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Socio-Technologies of Assembly: Sense Making and Demonstration in Rebuilding Lower Manhattan

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The Practical Challenge

As they recovered from the immediate shock and devastation of the September 11 attack, the citizens of New York and their elected representatives were confronted with the daunting challenge of deciding the future of the World Trade Center (WTC) site. So much had been destroyed: Thousands had perished. Tens of thousands had been displaced from their jobs. Tens of millions of square feet of office space had been destroyed or damaged. Critical infrastructure hubs in transportation, telecommunications, and electricity had been devastated; large corporations had been forced to relocate; small retail, hotel, and restaurant businesses had been crippled; students, employees, and local residents had been displaced and traumatized. The meaning and identity of Lower Manhattan as a financial district was now uncertain, and a city whose dynamism was in large part as a global crossroads was now a place of insecurity. It was clear that redevelopment of the site would be one of the most significant undertakings in the city's history.

As they rose to meet these material and emotional challenges, New Yorkers were confronted by social and political challenges no less daunting. There were so many stakeholders with so many disparate claims: The families of victims had claims for compensation and moral claims about the status of "hallowed ground." The Port Authority, as the owner of the land, faced claims from its bondholders. The leaseholders of the properties, with claims from their creditors, placed claims on their insurers. Companies filed claims for compensation. And all of these business entities pressed their interests on various governmental units and agencies whose multiple and overlapping jurisdictions compounded the complexity of the decision-making process. Meanwhile, residents, schools, and religious and cultural institutions in the adjacent neighborhoods claimed a role in the redevelopment

process, acknowledging the legitimacy of the claims of the victims' families but questioning proposals for a sixteen-acre memorial ("we don't want to live next to a cemetery"). Others pointed to studies showing that the economic and psychological impact of the attack was greater in neighborhoods distant from Ground Zero and argued that funds for redevelopment should be spent citywide. Some housing developers pointed to high vacancy rates among existing office buildings in Lower Manhattan and argued for new residential construction. Low-income groups argued that it should be affordable housing. Others argued for another kind of diversity that would bring universities, museums, and an opera house to the site. Environmentalists argued that the site should be a model of sustainable "green" development. Taxpayer groups argued that the properties should be developed with an eye to improved fiscal revenues. Architects pressed for impressive buildings, arguing that not only New Yorkers but all people touched by the event needed monuments as imaginative as the immensity of the tragedy. In turn, urban planners denounced the architects for proposals in which design leads the program instead of the program leading the design.

On one principle the various stakeholders agreed: redevelopment of the WTC needed to be an open and participatory process. The answer to the attack on our democracy could only be more democracy. Exemplary, in this respect, is the following passage from the mission statement of the Civic Alliance (2002), a confederation of scores of civic associations:

On October 1, 2001 more than 75 civic leaders gathered in an overcrowded conference room to begin a process so daunting we hardly knew where to start. The yet-to-be-named Civic Alliance to Rebuild Downtown New York had many different ideas on how to rebuild, but were united behind one goal—to transcend business-as-usual in support of an open, inclusive rebuilding process that would stand as a monument to democracy.

If all the participants agreed that the process must be democratic, there was little common understanding of what "an open, inclusive rebuilding process" might be. Multiple notions of democracy, multiple principles of representation, and multiple notions of public good exist. The citizens of New York, their elected and appointed officials, and their civic associations (many of which emerged after September 11) did not wait to come to an agreement about the rules and procedures for a democratic process. Faced with a situation unprecedented in its urgency and its challenges, each began to act congruent with its notions of democracy, representation, and participation. It is amid and through this extraordinary heterogeneity that New Yorkers engaged in a collective exploration.

Because the process of reconstruction would be as important as the product, rebuilding the physical space of Lower Manhattan launched a reshaping of the space of the public sphere. In the wake of September 11, small-scale public forums proliferated and were soon followed by more systematic efforts on the part of governmental agencies and leading civic groups to solicit input from the public about the design of an appropriate memorial and the future of the World Trade Center site. These public forums used very different technologies of deliberation: from ideas recorded on butcher block paper, to polling via personal touchtone keypads, to threaded online discussions, to websites and digital demonstrations. They offer a remarkable opportunity to examine technologies of citizen participation in governance when the reshaping of the public sphere occurs in an era when the forms of representation (in multiple senses of the term) are themselves coevolving with new digital technologies.

The Analytical Challenge

At midcentury, organizational analysts at Columbia University led by Robert Merton and Paul Lazarsfeld launched two ambitious research programs. On one track, Merton and his graduate students Peter Blau, Alvin Gouldner, and James Coleman examined the origins and functioning of bureaucracy using a rich repertoire of methods including small group analysis, ethnography, and survey research (Merton 1952). On the second, parallel track, Merton and Lazarsfeld established the Bureau of Radio Research to examine the dynamics of mass communication (Lazersfeld and Field 1946). Methodological pioneers, they developed the focus group method and used projection booths to study the demographics of audience reception well before their colleagues in comparative literature discovered "reception theory."

Whereas our Columbia University predecessors charted the rise of bureaucratic organizations and the emergence of mass communication, we have a new opportunity, at the turn of the century, to *chart the emergence of collaborative, nonhierarchical forms in an era of interactive media* (Beunza and Stark 2004; Dorf and Sabel 1998; Friedland 2001; Girard and Stark 2002; Sack 2005; Schuler 2004). But the analogy holds only to a point: if Merton and Lazarsfeld could pursue their twinned projects in parallel, ours must be conjoined in an era when questions of organizational design are closely related to design of the digital interface. We take up that challenge in this research project as we seek to develop concepts to study the

changing topography of public space in a highly visible test of the potential of new technologies of deliberation and demonstration.

