in an embodied, and therefore partial, perspective – that makes us personally responsible for it. The only possibility for the creation of effective technologies, from this perspective, is through collective knowledge of the particular and multiple locations of their production and use” [41].

Our concept of “situated expertise” shares the assumption of a material, almost geographical, dimensionality to the social spaces within which various forms of knowledge, expertise, and technology are taken up and set aside. Haraway initially advanced “situated knowledges” to signal the “multiple modes of embedding that are about both place and space in the manner in which geographers draw that distinction” [16: 71]. We are similarly in pursuit of a metaphoric architecture that signals embodiment and situated activity while forestalling flat-footed reductions of situation to identification, or, worse, demographic descriptors. The social movements we engage—poverty reduction, welfare rights, community caretaking—are not mobilized primarily around identity or the processes of subject formation that we call “identification.” Our work lands squarely on the terrain of a set of circumstances, convergent economic and cultural conditions that produce a “situation,” a position with a social location, rather than a “standpoint” identified with a particular identity formation or demographic category. Within this “situation,” no single investigator can credibly claim to “be” an expert, or to simply be identified as an “expert,” and nothing else. “Inside-out” methodologies work against conflating “standpoint epistemology” with “situated knowledges.”

Situated expertise involves the accumulation and validation of multiple perspectives produced from diverse standpoints—no one standpoint is privileged. The relationship of situated expertise to participatory process is thus clear—there can be no such thing as situated expertise in absence of participatory democracy. The move from local to extra-local entails the risk that one or the other will be subsumed; we evolved these conceptual tools to keep that from happening. We recognize that researchers produce standpoints for the purpose of making sense of the research process. Freire called this “the duty of not omitting ourselves”; Suchman and Haraway similarly emphasize the multiple

accountabilities of designers and researchers. Taking for granted “the total impossibility of being neutral before the world, before the future...presents us with the right and the duty of positioning ourselves as educators” (Freire in [4]: 86). Researchers are made, not born. So, too, are participants constituted in the process of collaboration.

*Collaboration.* By turning participation “inside out”—making participation into a set of collective experiences in which participants become researchers, and researchers recognize themselves as constituted in and through participatory process—we counter the heightened emphasis on personal or individual responsibility inherent in postindustrial welfare regimes. Regular meetings of our design group, called Women at the YWCA Making Social Movements (WYMSM), allowed us to develop and test research techniques through a collaborative process. WYMSM member Julia Soto Lebentritt described the group as *very* empowering for individual participants, praising the collective process we co-developed. “It was beautiful,” she said in a July 2003 conversation, “that we were from different walks. We had...different ages, experiences. But we were all on the same level... So it was really across different cultures, diversity interacting positively... Almost like a family gathering of...what we were passionate about, and what we felt should be done” (JSL 7/8/03: 66.2).

Collaborative research does not stop at simply “situating” social science, or doing social science “from below.” It pushes beyond locally produced articulations of social structure to collective critical consciousness. You must start from where people are, Myles Horton has written, “but then if you don’t have some vision of what ought to be or what they can become, then you have no way of contributing anything to the process. Your theory determines what you want to do in terms of helping people grow” [24: 99-101]. Collaborative process provides for a kind of social learning that Argyris & Schön [1] call “double-loop learning,” which challenges underlying social norms and organizational values. That is, inside-out methodologies clear a space for groups to collectively interrogate their own assumptions and values, as well as their tactics for making change. It is transformative rather than interventionist research.

Collective, self-interrogating inquiry is crucial for moving beyond shallow definitions of ‘local knowledge’ to a politics and practice based on oppositional or differential consciousness, which can generate forms of collective agency and effective resistance in the postmodern world [36: 409]. Collective struggle against social inequality is often difficult to sustain in low-income people’s organizing, because so much blame for economic circumstances is projected onto individuals. Learning from other group members’ experiences was the most valuable part of the WYMSM process, member Zianaveva Raitano insists: “That’s what was most important to me. The learning process...It’s amazing because sometimes I think I’m so alone in my issues and my stress, but I’m not. It’s like a whole new world opens when you’re involved with people and seeing their lives and their differences. It’s inspiring” (ZR 10/4/2003: 11-12). Similarly, member Cosandra Jennings provided the most evocative moment of the 2002 Women’s Economic Empowerment Series when she declared, “I’m realizing that my economic problems are not *my* economic problems – they’re *society’s* economic problems.” In a January 2004 exchange with Virginia Eubanks, she elegantly

described how her experiences with WYMSM helped her move from feeling frustrated and trapped to political activism:

