
Inclusion of Underserved Residents in City Technology Planning

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Abstract

Cities are increasingly integrating urban technologies into their infrastructures to improve municipal services, civic engagement, and quality of life for residents. Research suggests that technologies implemented in communities can worsen existing inequalities, yet there is little understanding of what underserved residents think about urban technologies or how they engage with their cities about technology policies or practices. Based on two technology forums held in underserved communities, we found that residents are motivated to participate in city technology planning because they believe technology impacts the economic and social health of their communities and because they are wary of the city's intentions behind certain urban technologies and policies. However, avenues for such engagement with the city were not accessible to our participants. We conclude that residents' participation in existing forms of governance poses an opportunity for city officials and those in underserved communities to collaboratively build urban technologies that benefit all.

Author Keywords

Urban technology; civic technology; smart cities; city technology planning; underserved communities

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Forum 1	14 participants
Forum 2	41 participants
Total	55 participants
Gender	54% female
Median age	51 - 55
Average household income	\$60k - \$69k
Race	81% Black 10% White 3% Latino
Education	29% less than bachelors 46% bachelors 29% beyond bachelors

Table 1: Participant summary. Demographic data was collected in a survey (n = 37).

Introduction

In recent years, the application of data, computation, and embedded systems in urban environments has led to the creation of “smart city” technologies. Smart city technologies include innovative digital solutions that use data analytics to address urban issues such as transportation, public safety, economic development, and environmental conditions (e.g., rainfall, flooding, energy consumption) [16]. Data generated from smart city technologies are often made available for public consumption, leading to the creation of *civic technologies*, which is a broad category that includes tools that leverage such data for public good [6, 26]. Henceforth, we refer to smart city technologies and civic technologies as “urban technologies.”

The proliferation of urban technologies has led many cities to create city technology plans. City planning typically includes stakeholders such as residents, private companies, and nonprofit organizations. Studies on such partnerships suggest that involving residents in the creation of policies that impact their communities is important [13, 14]. Additionally, given the potential for urban technologies to worsen existing inequalities [10, 23, 24], it is essential to include residents of underserved communities in the design of urban technologies, plans, and policies. By underserved, we are referring to resource constrained communities that have historically faced considerable social and economic disadvantage due to lack of investment and other unfair policies and practices at an institutional level [21, 27]. Thus, we address the following questions in this exploratory study: *What are underserved residents’ perceptions of urban technologies in their communities and of local technology policies? What factors shape these perceptions?*

Our results extend prior HCI research that focus on designing technologies in cities [3, 7, 17, 18, 20] and residents’

participation in local governance [4, 11]. This paper contributes an understanding of residents’ perceptions and concerns about urban technologies and policies and identifies opportunities to develop a more inclusive technology planning and policymaking process.

Related Work

Prior literature suggest that though some residents in underserved communities actively participate in the governance of their communities, particularly around non-technology related issues [11, 13, 14], they tend to have low levels of trust in government institutions [25]. Recent studies in HCI focus on how underserved communities engage with city officials about decision-making in their communities [11, 12], and community engagement has been widely studied in HCI [3, 4, 5, 12, 15, 17]. However, there has been little focus on how residents in underserved communities engage in the governance of technology, and though there has been research in HCI on the role of trust in community engagement [9], there is a lack of understanding of how trust may impact people’s perceptions of urban technologies and technology policies. Our results suggest that there is little opportunity to engage in participatory governance of technology and identifies concerns residents in underserved communities have about their city’s technology policies and use of urban technologies.

Methods

To examine our research questions, we held two urban technology forums in two communities in Chicago, Illinois. Local not-for-profit organizations that have credibility within their communities hosted the forums. Both communities experience high poverty, high crime, and low education. Table 1 summarizes the participant demographics. There were a total of 55 participants.

Tech Forum Activities

Icebreaker

In groups of 5-8, participants chose an image to represent their group. The provided images were cut from magazines or were photos of the community printed from Google Streetview. Next, they discussed any past experiences they had with community governance forums such as community-police meetings or meetings with local city council officials.

Mapping

Remaining in groups, each participant wrote what they believed to be their community's assets, general challenges, and technology gaps and/or challenges on color-coded stickies and placed them on their group's poster-sized map.

Brainstorm

The final activity was to brainstorm interventions that addressed the challenges identified in the mapping activity. Participants chose the topics to address in the brainstorm, which was led by facilitators.

Each forum lasted about 3 hours. We guided participants through activities to understand their participation in local governance, identify local assets and challenges, and brainstorm interventions. Assets included parks, libraries, churches, and public transit; challenges included violent crime, lack of quality businesses, lack of access to tech education and infrastructure, and the city's use of urban technologies for revenue rather than safety. We encouraged participants to think broadly about technology, and gave examples ranging from PCs to public displays at bus stops. Our goal was for residents to lead the conversation, therefore we did not limit the discussion to urban technology.