Search as Inquiry

If the era of Merton and Lazarsfeld was characterized by mass production in the field of the economy and mass media in the field of communication, mass movements typified the field of demonstration in the public sphere. While mass production, mass media, and mass movements remain important forms, the social forms that define our epoch, we believe, are more likely to be collaborative production, collaborative (interactive) media, and movements of collaborative search. Large social movements—for peace, justice, equality—are necessarily still on the political landscape. But today the space of public debate is as much a place of movement, of churn and heterogeneous turnings, as of *movements*. Fragmented and partial from the older point of view, this multivocality borders on the cacophonous. But this heterogeneity can be its strength. As knowledge is socially distributed in less hierarchical forms, the old boundaries between lay and expert, for example, begin to dissipate (Callon, Lascoumes, and Barthe 2001; Rabeharisoa and Callon 2002). When the tools of representation (as mediated images) become interactive, the task of representation (as who can speak for whom) can be reimagined. In an era when policy decisions involve complex technical questions, demonstrations are more likely to marshal charts, figures, models, and simulations than to mobilize popular movements in the street (Barry 2001). Alongside protest, public space is a zone of inquiry.

The field of information technology is rightly preoccupied with the problem of search. How can users find the information they are looking for? How can organizations locate knowledge that is distributed across departments and projects? How can citizens access relevant information across government agencies and civic associations? New technologies of search engines and knowledge management offer promising solutions, frequently combining semantic categories with new, network-based algorithms. However, we see the problem facing citizens and civic associations in New York as involving a distinctive type of search—a search when you don't know what you're looking for but will recognize it when you find it.

Unlike those searches that yield the coordinates of a known target or retrieve a phone number, product code, or document locator for a pre-identified entity or category, and unlike official inquiries (e.g., the Kennedy assassination, the Los Angeles riots, the Challenger disaster) that investigate a given calamity that occurred in the past, this form of search as inquiry is open ended. In New York this inquiry was

collective, it was distributed nonhierarchically across many hundreds of organizations, meetings, and sites, and it involved a combination of deliberately directed action and spontaneously emergent self-organization. In these characteristics of distributed intelligence in open-ended inquiry, it resembles the practices of scientific research. In examining a collective sense making, we start from the key insight of John Dewey's philosophy of pragmatism that we can come to know the question only in the process of making active steps toward solutions (Dewey [1927] 1991, [1939] 1993, 1998; Dorf and Sabel 1998). Search, when you don't know what you're looking for.

Dewey is our necessary point of departure not only because he thought systematically about inquiry[1] but also because he explicitly linked these ideas to the study of democratic practices and communication technologies. For Dewey, individuals in daily life must negotiate the constant churn of unanticipated consequences, changed circumstances, and shifting social and physical contexts. This daily work of sense making often requires an adjustment, revision, or even transformation of received interpretive tools before new challenges can be recognized and addressed. The sustained inquiry that transforms uncertainty into manageable order cultivates a common human capacity for intelligent judgment that requires, in order to be fully realized, the give-and-take of free and open social discussion, debate, and deliberation.

Dewey despaired that the American public had lost its ability to participate meaningfully in democratic politics; and he attributed this loss primarily to the modern technologies of communication and circulation that undermined local affiliation and the daily exchanges of face-to-face community. Although increased mobility and mass media supported the dissemination of ideas and information across a dispersed population, it transformed the public into a passive receptacle of already formed ideas and opinions. Nonetheless, Dewey maintained that "democracy is belief in the ability of human experience to generate the aims and methods by which further experience will grow in ordered richness" (Dewey [1939] 1993, 244); Dewey's vision of democratic participation required that individuals actively take part in making sense of their experience. This, in turn, required a collaborative sense making possible only through the give and take of face-to-face dialogue directed toward understanding "things as they are" and how they might be reconfigured. In their calls for the process being as important a monument as the outcome, the civic activists in New York echoed Dewey's conviction that "democracy is the faith that the process of experience is more important than any special result attained, so

that special results achieved are of ultimate value only as they are used to enrich and order the ongoing process" ([1939] 1993, 244). The question relevant to this volume, of course, is whether and how new interactive technologies might facilitate this process where the technologies of mass communication had failed.

Project Ecologies and Digital Ecologies
In examining nonbureaucratic forms, one of the key insights of the sociology of collaborative production is that the actual unit of organization is frequently less a formal organization than a project. Although producers are employed *by organizations*, they work increasingly *in projects*. Across a wide range of industries—film, construction, new media, automobiles, aeronautics, architecture, publishing, biotechnology, and many others—specialists from diverse fields (many of whom had not worked together before and, not uncommonly, who are employed by different organizations) collaborate in a project of limited duration (Grabher 2002a, 2002b; Sydow, Lindkwvist, and DeFillippi 2005).

The rebuilding of Lower Manhattan is such a construction project, not only because the sixteen acres of Ground Zero has literally been a site of recovery, then cleanup, and now construction, but also because the social construction of the rebuilding process has been a vast project similar, though not in scale, to project organization in the economy. The Lower Manhattan project is of limited duration involving many specializations and nonspecializations. Or, perhaps more accurately, we should think of a *project ecology*, involving hundreds, perhaps thousands, of smaller projects. With the exception of several dozens of government employees, almost no one is involved in these projects on a full-time basis. Citizens, professionals, and nonprofessionals assemble temporarily, sometimes forming named groupings (e.g., civic associations that spring up, lasting weeks, months, or less frequently years). But many of these microprojects could be a single meeting.

Although, as we will see, some of these assemblies can involve thousands of participants, the typical citizen assembly is not some grand popular parliament. Most are modest—the residents, employers, and workers of a mixed residential-commercial block in Chinatown, for example, or a team of citizen-architects, hastily assembled over a weekend like a pickup softball game. Many assemblies are face-to-face; some are almost exclusively online. Our research indicates, however, that many public assemblies involve a mix of physical and virtual forms. From a face-to-face meeting, announced by photocopied posters affixed to the bulletin boards of local schools, groceries, and beauty shops, someone produces minutes that are

disseminated by e-mail and posted on a website linked to other websites. Assemblies are recombinant technologies of masking tape and digital servers. Accordingly, in place of studying new digital technologies per se, or engaging in yet another comparison of online and offline forms,[2] like the concept of project ecologies, we attend to *digital ecologies*.