*VE: Do you consider yourself political, an activist?*

*CJ: [ long pause ] Yeah.*

*VE: Is that new to you?*

*CJ: Yes. Very much. Very much. I’m very much into my current events. I’m reading the paper all the time, I watch the TV. I do a lot of talking to people about what’s going on in their life, and how they’re getting help from society and our community.*

*VE: Where did that change come from?*

*CJ: It came from the Y[WCA], and it also came from the WYMSM group. Because in the past...I was basically living day by day. It was not about going in the community to figure out what their problems were. It was always about what **my** problems were all the time, and being blinded...I believe a lot of people are slaves to our society...we say we have no slavery in our country, but I believe we do. I’d never seen that before until I started to get into politics and all that other stuff.*

*VE: Do you think the change came from connecting your individual struggles to a broader context?*

*CJ: Right. You get stuck in this little place -- for me, I was on social services when my son’s father got incarcerated. For one, I hated the system because here I am a mother, going to social services when I shouldn’t be going...even though he did wrong, I should be getting help from his social security. Understand? That’s the kind of stuff I feel I’m entitled to because I have a son. But they make me degrade myself, make me feel like crap, and put me in this little box, feeling like I’m a slave because they make me go to work twenty hours a week for \$500 a month. Under \$500 a month...That’s why I’m saying sometimes you have to take a loss. I had to put myself in debt -- again -- more debt, to get off of social services. Because they sanctioned me because I told them I could not be a full-time mother, go to school full time and work part time! I couldn’t do it!...So I left my job.*

*VE: Wow. That’s an enormous risk. You’re so brave.*

*CJ: Well, I didn’t do it on my own. WYMSM helped me. It helped me realize that I had to make a better life for me and my son. I could not stay still and feel trapped (CJ 1/24/04: 22.0-29.6).*

The principles of participatory action research (PAR) and popular education allow us to more equally distribute the means—and the consequences—of social research. Too often, the subjects of even the most well-intentioned research or design projects live alone with the consequences of ambiguous, extractive, or easily appropriated results (see, for example, [31]). When the means of research, including the skills, tools, expertise, ‘local’ and ‘extralocal’ knowledges, time, resources, and processes, are shared, so too are both negative and positive consequences. It is the inevitability that all participants will have to live with the results of social transformation that provides the most important validity check for the research, and provides an impetus for generating timely evidence to be used in concrete struggles. We have found that whether participation will be experienced as extractive or effective, or lead to more fully democratic outcomes, depends on the degree to which macro-structural barriers can be

thus recognized and overcome through collaborative micro-practices.

*Scale Change.* Community organizers and activists often find themselves “preoccupied with sustainable local economic regeneration” and micro-dynamics, becoming unable to articulate a “holistic analysis of inequality and injustice...which can leave us misguidedly supporting policies which encourage participation as a further erosion of rights in favour of responsibilities, the end result of which is a continued transfer of resources from the poorest communities” [27: 175]. These conditions cry out for technologies that make the macro-structural arrangements of social life visible. One criterion by which to differentiate between participation that becomes a form of extraction or tyranny [5] and participation that truly redistributes the “means of thinking” [33: 46] is to look at the extent to which participants are enabled to analyze the larger structural conditions in which their experiences take place. A politics of scale change--the volatile melding of a politics of survival and a politics of social change, in Sanford Schram’s terms—makes opportunity structures more apparent.

We’ve described this dynamic as ‘building political houses,’ Nancy A. Naples’ phrase that captures the relationship of day-to-day, concrete and ‘placed’ community building to broader struggles for structural transformation. Recent critiques of participatory practice in the international development literature [2, 5] have produced important epistemological and practical challenges to what can be called “empowerment as subjection” [7], where over-emphasis on the micro-practices of citizen participation displaces social analysis and critique. However, calls to concentrate on challenging the state *to the exclusion of* developing alternative aid structures outside of it (i.e. Mohan in [5]) are clearly unsupported for low-income women in the United States. More intriguing, and effective, is a strategy that Sanford Schram depicts as “radical incrementalism,” which “pushes for as much change as possible while recognizing that often the resulting changes that are implemented may be only modest improvements to the existing system...[it] is not conventional top-down interest group incrementalism designed to simply work with the powers that be in terms of what they will allow. Instead, it is very much a bottom-up strategy designed to push the limits of what is possible, but with the recognition that challenging power and the existing limits of public policy discourse does not allow for the expectation that blueprints for an ideal society will be what gets implemented” [37: 35].

