

Seeing Differently: Enticing Reflexivity through Mediated Participation in Place in the Futurescape City Tours

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I. Introduction

Technological systems, artifacts and tangled skeins of social relationships are especially congealed and empowered in the city as place. Technology underpins the urban experience in both visual and sub-visual ways, coloring collective experience and contorting societal values in delicate and not so delicate ways. As Science and Technology Studies (STS) scholars, we are sensitized to the ways in which science and technology relate to social and political choices. Authors here have been involved in projects with long-term goals to involve the public more directly in science and technology policy discourse. We have become convinced that to produce scientific and technical innovation in the service of citizens' needs, public vigilance-- as well as strategic regulation and policy regimes-- are needed. We also hold the conviction that these regimes are inextricably tied to space and place.

We come to this view because we observe that citizens severely lack the access to spaces and information necessary to find contestable moments in the otherwise unseen scientific and technological processes that are obscured from public scrutiny or "black boxed" (Latour 1999). Our work to bring diverse groups together to debate S&T issues of public concern generates what Touraine and others have called a 'sociology of intervention' (Touraine 1983; Dubet and Wieviorka 1996). Therefore our efforts have been to design and conduct engagement experiences as participatory action research that cultivates reflexivity. Most recently, our work has involved engaging publics in examining how technological innovation just on the horizon may impact urban life in years to come.

Urban technologies can be mundane or substantially enchanted, yet in any case are knitted into urban experience in profound and quiet ways. Deeper than calling attention to the materiality of the world, we turn our gaze to the ways in which technologies structure nearly every aspect of contemporary experience and help formulate our sense of agency. Architectural and technology critic Lewis Mumford attests that we inescapably live in the era of the "megapolis": a new urban order that is the "relentless extension and aggrandizement of a highly centralized, super-organic system, that lacks autonomous component centers capable of exercising selection, exerting control,... and answering back" (Mumford 1961; 567). As few life choices and daily habits are not informed by the technologies that we have created, technologies around us spring from a powerful collective capacity to make new things that in turn capture and refocus our attention and energies. New styles of technology not only equal novel conveniences, features, and economic arrangements; these also prompt the evolution of new social forms and political arrangements.

Langdon Winner suggests that in order to live well in this technologically mediated "megapolis", it is crucial to trigger reflection on the subaltern desires and designs of our sociotechnical systems (Mumford 1970). This necessity to be reflective, to change our

routines, to enact an intervention rather than to merely observe the ebb and flow of daily life stems from his idea that technology is legislation that constitutes a world that either supports our physically and spiritual needs, or it instead structures our routines in ways that endanger our freedom and wellbeing (Winner 1986).

Combining our orientation as participant action researchers attentive to the development of so-called “sociotechnical” systems, we see the evolving city as a ripe site for interrogation and engaging the public in conversations about emerging social issues. It dawned on us that we needed new methods for connecting direct public experiences of the metropolis with public dialog about emerging technologies in the city. It is in this context that we have taken up and adapted digital and visual methods to support our aim to bring the residents of cities face to face with the technologies in their environments that shape the social and political conditions of urban life and to place these experience and insights at the center of our dialog processes, which we call here “participatory technology assessment,” or formal processes for consulting citizen about science and technology issues in decision settings. Digital and visual methods help us in this regard because they bring the technologies in a city into clear view and support a more reflexive approach to technology assessment in direct reference to lived experience.

II. STS, TA and PE: FCT as an alternative to BOGSAAT methods

New technologies embed themselves continually into the urban “megapolis.” One such technology that has emerged as the result of significant international research investments over the past two decades is nanotechnology: science and engineering across multiple sectors that bends a host of familiar materials to new uses by manipulating them at the scale of the impossibly small -- as small as one billionth of a meter. As such, nanotechnology is expected to be a persistent, pervasive and powerful force in reshaping the urban environment.

