

Crowdsourcing as Reflective Political Practice: Building a Location-based Tool for Civic Learning and Engagement

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Abstract

Many platforms for civic engagement, whether online or offline, are inconvenient and disconnected from the source of issues they are meant to address. They require that citizens leave the places they normally inhabit physically or virtually and commit to a separate space and set of processes. Town hall meetings are still a key point of engagement, occurring during specific times and in specific places. Online forums function similarly, in that deliberation occurs within profile-based websites for which you need to sign up and regularly return. This paper responds to the design challenge and research question: How do you address barriers to “minimum effective engagement” in community projects, and ensure that all citizens can have their voice heard on how to improve their local communities?

In order to raise levels of participation in community projects and expand the range of voices heard in governmental decision-making, there is a need for civic technology that is lightweight and compelling enough to enjoy continued use and to promote civic learning. In this paper, I develop a theoretical basis for effective citizenship through crowdsourcing monitorial activity by finding connections between several theories of citizenship and learning, which point to this activity fostering civic learning through reflective political practice.

Using a needs assessment of Boston-area municipalities, I reinforce my argument and concretize a set of design goals for a new socio-technical system to foster local civic learning and engagement around issues like urban planning. In the end, I respond to the research challenge and design goals by introducing a prototype for a location-based survey platform for Android smartphones called Action Path, and discuss early-stage user feedback and future work.

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1. Introduction

Robert Putnam's 2000 book *Bowling Alone* charted the decline in associational life and American civil society during the second half of the twentieth century, sparking a new and fervent wave of public concern over the health of American democracy. Since then, research has shown indicators of civic engagement, like attending meetings and involvement in community projects, have continued to decline through the early part of the twenty-first century (Levine 2013). Furthermore, gaps in civic engagement appear to be widening between races, classes, and generations. Whites generally have the highest levels of civic engagement, followed by Blacks; Asian Americans and Latinos are much lower (Bey 2008). Using college graduation as a very rough approximation of class, Levine finds that organizational membership and community project involvement are much more prevalent among college graduates (2013). In terms of age, the Millennial generation votes at lower rates than older generations, and also trail in their willingness to contact public officials (Pew Research Center 2010).

However, the news is not all grim. When looking at non-institutional political engagement or "participatory politics," Millennials participate at rates up to 41% (Cohen and Kahne 2012). And combining both types of political practice, Black youth are the most likely to have participated in some way (75%), followed by Whites (67%), Asian Americans (60%), and Latinos (56%) (ibid.). Participatory politics, defined by its emphasis on two-way communication and peer-based information and action networks, are often facilitated by digital technologies like social networks and mobile computing (Cohen and Kahne 2012). With high rates of technology use among American youth (95%+), these are becoming primary media through which civic engagement is practiced (ibid.). Research has shown that Blacks and Latinos are as likely as the rest of the population to own a mobile phone, and more likely to use it for a wider range of activities (Zickuhr and Smith 2012).

Participatory politics and other technology-powered forms of engagement are still new and understudied, but they may be key to reversing negative trends in civic involvement, especially for future generations. Henry Jenkins has argued that online communities might be the twenty-first century's bowling leagues, connecting youth and "creating a starting point for other civic activities" (2009). And mobile computing may provide the best opportunity to engage historically disengaged minority populations.

¹ This paper is adapted from the author's MIT master's thesis, *Action Path: A Location-based Tool for Civic Reflection and Engagement* (Graeff 2014).

Barriers to participation may include social class, the community values of your hometown, your personal resources—money, time, knowledge, and skills—and your learned ability to convert what resources and experiences you have into civic action (Verba, Schlozman, and Brady 1995). These manifest in low attendance rates at local, institutional forms of engagement like town hall meetings. While research suggests that the busiest people also tend to be the most engaged (Hyman and Levine 2008), lower class individuals working multiple jobs and young parents taking care of children may lack the time to attend in-person gatherings. Latinos and other minorities whose first language may not be English will stay away if they feel they cannot fully participate in deliberations. And undocumented community members may avoid any contact with authorities for fear of deportation. Additionally, youth across classes and ethnicities can feel marginalized at public events if their attempts to learn are perceived as naïveté or their voices are disregarded because they do not yet vote or own property.

Research Question

The research question at the heart of this paper is: How do you address barriers to “minimum effective engagement” in community projects, ensuring that all citizens can contribute their input on how to improve their local communities? The question serves as a design challenge to produce a socio-technical system accessible to a broad array of stakeholders and incorporating social processes appropriate to both individual actors (users) and relevant systems of governance. Like the civic engagement indicators discussed above, the focus for this project is on local community projects, and I am coining *minimum effective engagement* to further focus the challenge on the ability of a citizen to have their preference, question, or comment heard by someone with the power to effect change in their community using that information, and ideally the citizen is directly informed about how their input was used. This is meant to push the design to interface participatory political practice with institutional political structures, so that answering the research question means empowering citizen-users while respecting institutions as key stakeholders.

Design Methodology

This paper documents the first part of a “design-based research” experiment in response to the research question and design challenge, producing a prototype socio-technical system called “Action Path.” I develop a theoretical argument and conduct a needs assessment of Boston-area municipalities in order to establish design goals for the system; these are intended to push forward an innovative agenda around civic learning and engagement, specifically attuned to the practical needs of a target case study around urban planning. I then introduce the prototype for Action Path and discuss its potential to achieve its design goals using feedback from early test users. I conclude with a future research and practice agenda for the system and extrapolate to the broader field of civic technology design.

Design-based research approaches are meant to explore how educational innovations work in practice, starting with theory-driven design and deployments in real-life contexts (DBRC 2003).

They are meant to be flexible and iterative to support an ongoing design process and to adjust to specific contexts of deployments. My methodology is similar to “Design Action Research with Government” (DARG), which Emerson College’s Engagement Lab has developed specifically for designing civic technologies in collaboration with the City of Boston (Baldwin-Philippi, Gordon, Osgood, and Jacob 2013). DARG begins with goal setting in collaboration with a partner and then establishing research questions. This is followed by the technical design process that constantly reflects on the goals and research questions and involves ongoing meetings with partners and iteration both before and after initial implementation to ensure that the final product is appropriate and effective.

To ensure rigor in my evaluations, I am developing a mixed methods approach to studying user behavior and social outcomes. I analyze data from system use to see what a user is doing and when and where they are doing it. I layer this with in-depth, post-use interviews asking about how they use the system and how using it makes them think and feel. The evaluations are meant to serve the broader project, stakeholders, and future research according to Bent Flyvbjerg’s definition of “phronetic social science,” wherein action research and mixed method case studies are used to develop social theories tailored to real world application (2001). Flyvbjerg argues that it is the responsibility of the contemporary social scientist to ensure they keep impact in mind when doing their research, so that when papers are published and accounts are given, they inform an audience of politicians, designers, urban planners, activists, and others about what is effective and what is not, and in what ways the efficacy was a function of context. This experiment aspires to have such an impact.

2. Theory and Motivation

The Good, The Monitorial, and the Effective

In his book *The Good Citizen*, Michael Schudson talks about different eras in America that idealized different types of citizenship (1998). What it meant to be a good citizen at the dawn of American democracy differs substantially from whatever it means now. In particular, Schudson talks about how the ideal of the “informed citizen” dominated the discourse of the 20th century and was deeply intertwined with the role journalism played in society.

We are now at a point where journalism’s role is in flux and where the range of information necessary to be a fully realized participant in democracy, according to these ideals, is overwhelming. There is too much to know and too much to have an opinion on. Schudson argues that we need a new framework, a new kind of citizenship for contemporary times.

In lieu of the informed citizen, Schudson proposes the “monitorial citizen.” In Schudson’s words, “Monitorial citizens scan (rather than read) the informational environment in a way so that they may be alerted on a very wide variety of issues for a very wide variety of ends and may be mobilized around those issues in a large variety of ways;” they “tend to be defensive rather than

proactive”, engaging “in environmental surveillance more than information-gathering” (1998, 310–311). Monitorial citizens integrate their civic duties into their daily lives: watching over the kids on their block, keeping abreast of important consumer recalls, noting how weather affects the cost of groceries or their ability to check in on family members’ safety. Schudson notes that monitorial citizenship can be practiced all year-round and year-after-year, rather than a season-long practice of citizenship like when voting and political volunteerism emerges every four years during a U.S. Presidential Election year.