*Methodological Flexibility.* Engaged academic work always takes place in social and organizational contexts that are power-laden in ways that require navigational expertise. The methodologies of participatory research are non-programmatic, highly context dependent, require enormous practical and theoretical sophistication, and findings require high immediate relevance and usability. The focus on diversity and democratic process intrinsic to participatory research is time-consuming relational work that is undervalued at the institutional level, drawing upon skills and abilities that many academic researchers have little incentive to develop. These barriers are not easily overcome without substantial investment and struggle--not only in foregrounding “local” knowledge but in reframing the professionalized and specialized knowledges that we commonly refer to as “expertise.”

Renegotiating the conventional contract between the “researcher” and the “researched” calls for a great deal of methodological

flexibility. Our approaches have included the production of composites, parables, or “reconstructed stories;” extensive interviewing; participatory design of games, software, and traditional documentary products like audio and video; popular education outreach in the broader community; and the exploration of ‘dig where you stand’ histories. Facilitation, planning, and decision-making roles were shared between academic and community members, and tools and processes developed through WYMSM meetings were later integrated into other projects at the YWCA. As member Julia Soto Lebentritt remarked in a July 2003 conversation, “What worked best was the cooperative process...watching each person take positions in the group and facilitate the group in different ways...new tools that were introduced to deal with...trying to create something” (JSL 7/8/03: 56.8). Although WYMSM no longer meets regularly, these participatory design tools and strategies now infuse the larger organizational culture within which we worked. YWCA staff members Christine Nealon and Jes Constantine argue the tools are no longer specific to the design group, but are now widely shared: “Everything we do at the YWCA is WYMSM - its happening more often, with everyone. Now, it’s just what we do” (JS 1/20/04: 12.0).

Truly participatory research requires a repositioning of “experts” and a repurposing of multiple forms of expertise -- professionalized academic expertise, technological expertise, and “situated” or local knowledges -- and so, we think, provides insight into how collective knowledge is generated, verified, and shared. We propose that different social relations of expertise, express political commitments, and stances designed to promote critical social and technological literacy prevail depending upon whether knowledge production is taking place within, alongside, or outside social movements. Participants’ goals, objectives, identities, tools and tactics differ depending upon their social location and their capacities for analysis or discernment of the macro-structural conditions they face.

### 3. POPULAR TECHNOLOGY: PRACTICING INSIDE-OUT METHOD

Collective research methods provide a collaboratively produced set of interpretations about what priorities matter most to pursue, what changes would make a difference for people’s lives, and a diagnosis of how to go about advocating for social change. Most scholars lack these touchstones if and when they act autonomously from social movements. Participatory research draws upon scholarly expertise but equally values knowledge created and validated in concrete struggles in particular locales, and subordinates the goals of researchers to social change goals [39: 83]. This is by no means simple or straightforward in situations such as our own where we were positioned to catalyze or “animate” movements for social change.

Combining the five inside-out methodological principles with the techniques of participatory design and the goal of fostering critical technological literacy resulted in what we call *popular technology education* or *critical technological citizenship*. Popular technology is an approach to technology education and the participatory design of community informatics projects that combines the tenets of Paolo Freire’s popular education programs with participatory action research (PAR) and participatory design

of technological tools.<sup>1</sup> Popular technology is primarily problem-posing rather than problem-solving, and therefore takes the development of critical technological citizenship, rather than the design and creation of a technological artifact, as its principal goal. The process focuses explicitly on social justice, collective research and verification of data, and recognizes that diverse groups deploy different kinds of expertise that can create richer and more valid views of social structure. The following project illustrates these principles:

### 3.1 Beat the System: Surviving Welfare

In our “inside-out” model, participants “acquire important new knowledge, skills, and capacities by engaging in an iterative process of theory building, social intervention, critical reflection, and active experimentation” [34: 60]. Practices derived from “situated knowledges” start and end from different positions than knowledge production practices that do not take “situated” perspectives into account. Outcomes also differ, as implementation is eased by early, broad participation in decisions by those most affected by them. This dynamic is illustrated in one of the most successful projects developed by Women at the YWCA Making Social Movements (WYMSM), a peer-education role-play exercise called *Beat the System: Surviving Welfare*.