Socio-Technologies of Assembly
In place of "the public," we think about public spaces of collective sense making. Public space is not a sphere, and it is not homogeneous. But this is not simply because some have more resources or more room. Public space is not a flat land on which the unequal territories of already known interests or constituencies are already drawn. Instead, it is a heterogeneous space, populated by very different kinds of actors who come into being and through their interactions create the many dimensions of the space itself (Mische and White 1998).

   Therefore, in place of "the public," we think about variation in the forms of pubic assembly. Emphatically, however, assemblies are not populated simply by persons. Borrowing from Dewey directly and indirectly through his influence on science and technology studies, we develop a notion of publics as distinctive combinations of social networks, protocols, and technologies (Dewey [1927] 1991; Latour and Weibel 2005). There is no public, no public assembly, without protocols and technologies—even if these are as simple as chairs around a table and everyday conventions of conversational turn taking. Other assemblies are more complex. The key technologies of a public hearing, for example, are a microphone and a stopwatch, with protocols designating who among the socially constructed agents can speak (e.g., can a recognized speaker address the assembly as a "representative" or only as an individual citizen?) and for how long (e.g., "We are adopting a strict three-minute rule"), as well as rules about who cannot speak (e.g., the authorities present at the dais are authorized only to listen and must refrain from interjecting or responding).

   Attention to variation in the socio-technologies of assembly bears directly on our conception of sense making as socially distributed search. For many, the statement that "cognition is socially distributed" would likely be interpreted as referring to a process whereby cognition is distributed across a network of persons. These commonsense assumptions are reinforced by the strong tendency of sociological network analysts to focus almost exclusively on ties among people. But recent scholarship on distributed cognition (e.g., Hutchins 1995) suggests that we need to bring

not only people but also cultural and material artifacts into our network analysis. Doing so expands and enriches our conception of "the social." Cognition is socially distributed across persons and tools.[3] As Roy Pea (1993) writes in a study of distributed intelligence in the field of education (drawing on Vygotsky, on Simon, and especially on Gibson's [1979] notion of "affordances"): [M]ind rarely works alone. The intelligence revealed through these practices are distributed—across minds, persons, and the symbolic and physical environments, both natural and artificial" (47). To study collective sense making in the case of issues of public concern, we must be attentive to the instrumentation and infrastructure of deliberation. Different arrangements will provide different affordances—with differing opportunities and constraints. Socio-technologies of assembly are not simply settings, they are setups.

Assemblies will differ in the affordances they offer for different kinds of discursive practices.[4] Much of the literature on the public sphere has focused on a specific type of discourse—deliberation—to the expense of neglecting forms of participation that do not share its premises of rational and contained talk.[5] In an insightful essay, Sanders (1997) argues for other modes of giving input that do not have the exclusionary biases of deliberation: "[F]or example 'testimony'...might be a model that allows for the expression of different perspectives rather than seeking what's common. The contrast between the pursuit of commonality, and the simpler aim to include and represent a fuller range of critical voices, is at the core of the difference between deliberation and testimony (371).

In the following sections, we point to several socio-technologies of assembly in the Lower Manhattan project. As moments of collaborative inquiry, we start with "sensing" (e.g., gathering, collecting, sampling), turn to "sense making" (articulating, contrasting, discussing, re-cognizing), and conclude with "demonstrating" (showing, confronting, constituting).

Sensing

On the morning of September 11, 2001, Astronaut Frank Culbertson and his two Russian colleagues in the International Space Station had just completed their physical exams when they learned of the attack on the World Trade Center. As Culbertson (2001) wrote in a letter transmitted electronically later that day:

I glanced at the World Map on the computer to see where over the world we were and noticed that we were coming southeast out of Canada and would be passing over New England in a few minutes. I zipped around the station until I found a window that would give

me a view of NYC and grabbed the nearest camera. It happened to be a video camera...The smoke seemed to have an odd bloom to it at the base of the column that was streaming south of the city. After reading one of the news articles we just received, I believe we were looking at NY around the time of, or shortly after, the collapse of the second tower.

Culbertson's video images of the plume of smoke streaming from the collapsed towers were later followed by photographs from IKONOS, the first high-resolution Earth-imaging commercial satellite, as well as infrared images from the European Space Agency's low-flying SPOT satellite and NASA's Terra satellite.[6] Anyone in the world with an Internet connection could use these satellite prostheses to ''see'' the Ground Zero site from hundreds of miles in space. Cameras for government or corporate surveillance thus helped create a kind of reverse panopticon: in place of Bentham's architectural Panopticon where all prisoners were under surveillance from a central tower (Foucault 1979), in the WTC case all eyes were trained on the ruins of two central towers. The destruction of the commonplace had created a common ground (figure 7.1).

Civil engineer Guy Nordenson was much closer to the WTC than were the Space Station astronauts. His office is on Broadway only a block away from the site. From his home on that day, he began calling colleagues: engineers, emergency response specialists, and others in the earthquake engineering community. Aware that the city's emergency response headquarters had been destroyed with the WTC7 tower, Nordenson and his colleagues spontaneously began to assess the extent of damage to buildings in Lower Manhattan. To do so, they mobilized volunteer engineers through the Structural Engineers Association of New York (SEAoNY), and they started with resources close at hand. Earlier in the year, for a study for the Federal Emergency Management Agency (FEMA) to model the effects a medium-sized earthquake might have on Manhattan, Nordenson's team had created a database that described the structure of every building in Manhattan. With that database in hand, the SEAoNY volunteers carried out a series of physical and virtual inspections using Global Positioning System (GPS) technology, laser technology (known as LIDAR) with the capability of penetrating through the smoke to produce accurate elevation data, and thermal imagery for mapping hot spots in the rubble. Geographical Information Systems (GIS) provided the tools for integrating, analyzing, and displaying these spatial data. Within days, rather than weeks or months, they produced detailed mappings of the varying degrees of damage to buildings in Lower Manhattan.