In aggregate, monitorial activities might give the public the “omniscience” it needs to fully participate as citizens the way Walter Lippmann demands in his trenchant analyses of American democracy and civil society (1922; 1925). Lippmann argues that the increasing complexity of society during the early twentieth century meant that an elite class of experts would have to lead the “bewildered herd” of the public in order for democracy to function, since the average citizen lacked the knowledge necessary to act effectively on a systemic-level. Lippmann’s criterion of sufficient knowledge to act is a prudent one, but it assumes that this must be manifest in separate individuals. There is a contemporary alternative though: we can now “crowdsource” expertise for democracy (Howe 2008; Shirky 2008); that is it say the civic efforts and knowledge of a distributed network of citizens could be aggregated into an all-knowledgeable and effective citizenry.

Reflecting on Lippmann, Schudson agrees with his diagnosis that democracy cannot rely on citizens for expertise they do not possess, but hopes a balance can be achieved in splitting responsibility between expert governance and public participation. Polls and surveys that inform expert decision-makers rather than make decisions is one way to do this democratically. By expanding Schudson’s vision of monitorial citizenship using technology that provides information on demand for context as citizens come across an issue and thereby makes issues facing the community less abstract could close the expertise gap. Citizens are already experts of their own personal experience, but this expertise can be developed further and more enmeshed with public life through regular practice.

However, the success of crowdsourcing depends on wide and diverse participation. As mentioned in the introduction, inequalities across race, gender, language, income, and skill present barriers to participation and gaining the necessary information to understand an issue and act, which prevents polls from being truly representative. Kovach and Rosenstiel call the differentiated expressions of localized knowledge and engagement by citizens, the “interlocking public.” From their perspective as journalists, any published story will have three types of readers: “the involved public” who has a personal stake and strong understanding of the issue, “the interested public” who has no direct stake but can connect to the issue through firsthand experience, and “the uninterested public” who will not engage unless it is made relevant to them later by others (2007, 24). A citizen will be a member of each public at some point depending on the issue. Journalists have to write for all three types, so perhaps it is possible to design civic activities that can engage all three in different ways for effective action.

Ethan Zuckerman has been exploring the reality of citizens of differentiated knowledge and skill to find a definition for an “effective citizen” in lieu of a “good citizen” (2013; 2014). In his essays, Zuckerman talks about Schudson’s *The Good Citizen* in relation to Lawrence Lessig’s book *Code: And Other Laws of Cyberspace* (2006). Lessig sees four ways by which complex systems are regulated: laws, norms, markets, and code (or other similar architectures). Similar to Schudson, Zuckerman accepts Lippmann’s challenge that the need for omniscient and omnicompetent citizens undermines democracy. Zuckerman’s suggestion is that rather than deferring to individual experts for all civic action, we need to find the citizens who are knowledgeable or skilled in particular areas, such as one of the four means of regulation Lessig outlines. As a team, they might in aggregate have the necessary omnicompetence to act effectively.

Effective change campaigns are typically multifaceted in order to work on multiple fronts: pushing for legislative change, while also working on public opinion to change norms, and perhaps introducing boycotts or buycotts to change the flow of money through political networks. Zuckerman’s concept of aggregate effective citizenship focuses predominantly on what he calls “thick” forms of civic engagement, wherein citizens devise custom strategies to address social and political issues (2014). But not all citizens will be engaged at that level, some will still be marginally engaged or unwilling to seek out the information necessary to connect with an issue.

Does civic renewal require all citizens to be “justice-oriented” and “participatory” citizens, to use Joel Westheimer and Joe Kahne’s terms (2004) for citizens that seek systemic change and lead their peers, or “actualizing” citizens to use Lance Bennett’s term (2008) for a citizen that questions the government and seeks change through networked action rather than simply voting? What is left for the citizens that these scholars call “personally responsible” and “dutiful,” or even the uninterested and disengaged? Can they also be effective? This is where the model of technology-powered monitorial citizenship might make a difference.

Pain Points of Participation

For the average citizen overwhelmed by the demands of daily life, tempted to disengage from civic life to cope with quotidian challenges, how could their barriers to engagement be lowered to encourage regular participation? At the local level, in-person participation takes the form of the town hall meeting, usually scheduled for a couple of hours in the early evening on a weeknight by some part of the municipal government in order to hear views from the community on a decision that must be made to advance the city in some way. These meetings pull residents out of their routine spaces, and in some cases force them to work synchronously, which represents a high barrier to entry for many would-be active citizens. The merits of synchronous, non-routine forms of engagement are many, of course. Community-building requires that people stop and pay attention to each other, finding and perhaps literally inhabiting common ground.

However, in-person forms of engagement limit participation to only those who enjoy the freedom to make such commitments. In particular, it can exclude the voices of those who struggle with

English, as most materials and discussions will not be translated; of youth, who may be viewed contemptuously for the reasons mentioned in the introduction; of middle-aged citizens, who may lack flexibility in their schedules due to career-building activities and child rearing; and of the poor, who have no choice but to take on second or third jobs.

But local civic engagement is not simply inconvenient in these cases; the format itself may not be optimal for making issues relevant to citizens in terms of immediacy, personal connection, and the context of the actual urban landscape. These pain points emerge when we examine other online and offline platforms for civic engagement, which require that citizens leave the places they normally inhabit physically or virtually and commit to a separate space and set of processes. In addition to town hall meetings, occurring during specific times and in specific places, there are virtual town halls like MindMixer, where deliberation occurs within profile-based websites that require users to sign up for and regularly return to in order to participate. Electronic petition services like Change.org are easy to use and share but are only one-time, issue-specific interactions; furthermore, they live on a standalone web page, divorced from the community affected by issue.

“Report a Pothole” 3-1-1 service apps like Citizens Connect and SeeClickFix have taken advantage of the strengths of mobile devices to serve as location-aware data collection tools, enabling users to snap photos of street-level problems, geo-tag reports, and upload them to a central service to help increase the speed and efficiency of government service provision. These types of approaches are sometimes called Government 2.0 or “government as a platform,” as Tim O’Reilly puts it (2010), emphasizing the service provider role played by governments that might be made more efficient through private innovation and mounds of crowdsourced data.

SeeClickFix has seen enormous success particularly in New Haven, Connecticut, where after six years of deployment over 12% of the population had an account in 2013 (Sifry 2013). Sifry recounts several cases where long threads of dialogue between city officials and residents about issues like animal abuse, red light runners, and of course potholes, which suggest that SeeClickFix has helped create a unique culture of participatory governance in the city (ibid.). He interviews a former city director of traffic and parking, who says “It functions, in some ways, like a faster, better, letters-to-the-editor page, but one that has the ability to connect to a work order system” (ibid., 187). The difference however is that the platform is optimized for service provision not agenda-setting. These apps handle deeper, structural issues in society poorly. There is a need to facilitate collective action that enables citizens to engage more deeply and work on more complex issues, rather than just pooling individual service requests.

Lightweight Civics

In order to maximize rates of participation, forms of engagement should be lightweight, integrating well with everyday life and posing few barriers to access. However, these goals conflict with the needs for effective impact and inherent incentivization. One design solution is to develop games or game-like systems, which have been shown to lower barriers effectively and incentivize engagement through play. For example, Emerson College’s Engagement Lab has

found success developing production quality civic games like Community PlanIt designed for both youth and adults to collaborate around processes like urban planning (Gordon and Baldwin-Philippi 2014). Their civic games feature a challenge, what Eric Gordon calls “meaningful inefficiencies” (2012), which rather than trying to erase all costs of participation, instead challenge users in ways that enrich their experiences and make them fun and playful.

The Engagement Lab’s “Street Cred” app, which is built on top of Citizens Connect, attempts to incentivize collective action by tying submissions to active campaigns defined by the City of Boston and community partners, and rewarding users for their activity with points and digital badges. Adding the structure of campaigns helps make the activities more relevant and closes the loop on efficacy informing users of the value of their efforts, especially in coordination with their community. However, the points and badges are an example of “gamification,” which the adding of artificial relevance and incentives for participation that are unrelated to the tasks at hand. I think Street Cred is an important experiment for testing the use of this method for promoting civic activity among youth. Badges may help users express their civic identity when shared; but even so, I believe civic engagement platforms can be lightweight and compelling enough to enjoy continued use without resorting to point and badge systems. A paradigm for lightweight and compelling civic engagement I believe should aspire to function like the creation and sharing of political memes, like those seen during the 2012 U.S. presidential campaign, where play, identity expression, and community building are inherent components and rewards of the activity (Graeff 2013).