WYMSM was emphatic from early in the design process that we wanted to create an educational resource that could communicate group members’ personal knowledge of the social service system to a middle-class public that seemed naïve and misinformed about “real life.”<sup>2</sup> We were also concerned that the diversity of the community of women living, working, and gathering at the YWCA should be represented, and that the game could be a resource to *both* those who had experienced the social service system and those who had not. We met this challenge by doing our own research based on a compositing method used by Irena Papadopoulou, Karen Scanlon and Shelley Lees in their work with visually impaired adults [32]. Papadopoulou et al. used reconstructed stories to present and validate findings from interview data obtained during the Enfield Vision Research Project. Researchers conducted 90 interviews with visually-impaired people. After the first 20 interviews were completed, researchers presented findings to participants in the form of reconstructed stories developed according to themes and sub-

themes (including “registering or not registering as blind or partially sighted,” “social activities,” and “mobility and transport”) that emerged from data analysis. Respondents were asked to reflect on these stories on the basis of several questions [32: 277]:

*What are your general impressions of the stories?*

*Do you identify with the issues in the stories?*

*Are the stories true and credible to you?*

*Are any of the issues in the stories strange to you?*

*Do you disagree with any of the stories?*

*Are any stories missing?*

Research participants were then able to respond to the research findings and confirm their credibility and dependability.

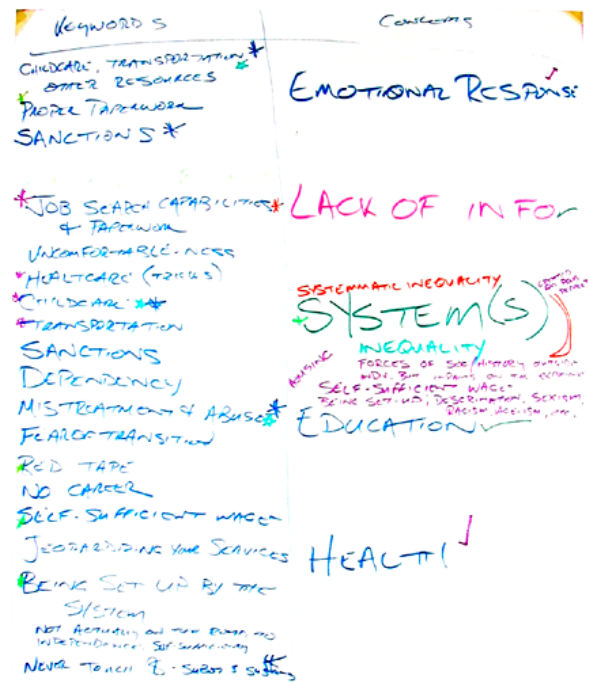


Figure 1. Data Analysis Flipchart

Following this method, WYMSM interviewed six YWCA staff members about women’s common challenges in navigating the social service system, and their strategies for triumphing despite an often confusing and irrational bureaucracy. Interview questions included:

*What is ‘the system’?*

*What keeps people from getting on when they need to do?*

*What keeps people from getting off when they want to?*

<sup>1</sup> The combination of participatory design, action research, and the liberatory pedagogy of Freire has enjoyed some popularity in recent years, especially in Brazil. See examples of similar approaches, for example, in [29, 10]. While the projects described in these two pieces—a computer literacy program for female inmates in the former and an information system for an ‘ecological’ farmers’ association in the latter—are laudable, we would like to take a moment here to differentiate our conception of ‘popular technology.’ For example, the kind of prison-based technology skill training described by Luz Barth and Boing may in fact offer some Brazilian prisoners expanded economic opportunity when they are released. Unfortunately, we have found in our own work that software-based training rarely leads to increased economic stability for low-income women in the U.S. [8]. In response, we have developed the popular technology approach, which rejects specialist technology education in favor of collective critical analysis of social structural conditions that oppress women in the workplace, the social service system, and the criminal justice system. In Freirian terms, popular technology education is a problem-posing, rather than a problem-solving, strategy. More simply put, popular technology does not seek to help low-income women “re-integrate” into the information economy (which they already support through low-wage labor of many kinds), but rather seeks to find ways to reform the information economy so that it can support a fuller humanity for all people.