Nanotechnology is associated with innovations that will make our cities more sustainable. It is said to be making our cities “smart” by rejuvenating subterranean water, waste and energy infrastructures (Wiek, Foley, and Guston 2012). However, as technologies in the urban environment evolve, it is important to create democratic spaces for diverse publics to critically inquire into the benefits, risks, desirability and impacts of technologies (Barben et al. 2008; D. H. Guston and Sarewitz 2002). This impulse to democratize scientific and technological governance relates to decades of work in STS that takes public engagement as the crux of the “solution”. For STS scholars, authentic democratic control of technology involves engagement with a plethora of decisions ranging from which research gets funded to informed consumer choice whether in the grocery store or the doctor’s office. Yet it crucially involves moving beyond technological somnambulism pervading society, to build in support structures, throughout society, that empower, enable and build the capacity of citizens to become involved, on multiple scales, with the governance of innovation. Participatory technology assessment, a long standing approach in STS studies, can and should take a variety of forms, and must be enabled within a variety of institutional settings, to match the rich variety of actors and settings involved in technological development.

From a methodological perspective, engaging citizens has too often lapsed into the conventional ‘bunch of guys sitting around a table’ (BOGSAAT) model (David H. Guston 2014, 56). In this context of technology assessment, practices of public engagement seek to

draw in diverse viewpoints to investigate and reimagine different sociotechnical pathways, however, many modes of engaging experts, stakeholders and publics fail to rigorously capture alternative ways of knowing or account for spatially and temporally situated experiences of technological change. Most generally, one of the goals of the FCT is experiment with new digital and visual methods to enhance the quality and depth of the citizen engagement. Our higher order goal is to amplify citizens' skills to engage with complex technological subjects and to develop and articulate their own views on the desirability and implications of sustainability and nanotechnology. In this chapter, however, we'd like to hone in on a more elusive target that has informed our design: building reflexivity. By building reflexivity we gesture towards unhinging habitual ways of thinking, seeing differently and unearthing systems of thought and technologies. We specifically want to better understand in our case how the integration of visual and digital deliberative mechanisms mattered in this pursuit of reflexivity. How do the different settings and modes of communication enable or constrain collective, critical reflection? How did the mix of media mingle with the physical instantiation of a walking tour of a familiar city to foster iterative, and social, learning?

The methodological techniques we describe here were adopted by research leads at the Center for Nanotechnology in Society at Arizona State University (CNS-ASU) under the auspices of the Anticipation and Deliberation strand of the Center's work. With major partners at Georgia Tech and the University of Wisconsin-Madison, CNS-ASU is the largest Nanoscale Science and Engineering Center (NSEC) for the social study of emerging technologies in the world.¹ The center aims to develop tools and research for envisioning ways to anticipate the transforming power of emerging technologies and to govern them appropriately. Given center affiliate experience with public dialog formats both in theory and in practice, interest in experimentation with new formats for citizen dialog, or public engagements, is a central aim of the program.

At CNS, we experiment with ways to trigger reflexivity through practice-led research into public engagement. The Futurescape City Tours are a constellation of civic engagement activities composed of an urban walking tour, varied interactions between citizens, stakeholders and experts, and image-based deliberative sessions. In 2011, the center developed the concept of 'material deliberation' (Davies et al. 2012) and began experimenting with using walking tours and photography in public engagement (Davies et al. 2013). These experiments lead to a pilot of Futurescape City Tours conducted in Phoenix in the fall of 2012 and culminated in a coordinated national implementation of the FCT in 2013 in six North American cities. The Futurescape City Tours as a research project seeks to better understand the value of public engagement activities that integrate diverse stakeholders and publics, tend to the politics of place, rigorously trigger imagination, and creatively use multi-media tools.

This effort of public noticing involves seeing beyond the obvious and quotidian, tending to the temporally and spatially dislocated sociotechnical systems at play. Such civic reflexivity in practice requires carefully facilitating, training the gaze towards that which people normally have a hard time confronting. Whether this be more literal related to the actual dimensionality of nanotechnology that is sub-visual, or the hiddenness of the technical

¹ See ("The Center for Nanotechnology in Society at Arizona State University Overview" 2014)

architectures and infrastructures that undergird cities to bring light, water, and fuel, technological systems are truly invisible and require an intentional rendering. Thus, engagement exercises that seek to engage critically with sociotechnical systems are a project of making the “invisible visible”, which became a guiding trope for the Futurescape City Tours. The FCTs are then an intervention design to reveal technology in everyday life, ‘see’ systems, and make legible the city in such a way as to invite critical, and collective reflection and reimagining.