Lightweight or “thin” forms of civics—Zuckerman’s term for actions that are mostly about showing up (2014), which include changing a profile photo, signing a petition, or sharing memes—are sometimes described derisively as “slacktivism” or “clicktivism” (Morozov 2009; White 2012). However, they can serve as gateways to thicker forms of engagement or even important contributions in and of themselves (Kahne, Lee, and Feezell 2013), especially when seen as fitting in among different roles of citizens necessary for successful functioning of society, as Westheimer and Kahne’s categories imply. The key is enabling dutiful but lightweight citizen contributions that travel with users and encourage a moment of deeper reflection during action, developing knowledge, skills, and experience that might enable and build confidence for thicker engagement—in other words, civic engagement as civic learning.

Connecting Theories of Citizenship to Learning

If the goal is community involvement, walking, especially along a non-routine path, should be valued as a public service in itself and represent a strong integration of civic learning and engagement integrating with everyday life. In her seminal book *The Death and Life of Great American Cities*, Jane Jacobs argued, “Lowly, unpurposeful and random as they may appear, sidewalk contacts are the small change from which a city’s wealth of public life may grow” (1961, 72). These connections with others that accrue over time build the knowledge and social capital necessary for a well functioning community. And this is not limited to meeting with others but also observing your surroundings.

One of Jacobs' key contributions to urban sociology and planning is the need for what she calls "eyes on the street" (ibid., 35). She asserts that safe streets are a function of their levels of vitality, which is their ability to attract people and their eyes, whether from windows above the street, benches along it, or at the thresholds of businesses, where proprietors and customers interact with the street. This is different from surveillance. Rather, it's the study of public life carried out in the open, where the monitored can see the monitor, i.e. *countersurveil*. Jacobs' insights in her book about what works and what doesn't in urban environments are based on the observations she made on her home street in Greenwich Village, New York City and on similar streets in cities across the United States. Moreover, it powered her arguments as a civic activist.

The Jane Jacobs Walk organization enshrines these principles of Jacobs' work as a community organizer and scholar, using the art of observation in urban spaces "to see how cities actually work through experience, to go out and see what makes a neighborhood thrive, or to see what makes a neighborhood struggle," to quote their "About" page. This approach honors the unique qualities of different cities—communities need homegrown solutions born of local experience—and represents a quintessential case of monitorial citizenship in Schudson's definition.

A challenge to tighter integration of civic and quotidian life is the low value American civil society places on public work as opposed to private work. Citizens are expected to contribute to their communities as volunteers during their leisure time. This outlook guarantees a gap in civic engagement between economic classes. A long-term goal for civic technology should be to find social processes capable of connecting Jane Jacobs-style urban exploration with Harry Boyte's theory of "public work" (2011). Boyte has been advocating for decades to undo the separation between civic engagement and public service from normal life and work. He argues that the relegation of civic work to the voluntary sector has led to the professionalization of politics, where duties once designed for the average citizen are filled by paid professionals like lawyers and lobbyists who are now the only ones capable of effecting change at the highest levels. This represents a structural engagement gap that reifies disinterestedness.

Boyte proposes we recognize the public service aspects of paid work and see such work as part of civic engagement, such as when builders engaged in efforts to create public buildings or spaces built in ways that better the community rather than something functional in only a strict sense. In line with the ideal of public work, prompts for civic engagement should arise naturally from what citizens already do, which suggests that connecting civic engagement to physical places as you walk by them could create a low-friction opportunity to reflect on a civic issue and take action. This opportunity is already exploited through well-placed flyers with calls to action—Textizen augments this approach with mobile technology by asking passersby to submit their opinions in an SMS. But flyers cannot be in every language, just like multi-lingual urban planners cannot be asked to stand on street corners all day and run pop-up town hall meetings.

Integrating civics with everyday life produces important opportunities for civic learning outcomes; Markus Prior calls this "by-product learning," whereby people "learn politically relevant facts as a by-product of nonpolitical routines" (2007, 4). Prior derives this concept from

his study of the “efficiency” of citizens’ media environments, finding that less efficient systems like broadcast television actually produce high levels of by-product learning because exposure to political information was high when so few channels and programming options existed. The city as a routine experience is generally perceived of as nonpolitical, and yet it is of course teeming with political realities that might be exposed through a well-designed socio-technical system. By-product learning via the nonpolitical routine of walking through the city may provide citizens with a greater awareness of their community’s needs and resources, similar to “town trails” used by educators to create open-ended learning opportunities by prompting independent exploration of a place with a few starting questions (Hart 1997, 177–181).

Civic Learning through Reflective Political Practice

Civic learning as defined thus far as something that happens through doing, which demands a theory of learning whereby a socio-technical system can produce valuable learning experiences and encourage reflection, so that observations can be converted into expertise. Donald Schön’s concept of the “reflective practitioner” (1983), wherein professionals develop expertise through quick moments of thinking on one’s feet or “reflecting-in-action,” offers guidance on how this may be achieved. Schön argues that the experience of taking action and returning to past experiences in practice accrue into what Schön calls a “repertoire” consisting of notes, images, and contributions that enable “reflecting-ON-action,” allowing practitioners to develop new theories and questions about their work, which also feed back into their future practice. This is the development of expertise. And while it seems an obvious insight into learning, there is a deeper concept behind Schön’s theory, which is its critique of the theory of “technical rationality,” where all problem solving is viewed as a linear and logical process.

Schön’s work on reflective practice and his critique of technical rationality stems from his earlier research published in *Beyond the Stable State* (1971), wherein he diagnoses mid-twentieth century society as one in which we can no longer rely on the stability of our states (countries) and their institutions in the same way we once could because they are in a continuous process of transformation. He argues that contemporary companies, social movements, and governments need to be “learning systems.” Schön suggests learning happens at the periphery or organizations in response to technological progress, and then should ideally be absorbed into their core over time, through what he calls “dynamic conservatism,” allowing institutions to learn and transform while continuing to maintain some semblance of stability to perform the essential functions that keep them from collapse.

I believe we can unlock Donald Schön’s concept of “government as learning system” from its bias toward Lippmann-like hierarchical paternalism by re-emphasizing Schön’s own arguments about learning happening at the periphery. The people at the periphery are not just savvy, early career bureaucrats. They are also private citizens who can participate in this process as reflective actors and contribute to policy designs at the core, so it is not just the government learning, but citizens learning to be citizens, similar to but more profound than the participatory governance possible with apps like SeeClickFix. I hypothesize that reflection on civic issues

within the context of where they affect the community will allow users of good civic technology to gain expertise and thereby become more effective citizens. Crowdsourcing the output of this “reflective political practice” can feed back into the socio-technical system to strengthen its civic learning and engagement outcomes.

Ivan Illich pushes Schön’s ideas to a similar ideal. Like Schön, Illich is aiming for a *learning society*, but like me he disagrees about the role and location of expertise. In his book *Tools of Conviviality* (1973), Illich takes the Marxist view that the control of the means of production in industrial institutions reduces people to mere consumers, depriving them of the essential freedom to have a say in how things are made and what can be done with them. His greatest fear is a Lippmann-like technocracy.

His antidote is the pursuit of tools and social processes of “conviviality,” which he defines as the “autonomous and creative intercourse among persons, and the intercourse of persons with their environment” (Illich 1973, 11). These tools and processes would ensure individual freedom through personal interdependence by being in the public interest and guaranteed so by being controlled by the public, in other words, by political processes.

Ideas like these make Illich an intellectual hero of the “maker” movement and constructionist educators, who focus on giving learners “good things to do” so that they might learn through doing and making (Papert n.d.). In many ways, the internet—in its purest form—is the ultimate tool of conviviality. And the promise of the internet and associated digital media has been one of a return to the *agora* of Ancient Athens, where direct democracy can be practiced with equal distribution of responsibility and at least the potential for expertise.

Of course, there are realities to contend with around access and ability in both cases. Few residents of Athens were allowed to be voting citizens, and those skilled in rhetoric had more power than those less skilled (Martin 2000). The contemporary versions of this are the digital divide and the “participation gap” (Jenkins 2006), rendering those without access to tools or without the ability to participate fully in the creation of effective digital media disempowered. Research by Eszter Hargittai and Aaron Shaw has shown that internet use, “web-use skills,” and autonomous access to online social networks “help explain online political information practices, civic engagement, petition signing, and political engagement activities” and follow patterns of differentiation across the so-called digital natives of the Millennial generation (2013).