In order to make sense of the disaster and begin the process of sense making about rebuilding (Beunza and Stark 2005), New Yorkers needed sensors. Without

Figure 7.1
Common ground.

waiting for centralized guidance, various specialists made their sensing tools available for public perception. As we saw, the first reconnaissance missions focused on the urgent tasks of determining the scope and boundaries of destruction. But almost immediately, reconnaissance also became a process of rediscovering the site. If the aerial photographs and thermal imaging provided a mediated access making visible the invisible, many people surged to the site to see for themselves. Despite the worldwide downturn in tourism after September 11, visitors started coming to New York in record numbers. Ironically, within months after its opening, the viewing platform designed by four prominent New York architects attracted more out-of-town visitors than the 1.8 million visitors that the WTC formerly drew to its observation deck each year (Lisle 2004).

To help them see, our Columbia University colleague, artist/architect Laura Kurgan, created a map, "Around Ground Zero: A map for walking in Lower Manhattan after September 11." Kurgan and her students watched visitors (even native

New Yorkers) wandering lost around the site, asking policemen where they were allowed to walk, or crowding around small xeroxed copies of FEMA maps posted for construction workers. They concluded that conventional street maps were of no help in providing orientation in the chaotic setting. Researched and produced by volunteers, Kurgan's map provided information about accessible streets and views, off-bound zones, suggested walking paths, memorial sites, and an inventory of damaged buildings. Writing for New York New Visions, a civic association of architects and planners formed after 9/11, whose Temporary Memorial Committee sponsored the map, Kurgan (2002) noted:

The map serves at once as a practical guide to the site and as a memorial document. Its aim is to help people make sense of what they are seeing, or, if that is asking too much, at least to measure their disorientation in the face of the unimaginable. The site around what was the World Trade Center is manifestly disorienting, for obvious reasons, and it should be in a sense, but the map addresses the unnecessary disorientation and allows visitors to take stock of what has happened.[7]

Inspired by artists who had produced a map of war-torn Sarajevo in 1996, the 18-by-24-inch foldable map was updated three times, first in December 2001, and more than 100,000 copies were distributed by volunteers at the site. As part of a pro bono project, New York new media firm Razorfish launched an interactive website version of the map. With Flash technology, a visitor can use a mouse to "roll over" areas of the map allowing multiple visual and political layers of the site to be exposed and entered.

Satellite photographs, Nordenson's GIS mappings, and Kurgan's interactive tour are all ways of seeing. New technologies thus facilitated a collective sensing. While lawyers argued about the conflicting property rights of the complex ownership and leaseholding structure of the site, New Yorkers engaged in a search for the properties of the site. In this exploration, they made collective discoveries about the characteristics, the features, the demography, the history, and the future possibilities of Lower Manhattan. Among these many reconnaissance missions, we highlight the following:

· With detailed drawings in the *New York Times* digital version, reconnaissance looked below to see that beneath the broken streets were miles of telephone cable, water mains, sewer pipes, subway tracks, and electrical lines.

· Looking up, various groups posted information about environmental pollutants in the air over New York. With data and interpretations independent of the Environmental Protection Agency (EPA), this reconnaissance essentially allowed New Yorkers to monitor the official monitors.[8]

· Looking over the site, a group of volunteer architects designed a viewing platform from which visitors could view the site. This physical platform was followed by virtual viewing platforms—webcams positioned atop buildings adjacent to the WTC recovery and reconstruction site.

· Looking in, the Sonic Memorial Project website posted aural recordings of sounds from the World Trade Center.[9] Academic research posted on an "After September 11th" site by the Social Science Research Council looked behind the façade of the WTC, showing that it had been a virtual portal linking global trade in intangible derivatives and warning of the new problems of a financial district in an era when proximity is a function of bandwidth.[10]

· Looking back, historians rediscovered an archeological record of the electronics merchants displaced by the WTC and before that a long-ago Arab market. In virtual exhibits organized by the New York Historical Society and the Skyscraper Museum, New Yorkers learned of the role of the Rockefeller family, of Robert Moses, and of backroom deals in the story of the planning, design, and construction of the world's tallest buildings for which it was often difficult to find nonsubsidized, nongovernmental agency tenants (Sorkin and Zukin 2002).

· With maps on the websites of Rebuild Downtown Our Town (r.dot), a newly formed civic association, reconnaissance (figure 7.2) looked out to display the employment catchment basin that brought workers from New Jersey, Long Island, and Connecticut, illustrating the complexities of the Lower Manhattan transportation hub and showing the possibilities of restoring the former street grid that had been in place prior to the WTC's construction in 1970.[11]

· Looking across the political landscape, public radio station WNYC posted an interactive map of the power structure of the political field. Scrolling over the map, the user could identify network ties of director interlocks and other political alliances among key decision makers in the rebuilding process.[12]

Public debate about projects such as that in Lower Manhattan are replete with discussions about "transparency." Typically, these refer to a desire that important decisions be made with full publicity, open to public view. In these and other reconnaissance missions, we see that transparency can have another moment. The study of science and technology frequently refers to processes by which the socially constructed character of a given artifact or technology has receded out of view, it becomes "black boxed" (Latour 1987). In "opening the black box," we become aware of possibilities that were incipient but not developed. Crisis can create open-

Figure 7.2
Reconnaissance.

ings of the black box. Cold and sleek on the skyline, whether we warmed to the twin towers or resisted their long shadows, they were part of the taken for granted. Tragically, in ruins, they, their histories, and the histories and social dynamics of Lower Manhattan became more transparent. In rediscovering the site, in re-knowing, indeed, re-cognizing the site, reconnaissance missions increasingly opened possibilities about what it might become.