Yet to get at this extraordinary vantage point, common methods of public engagement fall short. In this piece, we delve more into some of these shortcomings, but for now, suffice to say that what is needed is a sort of epistemological pluralism (Miller et al. 2008) that honors multiple ways of knowing. Yet these ways of knowing go beyond the inclusion of different disciplinary perspectives, to include diverse modes of expression. That is, public engagement exercises often privilege a stale style of discourse that is decidedly rational and too hygienic, that for them is exclusionary. This fuller approach to the kinds of knowledges relevant in public participation has since been captured as material deliberation “...as a shorthand for processes of deliberation and citizen engagement which incorporate an awareness, openness or sensitivity to non-traditional modes of deliberative interaction, including, but not confined to, the sonorous (music, singing, laughter, noise), the discursive (gossip, storytelling, anecdote, polemic, drama), the material (objects, bodies, sites, places) and the affective (hate, love, fear, attachment, nostalgia, intuition, pleasure). Such engagements show a sensitivity to the situated nature of all encounters, deliberative or not, as embedded in particular spaces, material configurations, and temporalities” (Davies et al. 2012, 353). CNS-ASU researchers are thus investigating how to move “beyond discourse” within deliberation so as to incorporate the material, visual, and affective.

These are some of the theoretical and methodological intrigues lying in wait behind the Futurescape City Tours. In this chapter, we situate our work in STS, describe the methods of the FCT, and work to discern how the approach attempts to open up invisible (mental and physical) infrastructure, make transparent and open for inquiry our collective and assumed routines around our sociotechnical systems by drawing in diverse ways of knowing. As researchers and practitioners intimately involved in designing and implementing the FCTs since 2000, we draw on our experiences as well as the data (field notes, interviews, transcripts of meetings, post-tour evaluations) from the 2013 national FCTs.

III. Description of Method:

The Futurescape City Tours involves four interactive sessions with a group of between 10-15 citizen recruits. The goal of the first session is to elicit the participants’ curiosities and concerns with regards to a pressing question. In our case, the focal issue surrounded the sustainability of emerging technologies in the urban environment. The initial session is designed to surface what citizens wanted to talk about, in order to plan an urban walking tour that was close to local and personal concerns. From these participant-led ideas, CNS researchers then conduct a walking tour of the city (the second phase) during which participants were asked to write reflections and take photographs to document, observe, question, and point out the places in their city where they saw the city changing. They were then asked to tag the photographs as linked to past, present or future. Along the way, participants interact with a variety of guest scientific experts and civic stakeholders to discuss

their concerns and curiosities with respect to the role of technology in the city. Finally, during the third phase, participants selected photographs to anchor a three part deliberative exercise where they negotiated the past, articulated the present, and envisioned the future of their city. Some of the national tours held in 2013 closed the engagement with a public gallery displaying of the citizens' images and responses to questions about the role of emerging technologies in the city.

Within this basic structure, there were several digital and visual mechanisms built in to encourage critical reflection that involved integrating experts, visiting diverse places, mobilizing different interaction spaces, and using photography as a tool of documentation and deliberation.

One important feature of the tour is the varied interaction that the citizens have to community leaders, prominent stakeholders and scientific experts². Prior to the tour, we identified, recruited, and coached at least one expert and one stakeholder who met the citizen group at each of the tour stops. FCT sought to connect citizens and others in dialogue in a number of non-traditional settings to encourage a more free and joint inquiry. Across the 2013 national sites, citizens visited labs, maker spaces, heating and cooling facilities, freeway underpasses and community gardens and had the opportunity to pose questions, initiate discussions and offer their critiques, hopes and fears to the engineers, policy makers, or scientific guides specially invited to interact with the citizens at each location.