It’s possible there will always be a periphery disempowered through some means. Smartphone ownership trends in the developed world suggest that at the very least access to that technology may not be a barrier (Smith 2013), but execution is still critical to succeeding with conviviality.

Technology-powered Monitorial Citizenship and its Critics

The power and potential of both active and passive forms of monitorial citizenship have been demonstrated by projects like the 3-1-1 apps, which crowdsource demands for government service provision and offer follow-up, Ushahidi, which uses SMS to centralize eyewitness

reports during crises, OpenStreetMap, which has been used in places such as the Kibera neighborhood of Nairobi to crowdsource a digital geographic record where institutions failed to do so, and SafeCast, which developed an inexpensive Geiger counter after the Tsunami and Fukushima disaster and mapped radiation levels across Japan with truck drivers willing to put them out their windows as they drive their routes. However, the hardest thing to design is not the technologies themselves but the social processes that surround them—this is why Illich believes we must invert our institutions first, establishing a norm that connects individual efforts to official outcomes. Not all of the aforementioned projects translate well to new, unintended contexts. People are at the heart of these projects. It's important that we design in collaboration with the real stakeholders, and that we negotiate and establish our values and expectations upfront.

In his latest book, Peter Levine argues technology-enabled crowdsourcing is an inadequate strategy for civic renewal (2013). He takes issue with the pure vision of crowdsourcing that emphasizes entirely bypassing traditional organizations in favor of decentralized, self-organized volunteer networks. Levine feels that the successful examples of crowdsourced civic action rely on preexisting shared values and goals, which require institutionalization through hard work and investment in organizing—processes beyond the capabilities of loosely affiliated networks. He instead favors networking together existing civic organizations into coalitions that might be able to coordinate efforts and expand the number of citizens involved in deliberative democratic practice.

In their attempt to find models of “internet + politics” that truly transform political practice, Fung, Gilman, and Shkabatar identify “social monitoring” as a new model of participation that in reality reinforces “traditional mechanisms of institutional monitoring” (2013, 44). They looked at three deployments of the Ushahidi platform: the original post-election violence reports in 2008, the Uchaguzi project monitoring the 2010 Kenya constitutional referendum, and the Kiirti complaint processing platform designed for Indian NGOs. In each case, the authors argued crowdsourced items mostly helped “professional users” like NGOs, private companies, or journalists access user-generated information, meaning average citizens still largely relied on intermediary experts to engage with governmental power. As a result, Fung, Gilman, and Shkabatar believe that what they call social monitoring and I would call monitorial citizenship will be increasingly used, but precisely because it reifies existing power structures rather than being transformative for citizens.

Both of these critiques are helpful for thinking about how civic technologies for learning and engagement ought to be designed differently, so that they take advantage of the lowered costs of participation offered through crowdsourcing without disempowering citizens by simply exploiting their time for a few data points provided to expert decision-makers. This tension could be addressed two ways. First, designing for reflective political practice with feedback loops informing users of how their input has been used can develop the expertise of the users, moving them out of the “uninterested public” category on more and more issues, and empowering them to engage more deeply in the future. Second, efforts should be made to work with members of the community that are underrepresented within powerful institutions so that they are part of the

design process of setting the agenda for what will be surveyed through the tool. This addresses Levine’s concern by using collaborative design as deliberative democratic practice to establish a starting point of shared values and goals.

3. Design Goals

From the exploration of theories of citizenship and learning and contemporary civic practice, four key design goals emerged for a socio-technical system capable of addressing the research question posed in the introduction. Using the needs assessment of Boston municipalities discussed in the next section, I have grounded the design goals on the use case of participatory urban planning. They are stated as user outcomes followed by criteria for successful implementation:

Design Goal	Criterion for Success
1. Users will be more aware of their community’s needs	Users can articulate new knowledge of both the geographic and political landscape of their cities, e.g. “I learned that the city is planning to create new bike lanes near where I work.”
2. Users will see their city in less abstract terms	Users perceive areas of the city as connected to certain issues and current events rather than as landmarks or where certain people live, e.g. “The city is considering creating a new bike line on the stretch of road I walk between the bus stop and where I work, and I see cyclists everyday struggle to find room on the road among the bus and all the cars.”
3. Civic learning and engagement will be more integrated in users’ everyday lives	Users participate in community projects more regularly, e.g. “Everyday I answer a poll or read an update about an issue I care about because the actions and information are connected to where I live and work.”
4. Barriers to civic engagement will be lower for users, especially users from traditionally marginalized groups	Users participate in community projects that do not directly affect them, e.g. “I submitted a question about the benefits of a new property tax discount for senior citizens, even though I am only 25 because someone bothered to ask me in my native language.”

4. Needs Assessment for Urban Planning Case Study

Following the core inspiration of Jane Jacobs and city exploration, Action Path's initial targeted case study is developed around urban planning. From November 2013 through May 2014, I attended sixteen public and private meetings and events with municipal employees, elected officials, community advisory committee appointees, and community activists in four Boston-area municipalities: Somerville, Arlington, Chelsea, and Cambridge. The majority of the meetings were in Somerville, MA where I live and have pre-existing connections with community leaders. These meetings served as opportunities for needs assessment, informing the design of Action Path's software and learning about opportunities for potential deployments. The result of the needs assessment was a strong confirmation by local urban planners and officials as well as community representatives of the need for a civic technology like the one called for in the Theory and Motivation section in this paper.

Understanding Local Planning Processes

The key insight gleaned through these many meetings and associated literature produced by municipalities was the nature of city planning. Understanding where citizens can have meaningful input into the process is critical to the success of civic technology. Fortunately, the planning processes I had a window into were already highly participatory. Multiple and creative opportunities for citizen involvement were designed into planning. The "Somerville by Design" team in the city's Office of Strategic Planning and Community Development epitomized this through their use of open houses and design *charrettes* that gave participants hands-on opportunities to think about the future of their public spaces. These meetings are typically scheduled in the early evening on weeknights. Publicity is difficult because the city cannot pay for extensive advertising but does send notices out through the channels they control and will post fliers in schools and even send them home with students. At meetings, activists from local community organizations and local small business owners directly affected by the planning were usually in attendance and represented key voices.

Both Somerville and Arlington are going through master planning processes, the former has hired a private developer to lead the planning process for redeveloping a large area, and the latter is trying to create a vision for the city that will include development goals and steer planning processes far into the future. Master planning involves many more decisions that must work in harmony because they affect a large geographic area and have many stakeholders. There is a need for not just wider and more diverse participation in those processes but a way to inform citizens of all aspects and issues at hand. Inevitably, meetings are derailed by questions that catch participants up to speed. I observed this in the smallest meetings I attended, and the problem is magnified amid complex master planning processes. Long reports are written by municipal staff and posted online, but there is no expectation that a meeting attendee has read all that content. A technology that provides information and context as-needed and allows people to participate in city planning rounds without attending all the meetings is greatly needed.

Findings from Somerville, MA

Three quarters of my meetings were in and about Somerville and it is the primary target for future deployment, so I will focus on what I learned there. The Somerville by Design team, whom I met for the first time at their “Davis Square by Design” open house event in November 2013, have continually expressed strong interest in Action Path and helped brainstorm ideas for deployment. They kindly invited me to many additional meetings so that I could pitch my project and find a good fit among the many planning efforts underway.

The key use case around urban planning for Action Path came out of their Davis Square by Design open house, and was reinforced when I went to their Green Spaces, Community Places open house in East Somerville. As seen in Figure 1, the city planners would present poster boards with proposed projects around the area. Usually these would involve photographs of what it currently looks like beside artistic or architectural renderings of proposed changes. Planners would stand next to the boards and explain to attendees what they were looking at, and then do quick polls about preferred options or ask people to explain why they liked or disliked something.



Figure 1: City Planning Proposals on display at the March 3, 2014 Green Spaces, Community Places open house in East Somerville.

One of the neighborhoods I looked into for deployment was East Somerville. I was invited to participate in a meeting of community leaders who had received a large grant for community revitalization. At the meeting, I learned about Chuckie Harris Park and the open question about how to visually connect the park with Broadway.

Chuckie Harris Park, completed in 2013, is a playground built on top of a once vacant lot. The City of Somerville wants to ensure that residents can easily find the park, as it is about a block removed from the main road and partially hidden by the Senior Center on the corner. This was the first example of a specific and real planning question that could take advantage of the tool I wanted to build in order to garner public input. I designed a survey with possible options for Chuckie Harris Park, and used it to demonstrate how a mobile app might be used to elicit feedback. The poster for the demonstration is in Figure 2.