In addition to 24 hours of audio and video recordings, we collected artifacts (i.e., 274 sticky notes, 9 annotated large maps, 33 worksheets), 267 photos of the sessions, and 31 pages of field notes from observations. We analyzed the field notes and all written artifacts (i.e, sticky notes, worksheets, maps) using inductive qualitative analysis [22].

Findings

Our results suggest that residents are not only concerned about their access to technology resources (e.g., internet, tech education), but also about the city's use of urban technologies and data in their communities. These perceptions appear to be influenced by residents' distrust of the city, and contributed to their desire to participate in the city's technology planning and policymaking process.

Though our participants engaged in established forms of local governance (e.g., ward meetings, community-police meetings), they felt that there are not enough opportunities to engage with city officials about technology. One person wanted *"more opportunities to discuss where tech is going and why and who has access to data and what they are doing with it"* [Community 1 (C1) sticky note]. Interest in the

city's technology plans drove several participants to attend the technology forums [C2 icebreaker worksheets].

Participants indicated a demand for participating in the governance of technology because they view technology as interwoven with community challenges, such as job access and crime, and because they have ideas for technology interventions that would promote community development. A group in C2 wanted *"a place to go to improve your computer skills and have access to a computer and the internet [because] you can't apply for a job without a computer"* [C2 sticky note]. Another participant wanted the police in her precinct to use an online crime reporting technology that she heard is used in other precincts [C2 field notes]. Residents had ideas about how to leverage local assets to improve technology access and strengthen their community, such as by holding pop-up technology demonstrations in vacant storefronts [C1 sticky note].

Though there was a general sentiment that urban technology has potential for creating public good, our findings suggest that residents do not trust the city's motivations for using certain urban technologies and question the safety of the data collected by these technologies. One participant was concerned that a crime reporting app might not be truly anonymous [C2 field notes], and a group of participants raised questions about how data from surveillance cameras is used and who has access to it [C1 field notes]. Another person compared the city's use of technology for revenue versus safety, saying *"In the community five people are shot but no one can track this. They can track cars [with outstanding tickets] to boot them, but can't track the people being shot and killed. Finding a murderer doesn't generate revenue for the city but boots do [..]"* [C1 field notes].

The unequal distribution of internet service in the city [1] was an important policy issue for our participants, and illus-

trated their distrust of the city. Some participants attributed the lack of internet access in their community to a political agenda of disenfranchisement, because *"not having internet locks you out of employment and corporate America, and it does [so] by design" [C1 field notes]*. Participants wanted the city to regulate internet pricing (as it does with other utilities like water and gas) and ensure equal broadband internet access. *"All companies should provide wifi [in all communities]. The city should identify areas that have limited wifi. Residents should hold the city and the alderman accountable" [C2 field notes]*.

Discussion

This study describes how local residents in underserved communities view urban technologies, the institutions implementing and utilizing these technologies, and the governance of technology. Our results suggest that a nuanced understanding of community complexities and residents' perceptions of urban technologies is necessary to develop equitable urban technologies. By community complexities, we are referring to the realities that impact the lived experience of residents, such as access to jobs, education, and local businesses, and experiential qualities such as safety, community pride, and trust in local officials. Results from our study indicate that residents do not separate their social and economic circumstances from their perceptions of technology, but instead, these factors motivate residents' participation in technology planning.

One way to begin to understand how these complexities are tied to technology is to include residents in underserved communities in the research, planning, and development of urban technologies and policies. To build successful partnerships, it will be necessary to consider the historic distrust that underserved communities have towards government officials due to decades of policies that negatively

impact, or do not address, issues faced by their communities (such as lack of investment and educational opportunities, overpolicing, concentrated poverty, lack of economic development, and unfair sentencing that leads to high incarceration) [2, 8, 21, 19, 27]. Such issues have led to considerable social and economic disadvantages among residents in underserved communities, fostering distrust in the institutions that create policies that perpetuate these issues. Technology and internet access may be a newer issue compared to other disparities faced by underserved communities, but residents view it as important and want to participate in technology planning and policymaking.

There are established avenues of engagement between residents and city officials around issues such as crime, which have clear accountability structures [12, 13]. Our findings suggest that residents are seeking a similar venue to communicate with the city about technology. Therefore, there is an opportunity for to leverage residents' participation in established meetings to make technology governing structures more visible. For instance, participants were concerned that the city does not make internet providers offer service in all communities; however, the city has little ability to control internet providers. During local ward meetings, city representatives could clarify the city's role in internet provision so that residents better understand the city's authority. Furthermore, city representatives could use such meetings to refer residents to the appropriate avenues to address their concerns about technology. Such communication should start at established civic meetings until engagement procedures for city tech planning are established.

Creating a platform for city technology engagement and accountability could develop communities' trust of tech planners and urban technologies. An avenue for participation could also enable the development of an inclusive research

and design process that accounts for community complexities and results in more equitable urban technologies.

Conclusions and Future Work

It is necessary to understand the challenges underserved communities face, as well as their assets, when designing urban technologies. Involving residents in the development of urban technologies could help develop effective tools and positively impact trust between underserved residents and the city. Future work should explore structures that support engagement in city tech planning.

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