Another key way to encourage layered modes of reflection was to diversify the places visited and types of settings that back-dropped the conversations during the tour. The citizens' interactions with stakeholders and scientific experts took place in a variety of locations and formats: the dynamics between strolling along a canal talking about water quality with environmental scientists differed from visiting a solar rooftop installation with an energy company representative. In designing the stops, we also worked to include a diverse array of indoor and outdoor settings (e.g., a farmer's market, (re)industrial zones, hidden infrastructures) and modes of interaction (some active and energizing, like participant led interviews, some pensive and slow, like observing behavior on a metro and free-writing).

As researchers, we also paid attention to including unique sites that the participants would not otherwise have access to. Inspired by urban spelunking we sought to offer citizens looks into hidden places. For example, in the Phoenix edition of the FCT, the group visited a heating and cooling facility that offered a particular ambiance to the start of the tour. As described by FCT researcher Jathan Sadowski:

On an unseasonably brisk Saturday morning in October, I met up with a group of almost twenty other people in front of downtown Phoenix's convention center. Soon, out of a locked metal door tucked back away from the street—one composed by hash marks that only barely conceal what lies behind—emerged a man. He greeted us, said his name was Rick, and ushered us through the door, which opened up to the top of a set of concrete and steel-lined stairs that descended underground.

The group made their way, zigzagging down the stairs—three stories, forty feet—below the earth. We reached the bottom and pushed open another door, this one heavier, solid. “Welcome to Phoenix’s underground district cooling system,” Rick said. Once we all donned hard hats, earplugs, and safety goggles, we would be venturing into the city’s guts.

Another technique that we used involved orchestrating some time to follow a path, and other times for more open-ended wandering. While logistically challenging, as organizers, we hoped that some unstructured movement would encourage the citizens to be drawn by their instincts while also providing more space to take photographs of what intrigued them about the urban landscape. One participant remarked, “I was a tourist in my own city, I was born here, lived here, and yet I haven’t seen a lot of these things.”

In addition to the different settings visited, the FCT’s also experimented with different interaction environments. Some interactions were reminiscent of traditional learning environments (an expert panel and Q & A sessions), while others were more untraditional. In the 2012 FCT Pilot, citizens were shown a DIY biofuels demonstration in a vacant lot in downtown Phoenix. In the 2013 Phoenix tour, participants were dropped at a farmer’s market and asked to conduct impromptu interviews with the vendors and patrons about the future of the city. These different atmospheres were intentionally designed in to the overall experience in order to trigger different ways of knowing in the hopes to generate a more diverse assemblage of perspectives. Participants found these ways they were nudged to engage in these different diverse interactional spaces helpful; for example, one participant noted (in the evaluation survey): “Forcing me and others to speak was very useful and comforting.”

The use of photography was a central mode through which the FCT was designed to prompt reflexivity. All of the FCT participants used cameras to track their intrigues during the tour, and after the tour, were asked to select 20 photos to post on a shared site. Each photo was accompanied by a caption meant to capture what they were thinking about when they snapped the shot. They were also asked to tag each photo past, present or future, adding in a layer of analysis and reflection to the task. The invitation to make choices about what to capture, how to frame the shot, and what to write as a caption involved cognitive and emotive processing that surpasses, or is at least profoundly different from, engaging in critical debate. Photography forces attention to the external world, to looking, to noticing, and the act of then selecting photographs provides an opportunity for another iteration on the experience and its intellectual or affective resonances. In this way, conditions in the built environment observed and apprehended as photographs and paired with value statements become evidence equal to the scientific and technical information provided by FCT organizers and experts.