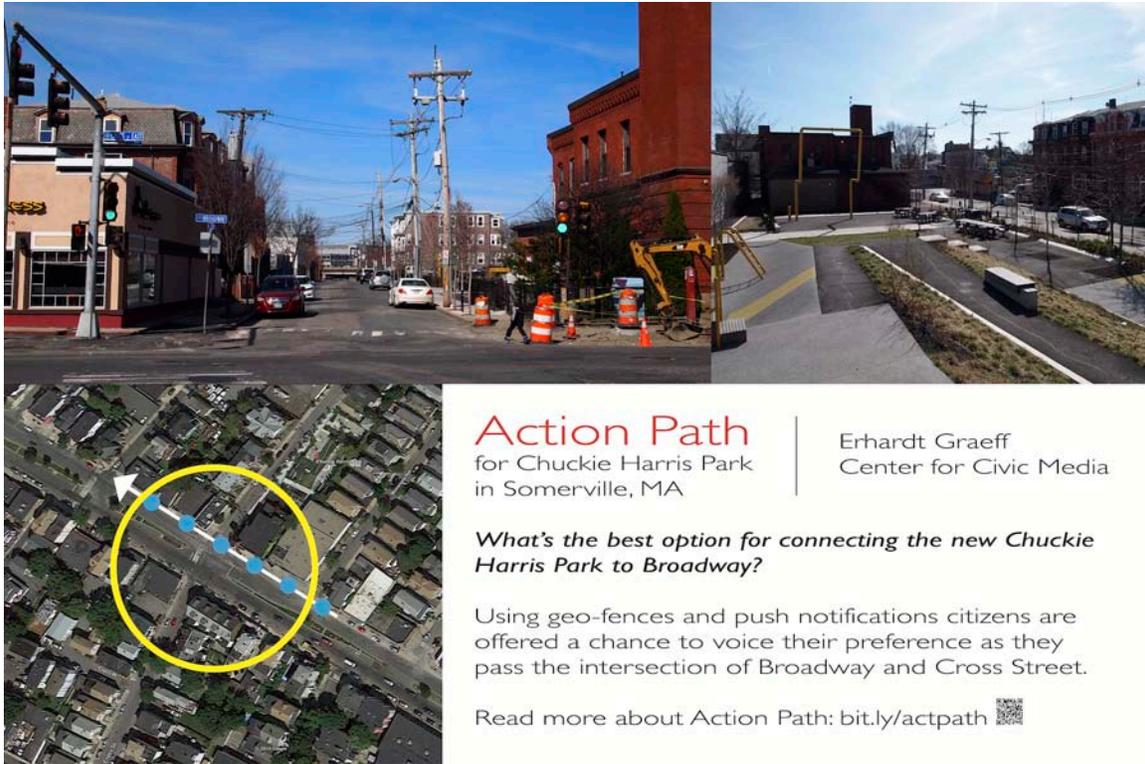


Figure 2: Action Path Demo Poster for MIT Media Lab Member's Week, April 2014

I had hoped the Chuckie Harris Park survey would be the first deployment of my prototype, but the community revitalization project was not ready to begin its planning phase. This was a recurring issue in my discussions with each municipality; many were on community planning timelines that spanned years rather than weeks or even months. So aligning a deployment with a concrete need and opportunity was difficult. Urban planning represents a challenge for technological innovation because the technology advances much faster than planning project timelines, many of which involve years of preparation before they even begin. They may also involve special grant applications which define the budget for new planning technologies that could prove obsolete by the time they are used.

Another challenge to putting the technology in place in Somerville is the many languages spoken by residents. Meetings of the local community development corporation Somerville Community Corporation are interpreted across four languages in real-time: English, Spanish, Portuguese, and Haitian Creole. A successful deployment of civic technology will require the user interface to be translated into these languages.

5. Design for a New Civic Learning and Engagement App: Action Path

The affordances of mobile computing, sensitive to location and always on and with citizens, make smartphones ideal for civic learning and engagement platforms aimed at integrating with citizens' daily routines and travels. Action Path, a name suggestive of games and adventure, seeks to reveal that hidden layer of political activity within the urban landscape, providing information and the opportunity to voice an opinion using a *just-in-time* delivery system.

The app employs “geo-fences” and push notifications to send one-question surveys to users when they walk past parts of their community which are currently involved in a decision-making process about how they might be improved. Geo-fences are physical areas that can be defined in software to trigger some kind of activity on a mobile device when the user enters or exits them, as illustrated in Figure 3. I call the surveys that users respond to after they receive a notification, “geo-fenced surveys.” These are designed in collaboration with sponsoring organizations like municipal governments, community organizations, small businesses, or others in order to elicit feedback on an issue to inform decision-making. Users can follow the issues they contribute to, and thereby receive updates and further opportunities to participate.

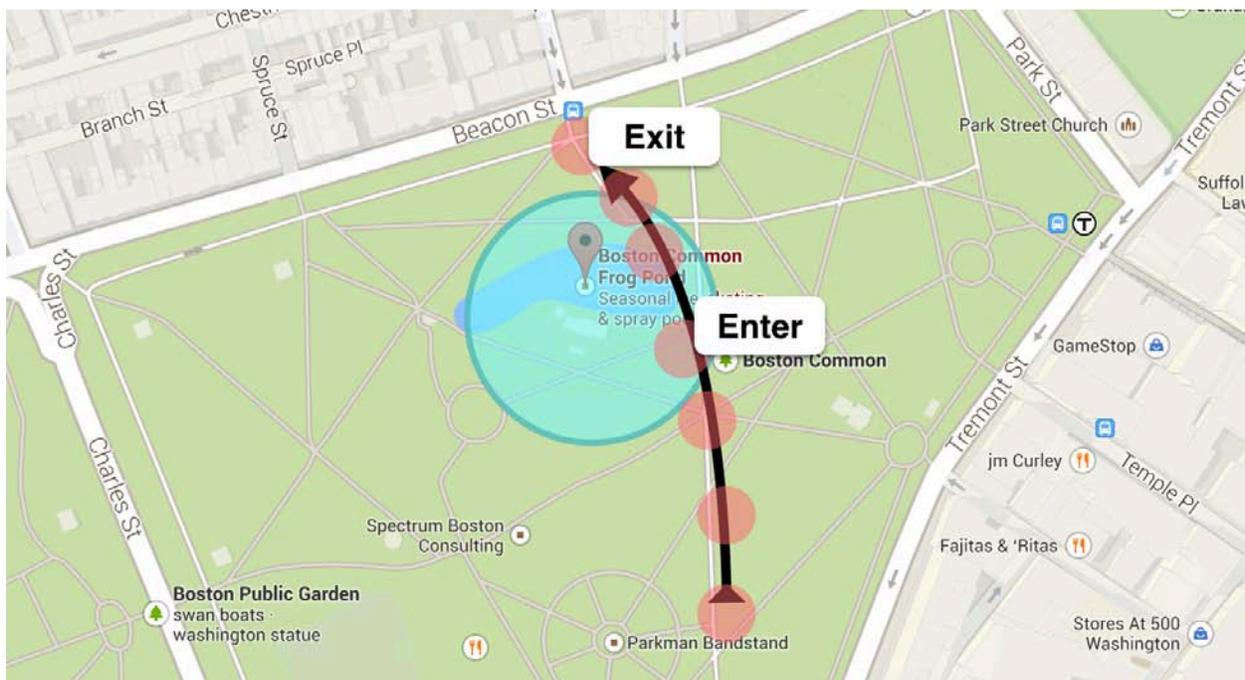


Figure 3: Illustrating a user walking through a geo-fence (Teal) with their smartphone pinging for GPS coordinates (Red), then detecting “Enter” and “Exit” of the geo-fence near the extent of its radius

Action Path users start the app on their Android device, which brings up an introductory screen and starts a background service that checks the user's location periodically even after the

introductory screen is dismissed. While a user walks around, their smartphone’s GPS coordinates are periodically checked to determine if those coordinates intersect with an active geo-fence definition, which comprises a latitude, a longitude, and a radius in meters. Action Path will push a notification when a geo-fence is entered, and it will stay in the user’s notification drawer until dismissed or otherwise acted upon.

The user is invited to take a survey—“Take Action”—by following the notification into a pre-designed survey pertaining to the local area and a locally relevant issue. Pressing the “Take Action” button opens up the Action Path app to a survey page showing one question and a multiple choice set of options, which are meant to simulate a simplified version of an urban planning open house. The response options can be purely text or can use images as buttons.