Sense Making

Assemblies of Imagination

Even while fires still smoldered in the WTC ruins, citizens joined together to begin the process of memorializing and rebuilding in Lower Manhattan. Within weeks, literally dozens of civic associations were formed. If you were an architect or an urban planner, it would be no exaggeration to say that you could attend a meeting every

Figure 7.3a,b
Imagine New York.

evening at some venue or another. In place of coordinating the energies of specialists, several newly formed civic organizations saw their mission as soliciting views from the general citizenry. One of these, Imagine New York (figure 7.3), convened more than 230 "imagine workshops" across the city. Meeting in schools, places of worship, community centers, firehouses, and living rooms, they invited the public's ideas and visions. These face-to-face meetings were augmented by an online submission form that made it easy to contribute an idea and/or image. Posters and electronic announcements for the meetings emphasized the following: "Anyone— regardless of artistic ability or any sort of training—can participate in a workshop." The meetings and website collected people's ideas by addressing three questions: "What have we lost? How have we changed? What should be done on the World Trade Center site, in your community, and in the tri-state region to move forward from September 11?"

Trained Imagine New York–facilitators wrote down citizens' ideas on large sheets of butcher block paper. These ideas were captured on digital cameras. Altogether some 19,000 statements were solicited from over 3,000 meeting participants and 850 online submissions.[13] Imagine New York then aggregated these 19,000 ideas into 49 "vision statements," which they distributed to the press, presented to official agencies and other civic groups, and re-presented to the community participants on the website. As a means of demonstrating that "we will make sure that your voice is heard" Imagine New York (n.d.) informed contributors that its "online Idea Gallery contains all of the ideas generated in workshops, submitted online, in the mail, and created on murals. We thank you for your lending the project your thoughts."

Searchable by keyword, theme, or workshop location, as the Idea Gallery emphasized, "You can locate your idea." Digitalization, therefore, not only facilitated collection and distribution of the citizens' "visions" but also supported a simple accountability: a given participant could see that her idea had been posted. And while doing so, she could see the similar and differing ideas of others. As figure 7.4 suggests, these ideas were thoughtful, playful, and extraordinarily heterogeneous. Onto the WTC ruins, citizens projected their images of the good city.

Assemblies of Deliberation
Whereas *Imagine New York* deployed protocols and technologies not for deliberative purposes but for expressive practices, Listening to the City (figure 7.5), an "electronic town meeting," used a different set of protocols and technologies to assemble an explicitly deliberative forum. Sponsored by the Civic Alliance in conjunction with

Rebuild taller and more magnificent than before as a symbol of resilience.

From now on we should listen to other countries problems and try to help so that they don't feel that America is a rich giant.

More kids on more swings.

It should be a place that everyone can go to.

Life without trucks, barricades—restore beauty and businesses.

I want the WTC to look big but not be so big, baby blue with yellow sprinkles.

Try to maintain the sense of community that has flowered in the aftermath of 9/11.

A neutral zone: no IDs, no paperwork.

Use the money to create community centers so the kids can stay out of trouble.

A universal United Nations community for people to sit, talk, and have coffee.

Let go, but not forget. No made-for-TV movies, etc., about 9/11.

We must find a way to celebrate what we've learned about each other and the city.

In the museum, what makes war, and how everyone thinks that they're right.

Global village—the UN for people, not diplomats.

DO SOMETHING RADICAL so people come from all over to see the beautiful structure.

I'd like to see affordable housing included.

Think 'public good' rather than 'private greed.'

Reconnect WTC site to the world by tying it to the river, harbor, and ocean.

A beautiful park is possible, with trees representing each country from which people came who lost their lives on 9/11 and open spaces filled with native greenery—a tribute to all life. We need to be part of nature and of the city at once. We need to see the sun and the sky.

Opportunity to develop new models for nontoxic; sustainable architecture; and redevelop not just finance and biotech; but incorporate industries for language and cultural learning and effective treatment of trauma at WTC site.

Figure 7.4
Examples of some of the 19,000 statements gathered by Imagine New York.

Figure 7.5a,b
Listening to the City.

the Lower Manhattan Development Corporation (LMDC) and the Port Authority, Listening to the City brought 4,500 people to the Javits Center for an all-day meeting on July 20, 2002, to review proposed plans for the WTC site and to deliberate more broadly on the redevelopment of the area. The Civic Alliance had canvassed widely before the meeting, and subsequent analysis indicates that the participants were largely representative of the major demographic contours of the city.

After arriving at the cavernous convention center, participants were dispersed, ten each to hundreds of round tables. At these tables they introduced themselves, and facilitators guided discussion. Participants at Listening to the City thus began by listening to each other. With keyboards hooked to a wireless local area network, each table entered opinions, goals, and means. A central clearinghouse synthesized themes that were projected onto giant screens. Using personal computerized keypads, participants were then asked to indicate their priorities among these themes with polling results displayed on the large screens in an iterative process. In a similar manner, participants also rated six proposals for redeveloping the WTC site. In overwhelming numbers, they rejected each of the proposals. At the end of the day, each participant was given a printout including graphs of the demographics of the attendees and the polling outcomes. Shortly after the July 20 event, 800 people began two weeks of online discussion in a second phase of Listening to the City organized around similar themes (Polletta and Wood 2005).

Widely publicized, the electronic town hall was decisive in discrediting the uninspiring plans sponsored by the Port Authority. In its wake, the LMDC seized the planning initiative. Promising that it would be more responsive than the bureaucrats at the Port Authority, the LMDC invited a set of international star architects to submit proposals to its Innovative Design competition and sponsored a series of offline and online forums, viewings, and hearings through which it solicited public feedback.