<sup>2</sup> An early version of the game was entitled “Life, For Real: Money, Sex, and Power.”

*How many/What kinds of sanctions are there? What happens with each sanction? (How long do they last?)*

*How could it be easier to get some of the services?*

*What skills does one need to navigate the system?*

*What patterns (with income limits etc.) have you experienced?*

*How much do you think you know about Social Services on a scale 1-10?*

*Are there things that you would like to know more about what SS provides?*

*Where can we find out more up to date information?*

Group members then transcribed and coded the interviews with the help of a data analysis handout, searching out keywords and concepts that were common across these narratives. From this collaboratively gathered data emerged a number of themes, including: red tape, work, childcare, education, health, access to information, resources, emotional response, systematic inequality, and “world turned upside down,” a phrase WYMSM members used to denote that the stories that circulate about the social service system (and its users) in popular media and policy do not match most women’s direct experiences. Conveying the structural context within which women are represented as “poor” became important to the group’s sense of what would be necessary to create a more realistic representation of the conditions women had experienced.

WYMSM member and author Julia Soto Lebentritt then led the group in constructing composite stories based on the characters, keywords and themes from the data. Below is the “Andrew” composite:

#### **ANDREW**

*Andrew is a 33-year-old intravenous drug user recovering in a MICA program. He has hepatitis C. Although he receives Medicaid, the federal health insurance program for indigent people, his bills exceed what Medicaid pays for the expensive pharmaceutical drugs that are essential to his liver functioning. His drug bills run about \$4000 annually. Seven months into the year, his Medicaid coverage runs out and he is denied for the rest of the year. He has to switch to one primary care physician who works for a clinic that will accept just what Medicaid pays for and not bill him for the balance, and drop all his other specialists.*

Finally, the group drew on Papadopoulos’ et al.’s example, modifying the questions for their next round of interviews. Before the group could conduct a new round of interviews, however, they were invited by local activists Andrew Lynn and Anne Marie Lansey to develop a workshop for a public day long “skill share” called *Pavilion*. The group used its next few meetings to create a popular education exercise using the composites as the basis for skits to be performed and discussed by workshop participants.

New insights were generated by public participation in “Beat The System” skits. Workshop participants explored possibilities that had not occurred to WYMSM members or interviewees. For example, in telling Andrew’s story, workshop participants portrayed a number of scenarios by which the character could obtain the healthcare he desperately needed for the five months a

year Medicaid fails to cover. One possibility was that Andrew could become a test subject for experimental Hepatitis drugs (one audience member yelled out “Don’t do it, Andrew!”). The group concluded that Andrew should commit a crime brutal enough to get five months in county jail, where he would get the medical care he needed, but not so severe that he would have to go to federal prison. Andrew finished the skit by stabbing another character—played by local anti-hunger activist and Green Party leader Mark Dunlea (another audience member yelled “Not the Green Party!”). The audience’s humor, the interplay between “teachers” and “learners,” and the uncommon insight yielded by the process are typical of popular education and participatory action research approaches.

WYMSM was drawn to compositing because so many of the women in the YWCA community have historically had poor experiences with social research. We were uncomfortable reproducing an interview dynamic in which women were asked to testify directly about their experiences in the social service and criminal justice systems. Composite stories offered respondents a way to de-personalize their own information by identifying (or not) with semi-fictional characters. The “composite and response” process allowed us to not replicate demeaning interview experiences many community members have endured in other situations. Far from being “information poor,” women in the YWCA community supplied a rich array of mainly extractive experiences with both social research methods and ICTs in the workplace, the social service and criminal justice systems. As WYMSM member Cuemi Gibson commented in an August 2003 exchange with Virginia Eubanks:

*CG: The computers find out who you are, too. Because I’m sure when they put your name and your social security number in there that everything comes down. That’s my experience with SSI [Social Security Insurance]. Here you go—all the way in the system now. Every part of your life, everything about you, is available. And I learned that in the military. That my name meant nothing. My social security number became me. That was offensive to me...The system knows everything about you. Know more about you than you know about them, and that’s not a fair game.*

*VE: And I think most low-income people, and most people of color, deal with that in a much more intense way than most white, middle class people. Having the state in their business is a really huge issue...*

*CG: Absolutely. If you got all that information about me in the system, why can’t you find me my reparations?! (CG 8/8/2003: 59.5)*

By turning interviewing inside-out, group members drew deeper connections between their own experiences and those of others. We also built from the everyday experiences of common people (including ourselves) to create “policy parables” with national--and even international--reach and scope. The exercise is now used by WYMSM for community peer education. The composites have recently been used to begin development of a website called “Survivor Stories,” patterned on the Southern Rural Development Institute’s *Parables to Policy* project (<http://www.srdi.org>), and based on further research conducted by WYMSM members Cuemi Gibson and Virginia Eubanks. In addition, “Beat the System: Surviving Welfare” was recently chosen as the theme of

the 2004 Popular Technology Summer Workshops (<http://www.populartechnology.org>), where the composites and WYMSM's research will form the basis of community-wide conversations about how to create a "high-tech equity agenda" in the Capital Region.

#### 4. CONCLUSION

Attending to both the theory and the practice of collaborative inquiry can result in the creation and verification of new knowledge and perspectives, as well as the deployment of knowledge toward social justice goals. The complementarity of these strategies lend participatory action research flexibility and vigor, both in times of rapid change and times of social movement abeyance. But PAR cannot be undertaken without an acknowledgment that the "standpoints" of participants are constituted in and through the situation encountered during the research process—in the course of producing collective analysis. Situated standpoints are thus relational and dynamic, rather than fixed and predetermined. We crafted "situated expertise" to suggest that the simultaneity of heterogeneous but overlapping roles—facilitator, participant, and researcher—provides an intellectual resource for producing more realistically attuned and thus relevant forms of expertise.

We've outlined an inside-out methodology for recognizing the imbrication of researchers and participants in ways that fulfill Freire's call not to omit ourselves. Our collaborators came into our participatory practice as "experts in their own lives," rich in skills and experiences. But we also acknowledge our own role in building adaptable structures and tools for analysis and transformation. As Donaldo Macedo argues in his forward to Freire's *Pedagogy of Freedom*, "Although pseudoscientists will go to great lengths to prevent their research methodologies from being contaminated by...social ugliness...so that they can safeguard their 'objectivity' in, say, the study of underachievement of children who live in ghettos, the residents of these ghettos have little difficulty understanding the root causes...The inability to link research with larger critical and social issues often prevents educators not only from engaging in a general critique of the social mission of their own educational enterprise but also from acknowledging their roles as gatekeepers in reproducing the values of the dominant social order" (Macedo in [14]: xxiii-xxvi). Choosing a different way of working together with our research collaborators is choosing to work towards a different world—and choosing a role beyond gatekeeping.

Popular technology has enormous potential for enriching our practice and scholars and activists in science and technology. We do not suggest that popular technology can supplant or replace the techniques and institutions of participatory design. Rather, because it privileges social learning, redistributes the risks and benefits of research, facilitates scale change, provides methodological flexibility, and offers a problem-posing rather than problem-solving orientation, popular technology is well-suited to exploring forms of critical technological citizenship necessary for attainment of social justice in an age of rapid technological change. It also offers a powerful alternative to the "catch the train or fall behind" policy approaches to "fitting the poor into the information economy" rampant in both public policy and popular media.

Engagement with people's struggles for social equality—such as feminism, civil rights and the anti-poverty movement—is what marks critical science and technology studies as divergent from more traditional fields such as the philosophy of science and the history of technology. This engagement enlivens the discipline and increases its social and political relevance by making it possible to engage with normative questions, that is, not just how technology came to be as it is and what it means, but what kinds of technology we *should* be making. Engagement with participatory research and design methods will allow us to question *how* that technology should be made, and *with whom*. Inside-out methodologies may allow us, as designers, activists and educators, to eschew weak, extractive and non-binding forms of participation in favor of more emancipatory and effective approaches to citizen engagement.

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