Selecting one of the options by tapping its button takes the user to a “Thank You” page. The page tells users they are automatically subscribed to follow updates on the issue they just completed a survey about. The user can “Dismiss” the app or “Unfollow” this issue and then close the app by tapping the corresponding button. If the user “unfollows” the issue, this is logged by the app before its display disappears and it returns to being just a background service. The user interface at each of these stages is depicted in Figure 4.



Figure 4: Action Path’s user interface from push notification to survey submission

6. Early-Stage Feedback on the Prototype

Six affiliates of the MIT Media Lab tested an early prototype of Action Path exhibiting the above functionality during a 24-hour period in June 2014. The user trial was designed to elicit first impressions of the user experience from potential users and to test my research protocols ahead of a full, real-world deployment. Each tester took a pre-trial survey asking about demographics and experience with smartphones, then they installed the app on their own phone or a loaner Android smartphone, carried that phone with them home and then back to MIT the next day, where I then downloaded log data from the phone and recorded a 15-minute post-trial interview with them.

Active Geo-fences for User Test

I designed five geo-fenced surveys, seen in Table 1, which simulated both serious and not so serious local issues for test users to encounter. Three geo-fenced surveys were placed around MIT's campus (MIT Media Lab, MIT East Campus Gateway, and Mass Ave Food Trucks). The MIT East Campus Gateway survey was taken directly from a recent planning discussion between the MIT Corporation and the City of Cambridge. Another geo-fenced survey was placed near Central Square, Cambridge (Vail Court), which was based on Denise Cheng's "Postmarked" project (2013). And another was located in East Somerville (Chuckie Harris Park), which was based on the same issue raised by the Somerville by Design team mentioned in the needs assessment.

Unfortunately, in the Geo-fence Definitions for this short test, Chuckie Harris Park was given the GPS coordinates for the light post near the MIT Media Lab, which had been used for an earlier test of local geo-fences. In other words, the test app suggested that Chuckie Harris Park was about two miles south of its actual location in a place likely to be triggered by many of the MIT Media Lab-based testers. While the data generated by engagement with this geo-fence are irrelevant to the design goals for connecting issues to physical places, they still provided me valuable feedback because Chuckie Harris Park was the only geo-fenced survey that used image-based responses; furthermore, the error created an opportunity for me to see how users might respond to a geo-fence they are unable to locate in the physical world around them. The radii for the geo-fences, listed in Table 2, were set at distances that would ensure they would fully encapsulate the location and nearest intersection in the case of the MIT campus-based surveys (70 meters) and at least two blocks in either direction in the case of the off-campus locations (90 meters).

Table 1: Geo-fenced Surveys for Early-Stage User Testing

Survey ID	Question	Responses
Chuckie Harris Park	What's the best option for connecting the new Chuckie Harris Park to Broadway?	<p>A. Street paint at intersection</p>  <p>B. Gate over Cross St</p>  <p>C. Grass corridor by Senior Ctr</p> 
MIT Media Lab	What addition to the 3rd Floor Cafe would you most like to see?	<p>A. Popcorn Machine</p> <p>B. Pizza Oven</p> <p>C. Kegerator</p>
MIT East Campus Gateway	Which redevelopment option do you like most?	<p>A. Renovation of E38 + New Transparent T Headhouse</p> <p>B. New Narrower Multi-use Building + New Transparent T Headhouse</p>
Vail Court	What should the owners of Vail Court do with their property?	<p>A. Sell it to city/developers for new apartments</p> <p>B. Sell it to city/developers for new office space</p> <p>C. Pave it over and add more paid parking spots</p>
Mass Ave Food Trucks	What cuisines would you like to see added as food trucks here?	<p>A. Korean BBQ</p> <p>B. Falafel</p> <p>C. Pretzels</p>

Table 2: Geo-fence Latitude and Longitude Coordinates and Radii for Early-Stage User Testing

Survey ID	Latitude	Longitude	Radius
Chuckie Harris Park ²	42.361420	-71.086884	90
MIT Media Lab	42.360539	-71.087447	70
MIT East Campus Gateway	42.362306	-71.086097	70
Vail Court	42.366839	-71.103972	90
Mass Ave Food Trucks	42.359025	-71.093575	70

Collecting Log Data

The user test version of the Action Path app logged all actions by users involving the app, and stored them locally on the phone in a log file with date- and time-stamps, as well as the GPS coordinates of the phone, if relevant, at the moment of logging. Loggable actions included:

- Loading the Latest Geo-fences
- Entering a Geo-fence
- Exiting a Geo-fence
- Clicking on a Notification
- Submitting a Response to a Survey
- Dismissing the Thank You page (passively following an issue)
- Unfollowing an Issue (active unfollow)

Insights from Log Data

The goal of this quantitative analysis is to understand where and when users respond to the notifications they have received on the Action Path app. I examined the latitude and longitude fields and the date and time fields to determine the distance and time between the last notification being triggered for a geo-fenced survey and when it was actually clicked on and then responded to.

Thanks to the onboarding process usually triggering the MIT Media Lab geo-fenced survey immediately upon installation, only the MIT Media Lab survey was triggered, clicked on, and responded to by every tester. While five testers triggered the incorrectly located Chuckie Harris Park geo-fenced survey, only three clicked on the notification and responded to it. All three who entered the geo-fence of the MIT East Campus Gateway survey responded to it. Only one

² The actual latitude and longitude coordinates for Chuckie Harris Park in East Somerville are latitude: 42.389235, longitude: -71.085226.

managed to trigger and respond to the Mass Ave Food Trucks survey. No testers triggered the Vail Court geo-fenced survey, although one tester during their interview described a commute that would have taken them within the radius of that geo-fence. These instances of geo-fence survey engagement are tabulated in Table 3.

Table 3: Number of Testers who Triggered, Clicked on, or Responded to each Geo-fenced Survey

Survey ID	Triggered (# Parts.)	Clicked (# Parts.)	Responded (# Parts.)
Chuckie Harris Park	5	3	3
MIT Media Lab	6	6	6
MIT East Campus Gateway	3	3	3
Vail Court	0	0	0
Mass Ave Food Trucks	1	1	1

In Table 4, I break down the same data by tester to show variance of engagement with the geo-fenced surveys across the sample. Tester F managed to enter three times as many geo-fences as the next nearest tester, but the three geo-fences are all near the MIT Media Lab, suggesting they didn't necessarily travel far, but rather back and forth often. Tester F and Tester C had the most diverse experiences in terms of responding to three different geo-fenced surveys during the user trial. Tester A had the lowest engagement numbers across the board. During their interview, they admitted to not checking the loaner phone they had been given, assuming they would hear the notification, which was not the case.

Table 4: Number of Geo-fenced Surveys Triggered, Clicked on, or Responded to by each Tester

Survey ID	Triggered (unique)	Clicked (unq.)	Responded (unq.)
Tester A	4 (2)	1 (1)	1 (1)
Tester B	6 (2)	7 (2)	3 (2)
Tester C	5 (3)	5 (3)	5 (3)
Tester D	6 (3)	2 (2)	2 (2)
Tester E	7 (2)	7 (2)	6 (2)
Tester F	22 (3)	4 (3)	4 (3)

Average Time to Click or Respond to a Notification. This metric is used to determine how long it took for the tester to see a push notification and take action on it from the time it was triggered. MIT Media Lab surveys completed with me were excluded from the raw data. If the same geo-fenced survey was triggered, clicked, and responded to multiple times by a single tester, those times were averaged first before averaging with the testers' times so as not to bias the results toward one tester's fast or slow reaction times.

Table 5: Average Times to Click a Notification and Response to a Geo-fenced Survey

Survey ID	Time to Click (min:s)	Time to Respond (min:s)
Chuckie Harris Park (n=3)	10:47.6	00:43.0
MIT Media Lab (n=3)	03:39.6	00:06.5
MIT East Campus Gateway (n=3)	01:08.4	00:32.1
Vail Court	N/A	N/A
Mass Ave Food Trucks (n=1)	03:44.4	00:03.9

Table 6: Average Times to Click a Notification and Respond to a Geo-fenced Survey by Tester

Survey ID	Time to Click (min:s)	Time to Respond (min:s)
Tester A	N/A	N/A
Tester B (n=3 2)	01:54.2	00:44.3
Tester C (n=4)	03:54.7	00:09.7
Tester D (n=1)	00:19.3	00:40.4
Tester E (n=5)	06:13.3	00:10.9
Tester F (n=3)	08:38.9	00:36.1

At over 10 minutes, testers were slowest to click on notifications about Chuckie Harris Park, which also required the most time to choose a response once on the survey page. This may be due to the confusing nature of the dislocated intersection or because it is a harder question, as one tester would admit later during their interview. Similarly, the MIT East Campus Gateway was considered a more challenging question as well, and the three testers who answered that spent over 30 seconds on average. The MIT Media Lab question was short and simple, as well as “whimsical,” to quote from a tester’s interview. This resulted in a very quick question to answer, only beaten out by the Mass Ave Food Trucks to be the fastest survey—but the speedy Tester C accomplished that feat on their own.