Demonstrating

Although relatively few street rallies and other contentious events occurred, the debate over the future of Lower Manhattan was not lacking in demonstrations. Like many of the important issues of our day, the political and the technical were intertwined in the matters of concern in the New York case. Accordingly, the relevant *demonstrations* involved charts, graphs, and visualizations—indeed, a wide panoply

of materials in which participants attempted to offer proof of the validity of their claims. As our research proceeded, we realized that it was pointless to identify some demonstrations as "political" and others as "technical," so entwined were the two in almost every instance.[14]

Exemplary in this respect were the demonstrations of the architects. The signature architects who participated in the Innovative Design competition did not, of course, take to the streets. But, in their own way, each was a kind of social movement attempting to mobilize popular opinion. Starting with their PowerPoint presentations at the Winter Garden where they unveiled their plans in December 2002, the architects demonstrated. Each demonstrated that his project was inspired. See, for example, Daniel Libeskind's energetic sketches or the shadow cast by Peter Eisenman's crisscrossed hands as attempts to capture the unique moment of inspiration. Using technical drawings and digital animations, they demonstrated that their buildings could be safely evacuated. With digital renderings of their models placed on the Manhattan skyline or at a city streetscape, they demonstrated that their project would exist on both a monumental and a human scale (all but one architect showed his building with a child in the image) and that it could be projected far into a future from which New Yorkers would look back with nostalgia. What better evidence that a building could exist than that it already did exist—as a postcard purchased by a tourist. And so each PowerPoint presentation concluded with postcard images—"shot" from helicopters or from a ferry on a calm evening with the Statue of Liberty, the Brooklyn Bridge, or the moon nestled in front, nearby, or hovering over the virtual buildings.[15]

On October 12, 2001, just a month after the WTC attack, people who lived and worked in Lower Manhattan engaged in a demonstration (figures 7.6 and 7.7) more typical of our conventional ideas of a social movement. Hundreds of people, many wearing surgical masks, assembled not far from Ground Zero at Pace University to demand specific details about the types and levels of toxins in the air and in their residences and workplaces. In press releases during that first month, Christine Whitman, administrator of the federal EPA, had reassured the public that there was no cause for health concerns. Early statements referred to air quality:

EPA is greatly relieved to have learned that there appears to be no significant levels of asbestos dust in the air in New York City." (Governor Whitman, EPA Press Release, 9/13/01)

I am glad to reassure the people of New York and Washington, DC that their air is safe to breathe and their water safe to drink. (Whitman, 9/18/01)

Figure 7.6
Demonstration.

Subsequent statements referred specifically to homes and workplaces:

New Yorkers and New Jerseyans need not be concerned about environmental issues as they return to their homes and workplaces. (Whitman, 9/21/01)

[There is] no evidence of any significant public health hazard to residents, visitors or workers beyond the immediate World Trade Center area. (Whitman, 10/3/01; all quotations available at www.epa.gov/epahome/newsroom.htm)

But the demonstrators at the October 3 meeting told of their children coughing and wheezing and of other symptoms: "'All I know right now is that there are irritants. What are these things?' said one resident. 'For some people, that meeting might have been soothing, but I'm still thirsting for more information'" (Ramirez, 2001).

Sadly, good information was not forthcoming from the EPA. In fact, the early official statements that conditions were safe put the residents and office workers of Lower Manhattan in a terrible double bind. Because the federal agency had declared that there was no health hazard, other agencies used these rulings as justifications for not making rigorous inspections inside homes and workplaces. Yet it was precisely in these interiors that levels of contamination would be most dangerous
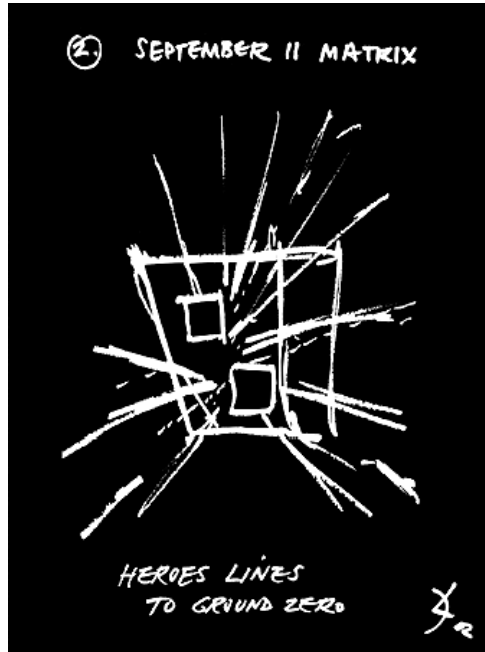
Figure 7.7a,b
Demonstrations.

Figure 7.7c
(continued)

when pulverized debris and toxic fibers were stirred up during cleanup (Carpenter et al. 2005).

Over the course of the fall of 2001 and spring of 2002, numerous civic organizations mobilized to pressure government agencies to provide information on health conditions. These included 911 Environmental Action, AsthmaMoms, the WTC Community/Labor Coalition, the Lower East Side-Chinatown Consortium, and the Lower Manhattan Tenants Coalition. Initial efforts were directed at demonstrating that the relevant agencies were engaged in a kind of jurisdictional nonaccountability, each agency claiming that some other was responsible.[16] As they strove to force accountability, residents and workers came to learn that they would have to acquire technical knowledge—for example, about the difference between long and short asbestos fibers, about the toxicity of dioxin, lead, arsenic, mercury, and other contaminants, and about established standards for schools and workplaces. At the meetings of local community groups, we heard discussions that were not only about how to prod elected officials but how to comprehend measurements at the micron level.[17]

Some groups focused on the unique conditions in which the towers had collapsed vertically on themselves. That tremendous force produced new forms of ultrafine particle contaminants—for example, cement dust pulverized to microscopic size or inordinate ratios of small to long asbestos fibers—in structures and at levels that had not been observed before (Chatfield and Kominsky 2001). In their demonstrations, the community groups provoked members of the "technical community" to acknowledge that on some matters there were no agreed-upon standards because the types, levels, and combinations of contaminants were so unprecedented in the Lower Manhattan case.