After the tour, during the third gathering of the participant group, the hundreds of photos were printed out and placed around the meeting room. Over the course of three hours, the citizens worked on three different tasks with the photos with a process indebted to the concept of material deliberation (Davies et al. 2012). First, they were asked to select photos tagged past for three that mattered most to them, and then discuss in small groups how they see that ‘past’ persisting. Next, all of the photos tagged present were stuck to a large wall and the participants were instructed to select one ‘positive’ and one ‘negative’ image and then

explain, in writing, their choices. Finally, participants were invited to select several photos from the 'future' pile, and then place them on a wall overlaid with a matrix (time x desirability). The matrix ran on the x-axis from now into 50 years, and on the y-axis from desirable to undesirable. Thus the participants were asked to pluck out, from the hundreds of photos tagged future those images that resonated most with them, and then give their reasoning or feeling about when the representation crops up and with either desirable or undesirable implications. The resulting timelines offered a collage of their collective imagination about the future of their city.

IV. Analysis of the Method

Based on our assessment of the pilot and multi-site Futurescape City Tours, we now turn to a discussion of how well these methods may function to build reflexivity through an examination of the nature of participation, collaboration, the use of digital and visual techniques situated in place, with attention to issues of power and ethics. Our goal in employing these methods has been to disturb routine habits of mind and perception and to bring our participants into closer contact with material aspects of their cities as a means to spark new agenda setting and fresh conversations about public needs and priorities. We wished to explore how these different experiences and modes of communication functioned in the context of pTA, and to especially focus on the use of photography as a deliberative prop.

IV. A. Participation/collaboration

Intervening as participatory action research, the Futurescape City Tours consciously constructs a public around a specific consultative event rather than becoming involved with an existing social or political group or community. Most technology assessment that involves the public takes the disinterested citizen as its most valued participant. FCT broadens the conception of the ideal participant by taking a "hybrid forum" (Callon 2009) as its model, where both knowledgeable experts and lay participants learn together and identify issues of mutual concern. Using both in-person and online advertisements for the FCT event activities, FCT organizers recruit a demographically diverse citizen panel as well as professionals, scientists and engineers who serve as information experts both formally and informally during the walking tour. FCT attends to social power differentials in this hybrid public by organizing information and expertise to support citizen set agendas.

In practice, however, traditional power relationships crop up due to personality differences among lay and expert participants, experts' comfort levels at communicating specialist information to general audiences, and the expectations of participants themselves. As Davies (2011) diagnoses in her review of engagement practices, participants tend to maintain an expert/lay divide. For example, during a site visit on one of the Phoenix, Arizona tours focused on nanotechnology and water filtration, we met several scientists on the banks of the canal system that runs through the city. We were surprised to note that as the scientists began to share their stories about how nanotechnology might change how we process gray water, the participant group took several steps back and became an impromptu audience in a semi-circle around the speakers, remaining silent until the remarks concluded.

The informal mixing of our invitees and recruited citizens happened more often in interstitial moments when no experts was “on stage” to provide context at a certain point on the tour. Instead, as we walked from place to place. People had time to make personal notes and take photographs, thus the various roles of individuals in the group fell away into a shared experience and more even conversational exchange. Since the scientists or other guests invited to augment the citizens exploration were invited to the subsequent tour stops, many opportunities for further exchange enabled more unscripted conversations and mutual inquiry. These seemingly impromptu meetings, however, were the types of collaboration and exploration that organizers sought, albeit with a less prescribed idea of what the outcomes might yield. The significance of this different sort of exchange is difficult to quantify, however in post survey data, participants reported that they valued having access to knowledgeable people whom they might not have a chance to meet and in places they rarely visit. X said this.... This type of exchange is a foundation for what Guston has called capacity building, a civic sensitivity that is “not about scoring political points or winning elections, but... understanding what’s important for ourselves, our fellow citizens, and our communities”(David H. Guston 2014, 57).

IV. B. Use of digital or visual technology

This use of photography as a tool for dialog in FCT is akin to the anthropological technique “photovoice.” Photovoice has been used in healthcare contexts and with vulnerable populations as a method for drawing out sensitive concerns and sociocultural values in direct reference to on-the-ground living conditions (Gubrium 2013; Wang and Burris 1997). Practitioners put cameras in the hands of people as a participatory action research technique that empowers marginalized communities.