Looking at the average times by each tester to click on a notification, only the single geo-fenced survey encountered by Tester D resembles a reaction time conforming to the intended user experience of responding to surveys shortly after you are notified of their existence. The problem may have been the lack of a clear audible notification and flashing light—a missing feature raised by several testers during the interviews. However, because the key is answering the question near to a geo-fence not necessarily within a timely fashion, we look at data about distance in the next section.

*Average Distance from Geo-fence Origin to Point of Click*³. This metric is used to determine how far away testers are from the origin (central latitude and longitude coordinates) of the geo-fenced survey notification they are clicking on. These are not measured from the point where the notification was triggered because those are at the edge of the geo-fence’s radius and the goal is that testers will be near the survey’s actual location to offer additional context when responding to the question. A good distance should be within 70 or 90 meters, since those are the radii used for these geo-fences. I calculated the distances in Table 7 and Table 8 by entering the latitude and longitude for each data point against the relevant geo-fence origin coordinates into Adam Schneider’s “great circle distance calculator” on GPSVisualizer.com and then averaging them in the same fashion as the times above. Once again, users’ initial MIT Media Lab responses are excluded.

Looking at Table 7, it appears there is something about the location of Chuckie Harris Park and even the MIT Media Lab that results in testers missing their notifications until they are far from the geo-fence origin. However, Table 8 reveals how Tester F skews the data significantly by responding to notifications far from their relevant location, whereas the other testers are all within a reasonable average distance from the geo-fence survey origins they respond to. In future user trials, this data should be collected and analyzed ahead of interviews so that specific questions can be targeted at testers like Tester F to understand why they respond to notifications so far from their location. In their interview, Tester F did mention responding to notifications while at their apartment.

Photographs taken by Tester B and Tester D show their close proximity to the MIT East Campus Gateway location when responding to the survey, confirming their low distances. Tester E’s unusually low score was thanks to his office being within one of the geo-fences. Every time he went to his office it triggered the geo-fence survey, which was a comfortable and convenient place to respond.

Table 7: Average Distance from Geo-fence Origin to Response Submitted for each Geo-fenced Survey

Survey ID	Distance (m)
Chuckie Harris Park (n=3)	624
MIT Media Lab (n=3)	229
MIT East Campus Gateway (n=3)	103
Vail Court	N/A
Mass Ave Food Trucks (n=2)	43

³ Although I initially wanted to present this information geographically, I have not mapped the locations of individual users over time in order to preserve their privacy.

Table 8: Average Distance from Geo-fence Origin to Response Submitted by Tester

Survey ID	Distance (m)
Tester A	N/A
Tester B (n=2)	83
Tester C (n=4)	105
Tester D (n=1)	35
Tester E (n=4)	62
Tester F (n=3)	769

Post-Trial Interview Design

I designed the interview protocol to complement the quantitative analysis and elicit rich qualitative feedback about the testers' experiences of Action Path as well as its design. I wanted to know about both the practicalities of each tester's commute in tandem with the psychological impression of the experience. Thus, I asked a series of questions such as "What did you *think* about when you arrived at your first point of action?" "What did you do? *Describe your process*," and "How did using Action Path make you *feel*?" When it came to design, I asked explicitly about what they didn't like about the design and what changes they would suggest, including new features in order to help prioritize future software development.

All interviews were recorded digitally and subject notes were taken during the interview to highlight side comments or testers' non-verbalized responses. I used thematic analysis to sort the feedback into useful groups to inform the next design iteration and assess the prototype's progress toward the design goals.

Insights from Post-trial Interviews

User Experiences Summary. All of the testers said the design was some combination of easy-to-use, "minimalist," "seamless," "simple," and "unobtrusive." But not all of the testers found Action Path's user experience fit neatly into their mobile computing habits. Three testers claimed that their normal commute involved stuffing their smartphone in their backpack and not checking it again until they got home and unpacked. They tried to keep it closer to them when they walked and to check it more regularly than they would, something the non-backpack stuffers also did.

All six testers wished there were more geo-fenced surveys available. They were disappointed when there were no actions attached to locations near their homes and favorite places or in other neighborhoods they explored during the 24-hour test period. This suggests there might be interest in a higher density of actions, although that could be an artifact of this particular simulation, where testers were eager to try out the app.

Among the available actions, the three testers who entered the erroneously located Chuckie Harris Park geo-fence all expressed a strong preference for its survey style that used images in the response options. In contrast, two of the testers considered the MIT East Campus Gateway

survey particularly confusing without images accompanying the options. If the ideal geo-fenced survey uses well-designed imagery this suggests that sponsor organizations will need to have a designer, or someone willing to be trained to design good imagery, on the team managing their Action Path deployment.

Feature Requests. The most common request among testers was more information or context attached to the surveys. While testers who took the Chuckie Harris Park and MIT East Campus Gateway surveys said they learned about the places and the issues involved—meeting the design goal of greater awareness of the community’s needs—they all indicated they would have liked to know more. Most testers asked for a link to more information about the issue, although one was also interested in having access to a kind of ongoing conversation around the issue with other users and/or community leaders.

Maps were also requested to help find the location of the geo-fenced survey target, a need reinforced by the distance from the targets where testers appeared to be answering their surveys according to log data. Interestingly, when asked if they had sought information on their mobile browsers or looked up locations using map/navigational applications, none said they had, even though they were interested in learning more and informing their decisions.

Concerns. I asked each user how they might want to be updated about an issue, specifically probing about a desire for using location-based notifications in the same fashion as the surveys. Three testers were very eager about that idea in lieu of other kinds of announcements via email or buried in elsewhere in the app because they found location-based notifications to be a “novelty” and “cool.” However, all testers, including those three, expressed concern about the volume of notifications that might be generated. To quote one of the three, “If it turns out that every five seconds I get one, then I would turn it off.” The backdrop for these concerns is a variety of behavioral patterns among testers for dealing with smartphone notifications. When I asked them about it, two testers said they disable most notifications by default. Another two allow them all by default. One of these testers said, “There are apps that I use that are like notifications all the time, and I just clear them away, clear them away, clear them away. I don’t think I’m bothered by it for some reason. I never really play with it too much. Unless they get really incessant and then I just usually mute it.”

When I asked if they would be willing to regularly use the app if it was installed on their phone, everyone said they would, but it is difficult to read this as an unbiased response. One of the notification disablers told me, “I think I would leave it on full-time. I would probably want there to be some kind of “do not disturb” option, whether that’s like phone-wide or just this app.” Other notification-heavy apps like Niantic Lab’s *Field Trip* have a “snooze” feature as well, which might be useful to add to the notification. These responses raise important questions about what is the best way to interrupt users and to keep them informed, which impact how well Action Path fulfills the design goals of integrating civic learning and engagement in everyday life and lowering barriers to participation.

One last area of concern was about where the survey questions came from and how the responses would be used. Three testers expressed varying levels of concern about who the sponsors of the survey questions were. One tester was emphatic that the questions not have any commercial framing, arguing “there is a difference between feeling like you are donating your data and opinion to a commercial thing versus a civic... or something that would improve your community.” They went on to cite Google and Facebook as examples of companies that want their data “so that they can sell ads better, which doesn’t relate to my overarching goals for [where I live].” Another tester wasn’t sure about the impact of their contribution because they didn’t know if the question was connected to an entity with sufficient power, “I guess it was unclear what that agency was, who was behind the survey, who was behind the answer—was it simply somebody who didn’t have any agency themselves who proposed the survey? It was hard to tell how far my interacting with it would go.” This indicates an interest in transparency that will need to be designed with sponsoring organizations. Commercial developers with municipal contracts may want to use the app for planning purposes and there will be a need to ensure that users feel like they are contributing to a cause that is improving the community rather than enriching the company, which is a part of designing a good and inclusive planning process as discussed in the needs assessment.