At the end of 2001, new and disturbing information became available to citizen groups. In their initial efforts to learn how to read and interpret technical reports, the local community had been assisted by experts at nongovernmental organizations such as the New York Committee on Occupational Safety and Health (NYCOSH) and the New York Environmental Law and Justice Project. Now they found allies inside the government agencies. For example, in a memorandum of December 3, 2001, Cate Jenkins, an environmental scientist in the Office of Solid Waste and Emergency Response of the EPA, systematically documented discrepancies between official press releases and internal information obtained by the EPA. For instance, while Governor Whitman was reassuring the public based on outdoor air samples, scientists at the EPA were looking at reports of elevated levels of indoor contamination that greatly exceeded the agency's own standards; similarly, the agency was recommending cleanup procedures that directly violated its own safety guidelines. Later the Office of the Inspector General of the EPA issued a finding that the EPA's blanket statements about air safety had not been based on sufficient data and analyses (EPA Office of the Inspector General 2003). Meanwhile, hearings conducted by the EPA's ombudsman concluded that the agency had abdicated its responsibility for monitoring indoor cleanup.[18] Finally, the Sierra Club issued a major study that systematically documented instances where government agencies, including the EPA, had misled the public (Mattei 2003). Agencies responsible for public safety had not simply given poor information but had knowingly given the public deliberately misleading information.

With these technical findings, the various civic organizations sought to demonstrate that the EPA was engaging in a cover-up. Because the dominant print media fell in line with the EPA story (the *New York Times*, e.g., ran no fewer than thirteen stories between September 12 and February 24, 2002, emphasizing the safety of the site) (Katz 2002), these demonstrations were made online. Civic websites directed

What Was Known, What Was Said

A comparison of known information on World Trade Center pollution and health effects
with statements made or actions taken by federal administration

Date	Information on Pollution/Health Effects Available	Statements Made/Actions Taken by Federal Administration
August 1, 1994	EPA advises schools not to use polarized light microscopy (PLM) analysis for asbestos testing, urging them to use the "improved" transmission electron microscopy (TEM). EPA explains that the new method identifies "thin asbestos fibers below the limits of resolution of the polarized light microscope."	In September 2001, the EPA uses the old PLM method to test for asbestos in the dust generated by the WTC disaster.
September 12, 2001	Regarding a White House request to produce fact sheets re asbestos, Dr. Ed Kilbourne tells the CDC, "We are concerned about even being asked to write a document for the public about reentry at this point," and warns, "We are aware of other potential toxic hazards in the WTC area about which you haven't asked." (Federal experts know the typical products of building demolition and burning of mixed materials.)	EPA's September 13, 2001, press release states that pollution tests "have been very reassuring about potential exposure of rescue crews and the public to environmental contaminants... the general public should be very reassured by initial sampling."
September 14, 2001	On September 13, 2001, Drs. Philip Landrigan and Stephen Levin of Mount Sinai warn that Ground Zero workers need training and "protective equipment." Dr. Levin warns that surgical masks do not protect against asbestos and urges use of a mask with a special filter. EPA data shows asbestos in dust ranging from 2.1 percent to 3.3 percent—above the 1 percent level at which material must be managed under asbestos standards. A Federal test of EPA's Region 2 office building lobby at 290 Broadway using the more sensitive TEM method finds asbestos. EPA does not even wait for these results; it conducts an environmental clean-up of its lobby based only on the presence of visible dust.	The White House Council on Environmental Quality changes EPA staff's September 14 draft release, which had stated, "The concern raised by these samples would be for the workers at the cleanup site and for those workers who might be returning to their offices on or near Water Street on Monday, September 17, 2001." This sentence is deleted. Instead, the September 16 release quotes OSHA saying, "Our tests show that it is safe for New Yorkers to go back to work in New York's financial district." The EPA office building testing and clean-up information is not made public at the time.
September 16, 2001	The EPA tells *New York Newsday* that its highest recorded asbestos reading for dust contamination was 4.5 percent.	*New York Newsday* quotes the EPA administrator as saying that "there is no reason for concern," based on airborne asbestos tests in the financial district. The stock market reopens on September 17; tens of thousands of workers return to work in the Ground Zero area.

Figure 7.8
What was known, what was said.

citizens' attention to reports that showed inconsistencies and falsehoods.[19] Typical of these demonstrations were timelines or tables that juxtaposed what was known and what was said by federal administrators (figure 7.8).

With these demonstrations, civic organizations were able to fix the attention of elected officials to their grievances. In the spring of 2003, Senator Hillary Clinton threatened to block the nomination of Governor Whitman's successor at the EPA. In exchange for her vote, she secured public hearings by an expert panel to review the agency's work and make recommendations for corrective action. With the establishment of this panel, citizen groups were eligible for public funds to hire independent experts to monitor the monitors. With vastly superior resources, the EPA

launched a counterdemonstration on its own website in a public relations campaign designed to convey that it was, after all, a caring public agency (figure 7.9).

Conclusion

Our overview of the deliberations and demonstrations in rebuilding Lower Manhattan is doubly inconclusive. First, this chapter outlines an analytic strategy and is too brief to examine the topic in depth. Second, the rebuilding of Lower Manhattan is still very much a work in progress (Sagalyn 2005). Although architects have been chosen for the WTC site, the memorial, and the transit hub, there is much dispute about the overall design. Moreover, as we saw, the public's involvement has been less about this or that architectural design than over the use of the site and its relationship to neighboring districts and the city as a whole. Many, indeed most, of these issues remain unsettled.[20]

What has been learned? New Yorkers demonstrated that civic participation can be revitalized and that new technologies can be an important resource in organizing that participation. New civic associations were mobilized, and existing ones were repurposed. The Municipal Art Society spun off Imagine New York, the American Institute of Architects sponsored New York New Visions, the Regional Planning Association provided leadership in forming the Civic Alliance, and professional networks coalesced into more formalized, albeit temporary, organizations. In these and other assemblies, tens of thousands of lay citizens actively participated in the extended processes of collective sense making. In nearly every case, websites, listservs, and other digital technologies were critical in mobilizing energies, providing information, and supporting collaborative, interpretive work. Aware that the interest of lay citizens and engaged professionals might wane as the sense of immediacy diminishes, dozens of civic organizations formed a new umbrella, New York 2050, to debate the city's future as a lasting legacy to the democratic momentum forged after 9/11. Thus, the most important consequences might lie in yet another stage of sense making when citizens reflect on the process and draw conclusions about the limitations of their own experiments.