Methodologists Wang and Burris use the technique to enable people to record and reflect their community’s strengths and concerns, to promote critical dialog and knowledge about important issues through large and small group discussion of photographs, and to reach policymakers (1997, 370). The act of photo taking in FCT is in effect ‘education for critical consciousness’ that aims to build capacity among project participants to imagine future states of the city they tour and to heighten awareness of the role that technological infrastructure plays in everyday urban experience (Wang and Burris 1994). Photos are meant to be an intermediary, aiding interactions between and among research participants and empowering community members.

Photographs reveal that experiential and material pTA methods in FCT have the potential to render hidden scientific and technological infrastructures more transparent not because these methods focus on education about these seldom-popularized city infrastructures, but because the process allows people space to articulate individually held values through the use of material and experiential encounters and provides a forum for public debate that has the potential to move individually held positions towards synthetic public values useful for governing scientific and technical futures.

IV. C. Issues of power/ethics related to this approach

The potential pull that these images of details in urban settings and technologies might have on the perceptions and collective understandings of the photographer and viewer should not be underestimated. Davies et al reason that given the “co-development” of technology and society in cities, participatory processes should formalize these competing pressures of the material and social into deliberative processes (2012, 352). As such, otherwise inert photographs that provide evidence of conditions in cities may have significant influence on how citizens set agendas. One photograph may reveal a little remembered detail about the former use of a now abandoned building, leading to a discussion that recovers a potentially robust repurposing of the space. Another photograph might obscure, hinder, or block the creativity of the photographer when it is her turn to present evidence in the group discussions. While photography in the dialog setting can be very powerful in amplifying the concerns of underserved or overlooked community members, it can also continue to lend legitimacy to a long-standing reality in the city scene that should instead be challenged or reimaged. For example, in Springfield, MA, images of the derelict train station and its other traces recurred and bounded discussions of transportation in the city more generally. It was difficult for the participants to move their thinking beyond the relics of a system that had long since ceased to serve them.

We also must take care with the technique of integrating experts and stakeholders into dialog processes. Models such as the consensus conference developed in the Danish context explicitly deemphasize the role of experts to place citizens in the drivers seat. The first instances of FCT in the pilot and the six-site implementation took a more bold stance in including and integrating experts as a means for the whole group to make sense of the city scenes they witnessed together. While integrating experts increases the reach of the group, it also sets the expectation that there will be further steps taken after the event to connect insights to policy change. Focused on capacity building, the FCT is not designed to make those links explicitly, though we noticed that these links have the potential to blossom through the mutual interest and efforts of participants who carry an agenda forward.

V. Discussion/ Conclusions

As a practice-based research project, the FCT experiments with digital and analogue media to support civic reflexivity and public engagement with emerging technologies. In doing so, it reacts to developments in STS approaches to public engagement and seeks to venture a methodology that more effectively harnesses the collective imagination to make transparent, share and hopefully subvert business as usual.

We assert that digital and visual methods attuned to technology realities in the urban context carry forward from the practice of ‘wayfinding,’ which in design and architecture refers to the art and practice of spatial problem solving. In his classic work of urban design, *Image of the City* (1960), Kevin Lynch asked citizens of Los Angeles, Boston, and Jersey City to draw maps of their city from memory. The resulting drawings and interviews led Lynch to coin the term *imageability*. This term refers to a typology of urban features that Lynch established as he analyzed this data to ascertain which city forms are memorable, compelling, and useful to the people who live and work there. Imageability now informs the professional design practice called *Wayfinding* that seeks to make everything from public places to virtual

information spaces easier to understand and to navigate (Passini 1984). In the same way that wayfinding practices aim at making urban settings understandable and functional for city residents, FCT methods have the potential to render hidden scientific and technological infrastructures and systems understandable and useful for urban publics.

In pTA, where events are more rare and contrived around elusive issues of scientific and technological impact, as well as in community engaged research, where knowledge develops iteratively through long term relationship building techniques are needed for revealing community assumptions. In our example of FCT, techniques for subverting routine perceptions of how the city and its technologies work provide the vehicle for trying out alternative methods.

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