Civic Learning Outcomes. Despite the confusion over where and what Chuckie Harris Park was, two of the three testers who triggered that notification felt very strongly that it was their favorite survey, and not only because of its use of imagery but because it represented a challenge demanding substantial reflection and engagement, evoking Schön’s reflective practice and the Gordon’s meaningful inefficiencies. One tester argued,

“The more it felt like solving a problem or genuinely answering a hard question, not something that was simply an opinion poll, but where I felt like I was bringing some strategic thinking to bear, I think it was more fun to do that.... The Chuckie Harris question was probably the simultaneously most and least fun. It was the most fun because I felt like I could actually really work through a hard problem.”

The other tester commented,

“Chuckie Harris Park—I really liked that notification.... That was something I have never encountered before. It appeared to me as city design, an urban design campaign, or like participatory design that I have never seen before.... I am already using some apps that provide me information about certain architectural places or any other points of interest. That is just one-way information; there is nothing I can do. I can take a picture, I guess, but nothing more. I kind of know a little more—I guess—that you are tying actions along with the place idea. That was most effective for the Chuckie Harris Park.”

This comment expresses the demand for the content of in-personal planning processes, where planners and architects present sketches to the public at open houses and garner feedback on what people do or do not like, set in the locations where planning is meant to happen—

something the Somerville by Design team has done during brief design charrettes. Action Path might be able to extend those experiences beyond the few hours that they last and reach people who could not make it or are more comfortable thinking through those questions by themselves on their own time.

Most of the testers felt that using the app, albeit for a very short period, changed how they approached their city—moving them closer to the design goal of a less abstract experience of the city. For two testers, this was a psychological mindset like “low-level mindfulness” or “exploration,” which evoke the potential for Prior’s by-product learning, and thus achieving a greater awareness of the community’s needs. For two others, it inspired them to reflect on the places they care about and to hope for geo-fenced surveys connected to those places, which they could participate in. For example,

“I started rooting for ‘Will I get things that really matter for my surroundings?’ But I never got any of them. For example, I went to the Muddy [Charles Pub on MIT’s campus] and I was already starting to think, ‘I wonder if it is going to talk about the future plans of the Muddy?’ And then I was excited, but that never came. And then as I walked home, I wondered what stuff is happening around here...”

This raises the question of whether users should be able to add geo-fenced surveys themselves. There is a great opportunity for users to take *thicker* civic action by making survey creation a feature. However, it runs into the concern over whether feedback is being submitted to someone who has the power to effect change. From a technological standpoint, creating the location-based version of Change.org by allowing users to place new electronic petitions throughout their community is straightforward. But to ensure impact, Change.org has a large staff of professional organizers who help maximize the efficacy of submitted petitions—a complex socio-technical system with high labor costs.

Several testers felt like they had a greater sense of agency by using Action Path. For one, this was experienced in terms of information access: “I had access to a layer of information that I was previously unaware of.” Two subjects felt empowered by the ability to follow an issue, representing a kind of two-way responsibility. One said,

“I love the idea of following. I actually think that is really important. Because it’s like your participation matters and it feels like it matters and then you can follow up and verify that it mattered in some way. And you might have been made aware of an issue or an existing set of possibilities in a particular space. And since you have been made aware of that, you then probably would want to know what happens to that—what are the current debates on that.”

The other argued that it represented a uniquely maintainable level of responsibility, a good indicator that Action Path could lower barriers to engagement,

“It felt like not only did my voice matter but I could continue on the issue if I was interested. I thought that was the simplest, easy way to get involved in the community. It wasn’t a high commitment level, it was just whether or not I wanted to follow an issue, and the idea of following is so well-ingrained because of Twitter—I thought it was perfect.”

One result from the early user tests, which reinforced the need to lower barriers through convenience but failed to reinforce the intended trajectory of civic learning leading toward thicker engagement, was the fact that no tester sought out additional information about the issues or locations mentioned in the geo-fenced surveys. This was despite the testers remarking on the curiosity inflamed by the app and insisting that they want more information and context. One tester offered, “the cognitive load of standing in the middle of the sidewalk trying to figure out what I thought of Chuckie Harris Park and also looking up Chuckie Harris Park was a little more than I was willing to do.” This makes practical sense. However, the fact that none of them looked up information presents a potentially new design challenge. At the very least, information-seeking behavior should be explicitly asked about in future rounds of user testing.

7. Conclusion and Future Work

Summary of Contributions

Theoretical

In this paper, I have presented a theoretical argument for technology-powered monitorial citizenship to address declining and unequal levels of civic engagement. I argue that rates of participation in community projects can increase both in the near-term and the long-term by deploying civic technologies like Action Path, which have been carefully designed to facilitate *minimum effective engagement* and to serve as civic learning experiences that develop users’ expertise and sense of agency through *reflective political practice*.

Practical

I have developed a prototype Android app capable of delivering geo-fenced surveys using push notifications. Feedback from the first iteration of test user feedback suggest that it has the potential to fulfill its design goals of helping users be more aware of their community’s needs and seeing their city in less abstract terms. A major real-world test deployment is still needed to evaluate Action Path against its remaining two design goals of integrating civic learning and engagement more tightly into users’ everyday lives and lowering barriers to civic engagement.

Limitations

All claims made in this paper are preliminary. The paper documents the *building* of a new civic technology through design-based research. The technology is at too early of a stage and the current sample of test users too small to draw conclusions about the real-world viability of

effective civic engagement and civic learning through the practice of monitorial citizenship using Action Path. Specifically, the claims around how this socio-technical system will enable monitorial citizenship cannot be tested until a full real-world deployment aggregates user activity to crowdsource expertise and contribute to municipal decision-making.

Future Work

Municipal Deployments of Action Path

While the key user experience and interface elements are already in place, real-world deployments will require 1) significant improvements be made to Action Path's technology and 2) the organization of a series of participatory design sessions with municipal staff and relevant community members in order to develop geo-fenced surveys and launch events for the app.

Major Technological Needs before Municipal Deployments. The following are key pieces of architecture that should be put in place in order to effectively deploy Action Path:

1. Secure data collection and dashboard system for recording and storing responses from users
2. Mechanism by which survey sponsors can remotely update users about the issues they are following
3. Internationalization of app into most commonly used languages in the community
4. iPhone version of Action Path.⁴

Social Process Design Priorities. The early-stage user feedback raised concerns about how information will be used. Since users will have accounts through Action Path, a way to inform users how their data will be stored, how anonymous or not anonymous they will be to the survey sponsors and to other users, and who is sponsoring a survey and their ability to employ the user's data to effect change need to be designed.

Geo-fence design workshops will need to be organized with key community stakeholders. Designing a good geo-fenced survey includes the location specification, question wording, and context provided around the question and available responses, as well as how responses will be used in reports and decision-making and how contributing users will stay informed about the progress of the issue. This requires a sponsor like a city government to dedicate time and energy to developing and executing a protocol for working with Action Path that is integrated into their normal processes. Similarly, the launch events and other mechanisms for promoting adoption of the app among local citizens need to be designed with partners to make sure a wide

⁴ This is not necessary for the first few iterations of real-world testing but will be necessary before Action Path can be considered production-quality for widespread use.

cross-section of the community are informed about the app's existence and given the opportunity to install and try it.

A Broader Civic Technology Research and Practice Agenda

As a technologist and social scientist building prototype civic technology, I cannot avoid the question: Can a solution like Action Path really scale? Assuming the iPhone version can be developed and internationalization into all the relevant languages of a community can be attained, how can Action Path overcome the low adoption rates and persistently small and self-selected *N*'s faced by town hall meetings and civic engagement apps alike?

To me, this suggests a research agenda of two parallel components. First, I think researchers and technologists need to keep developing prototype civic technologies and field-testing them. Some of these will be production-quality, like the tools coming out of Emerson's Engagement Lab. Others will remain proofs of concept, ideally following the model of phronetic social science. They will serve as source material for future iterations and projects as well as for design principles that technologists can incorporate in consumer apps and tools which already enjoy wide uptake. In this way, technology design can itself be public work. Like activist and technologist Nick Grossman (2013), I believe that civic technology will have the greatest impact by helping to make all apps more civic, not just by making more civic apps.

In parallel, I believe we need to work on redesigning civics education or, as I have tried to argue in this paper, open up civic learning to incorporate the practical means by which young and old can push for change in their communities and throughout society. Civic engagement in the form of monitorial citizenship is one practical approach, whereby we might develop expertise through reflective political practice—learning how to learn about issues affecting our world and to find small ways to contribute toward bettering it, one action at a time.

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