The information government paradigm, as applied to the case of post-9/11 New York, highlights how new technologies were less important in facilitating intragovernmental coordination than in fostering the generation of information at a vast number of sites and the circulation of this information among citizens themselves

Figure 7.9
EPA advertisement.

(Johnson and Bimber 2004). However, we contend that of even greater significance was the interpretative dimension of information government. In our era, information abounds. Faced with a deluge of information, a multiplicity of evaluative principles, and myriad features that could be potentially salient, what is taken into account? What counts? To that challenge, New Yorkers deployed new technologies not only to increase the flow of *information* among a greater number of nodes but to build communities of *interpretation*.

As a large and amorphous project ecology, civic engagement in the New York case shares an important challenge with other "project" forms: given that projects are by definition temporary, how is the knowledge that is gained from one project made available to future projects? This problem is especially acute in the digital era. As our own research indicates, many of the websites and other digital formats from which we collected data are no longer in operation and, therefore, that particular knowledge base is no longer accessible to citizens. If public officials are to be held accountable, the public needs access to records of its own accountings. How will libraries, museums, and universities respond to this challenge?

Notes

1. For useful introductions to these ideas, see the essays "The Pattern of Inquiry," "Analysis of Reflective Thinking," and "The Place of Judgment in Reflective Activity" collected in Dewey 1998.

2. In place of the debate about online versus offline forms, our observations in New York lead us to think about actual organizational forms that recombine virtual and conventional modalities (see Barney 2004; Woolgar 2002).

3. In a study of an abitrage trading room, Beunza and Stark (2004), for example, show how calculation is not a function of the solitary trader but socially distributed across persons, desks, mathmetical models, visualization techniques, automated algorithms, and other instrumentation. See Callon and Muniesa 2005 for a more general discussion of calculation.

4. Our emphasis here on the the networks, protocols, and technologies should not imply that participation happens just by assemblying people in a forum. As Agre (2004) argues, performance requires a set of skills—making associations, building issues, and forging alliances, for example.

5. Burkhalter, Gastil, and Kelshaw (2002) offers an instructive summary: "In sum, deliberative groups build a strong information base, consider a range of solutions, establish representative evaluative criteria, and apply those criteria equally to all solutions" (405). Sanders

(1997) argues against deliberation as necessarily exemplary: "Deliberation is a request for a certain kind of talk: rational, contained, and oriented to a shared problem. Where anti-democrats have used the standards of expertise, moderation, and communal orientation as a way to exclude average citizens from political decision-making, modern democrats seem to adopt these standards as guides for what democratic politics should be like. And the exclusionary connotations of these standards persist" (370).

6. Examples of these images are available at http://www.globalsecurity.org/eye/wtc-imagery .htm.

7. http://www.bu.edu/prc/6months/aroundgroundzero.htm.

8. 911 Environmental Action (www.911ea.org); New York Environmental Law and Justice Project (www.nyenvirolaw.org); Asthma Moms (www.asthmamoms.com).

9. www.sonicmemorial.org/.

10. www.ssrc.org/sept11/essays/.

11. www.rebuilddowntownourtown.org.

12. http://www.wnyc.org/sixmonths/.

13. See Kutz et al. (2005) for a preliminary analysis of these statements using computer-assisted interpretation algorithms.

14. Science and technology studies have been fascinated by the similarities between the repertoires of science and politics (Latour 1987). Most recently, Barry (2001) has shifted attention from processes of representation to practices of demonstration, highlighting the entanglement of the political and the technical. For a concise but extraordinarily rich discussion of these issues, see Callon's (2004) review essay.

15. Unlike physical models, the digital renderings by the architects in the Innovative Design competition were available to the public at any time on dozens of websites.

16. See "EPA National Ombudsman First and Second Investigative Hearings on World Trade Center Hazardous Waste Contamination." Convened by Jerrold Nadler, Congressman; Robert Martin, EPA Ombudsman; Hugh Kaufman, EPA Ombudsman Chief Investigator in New York City, 2002. Available at www.nyenvirolaw.org/PDF/ Transcript-EPA-OmbudsmanHearing-2-23-2002.pdf and www.nyenvirolaw.org/PDF/ Transcript-EPA-OmbudsmanHearing-3-11-2002.pdf.

17. Technical materials posted on community organization websites were often more informative than those of official agencies. See, for example, the "Question & Answer for NYC Residents Specific Safety Precautions" section of ImmuneWeb 911 launched within weeks after 9/11, http://www.immuneweb.org/911/.

18. "EPA has not fully discharged its duties under PDD (Presidential Directive) 62, the National Contingency Plan (NCP) and the 2001 OMB Annual Report to Congress on Combating Terrorism. EPA has abandoned its responsibilities for cleaning up buildings (both inside and out) that are contaminated, or that are being recontaminated, as a result of the uncontrolled chemical releases from the WTC terrorist attack" (Martin 2002). Available at http:// www.nycosh.org/environment_wtc/Ombudsman_Findings_WTC.pdf. After issuing his report, National Ombudsman Robert Martin was fired by the EPA.

19. www.911ea.org/.

20. Nonetheless, the collaborative sense making that we described did have consequences in its establishment of success criteria: an outcome can be judged to fail if it does not harmonize commercialization, memorialization, cultural institutions, and new residential development.

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