

# Cracking Public Space Open

## Design for Public Librarians

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Public libraries in the U.S. and around the world are rapidly changing due to expanding technological and social needs of their communities. Furthermore, in recent years, public spaces, including libraries, have faced budgetary and other pressures, putting a strain on the resources available to librarians. As such, public libraries are a compelling cite for uncovering socio-technical entanglements between government services, technology use, public space, and civic participation. In this paper, we report on a qualitative study of librarians in a U.S. urban public library system undergoing substantial renovations and transformations. We frame the work of librarians as a range of infrastructuring practices, which help uncover insights about the socio-material and political conditions of public service in libraries. Using the metaphor of *cracking public space open*, we contribute a set of design provocations to support an increasingly complex work of public librarians.

CCS CONCEPTS • **Human-centered computing~Human computer interaction (HCI)~Empirical studies in HCI**

Additional Keywords and Phrases: Public space, public library, infrastructuring, civic design

### ACM Reference Format:

First Author's Name, Initials, and Last Name, Second Author's Name, Initials, and Last Name, and Third Author's Name, Initials, and Last Name. 2018. The Title of the Paper: ACM Conference Proceedings Manuscript Submission Template: This is the subtitle of the paper, this document both explains and embodies the submission format for authors using Word. In Woodstock '18: ACM Symposium on Neural Gaze Detection, June 03–05, 2018, Woodstock, NY. ACM, New York, NY, USA, 10 pages. NOTE: This block will be automatically generated when manuscripts are processed after acceptance.

## 1 Introduction

According to the American Library Association (ALA), there are over 119,487 libraries in the U.S., which include public libraries, academic libraries, school libraries, special libraries, armed forces libraries and government libraries [2]. Public libraries serve a range of important functions in the community and public opinion surveys have shown that they have enjoyed steady support [36] even as trust in other public institutions has fallen. However, like many other community and local government services, their status is being challenged by information and communication technologies (ICTs). This phenomenon is not new. Weigand's historical account of public libraries in America shows that they do not only serve the culture they are in, but they are also shaped by that culture [94] in an ongoing negotiation. Today, the expectations of public libraries, in terms of information, resources, and services are expanding.

At the same time, there has been a steady decline in public space and associated services due to liberalization and downsizing of government, as well as the rise of global capital and its influence on local governments [6, 57]. Today, public libraries operate under two opposing forces: market logics and the private sector on the one side, and a commitment to knowledge and democracy on the other [1]. Economic hardships and instability both in urban and rural areas, along with the rising homeless population in the U.S., have also expanded the role of public libraries in social inclusion [35] and technological empowerment. [97] At the same time, this has intensified the debate around what libraries are for. While there is a need to reinvent the library to serve beyond its original purpose as a repository of knowledge [14], there are also complex questions about whether librarians are put in an unjustifiable position to serve everything to everyone. Finally, there is a recognition that public libraries, especially in urban settings, are situated in interdependent socio-technical systems [64]. These tensions call for an increased attention to HCI design in this space. While there has been some research on design for library users and library as a place [17, 71, 97, 98], there has been little research in HCI focused on the work librarians. Rather than seeing librarians merely as local information service providers, we need to understand their work as active, creative agents in their communities, who are dealing with complex socio-technical systems. This perspective motivated our research questions: *How might we expand our understanding of public librarianship through the concept of infrastructuring? What kind of infrastructuring practices do librarian engage in? And how might HCI design productively support the socio-material conditions and work of public librarianship?* To that end, based on the ethnographic study of librarians in the Fulton County Library System (FCLS), which is based in Atlanta, Georgia, USA, we demonstrate that the work of public librarians consists of a variety of infrastructuring practices. Our contribution consists of an articulation of two distinct types of infrastructuring in public libraries: (1) civic and social infrastructuring and (2) infrastructuring with and along market logics. Furthermore, we contribute design implications for HCI research in public libraries and similar community-oriented public service institutions. Finally, using the metaphor of *cracking public space open*, offered by one of our research participants, we propose a set of provocations for design to support public librarians. It should be noted that our work took place in the U.S. urban context. This influences which issues are foregrounded and how. Public libraries in other countries and regions are outside of the scope of this analysis.

## 2 Related work

In this paper we add to the ongoing research in public space and public service with a focus on public libraries as an institution for civic and community engagement. Furthermore, we draw on the notions of infrastructuring, which has been taken up in HCI and CSCW research to attend to and articulate socio-technical relations. Finally, we outline how infrastructure has been engaged with in library information science (LIS) literature. In recent years, there has been significant HCI and CSCW research exploring implications of ICTs in public [22, 25, 32, 37, 56] and semi-public spaces [40, 51, 82]. Researchers have explored how ICTs in public spaces can configure relations with the physical architecture [18, 22, 31, 56] and how they can shape the emotional states and interpersonal relationships of people in those spaces [37]. The urban environment, with its high density of population and frequent convivial encounters among strangers as well as familiar people, can foster a whole range of emotional experiences ranging from anxiety and danger to friendship and play [50, 70]. Furthermore, the library has been explored as a cite for technology adoption [81] and for expanding civic participation. [20, 21] [17] Recent work by Yoo *et al* explored HCI design in public libraries from activity-centered and place-centered perspectives [98, 99], highlighting the challenges joint co-production in public events. Recent research has also explored the future of public libraries using speculative and critical design methods to explore alternative notions and politics of library catalogues [16] and conviviality in public space.[50] The concept of *infrastructuring* understands technological change by focusing away from things (roads, pipes, etc.) towards relations that they enable. Infrastructure is “fundamentally and always a relation and never a thing” and therefore it is ongoing, situated, contextual and contingent. [86] *Infrastructuring* refers to actively attending to these relations, breakdowns and what infrastructures mean to different user groups. [85] In design,

infrastructuring refers to the notion of “continuing design” [42, 43] beyond the traditional project in which “the boundaries between use, design, implementation, modification, maintenance, and redesign are blurred” [42] Infrastructuring is useful in examining public librarianship because (a) it helps uncover the rich variety of relations they foster and (b) understand the increasingly complex work of librarians. Infrastructuring is a productive theoretical lens because, as we will demonstrate, the work of librarians is community-oriented, and therefore loose, creative and heterogeneous. [74] It is also politics-laden due the fact that is part of a municipal bureaucracy.

## 2.1 Civics and Community Engagement

In recent years, HCI researchers have focused on issues and concerns of communities. [24, 74] Public libraries do not only provide information services, but they also serve as community centers and engines of democracy and civic life [71, 95]. One way, researchers have engaged with issues of civic life, civic participation and community engagement through the lens of digital civics. While this literature often involves questions of citizen-government relations and interactions it also extends beyond traditional power structures such as the nation state, city hall, elections, and includes other less formal and more discursive networks [26] [25] [61]. Seeing civics in this way highlights how HCI can break or push against normative notions of democracy, citizenship and legitimacy. Digital civics in the work of advocacy groups can show how social and political actions can exert influence at various scales and magnitudes, all contingent on the specifics of the people and cities in question. In this context, Asad and Le Dantec argue that digital civics, specifically digital advocacy, can form attachments across sites through affinities between resources, between identities and between issues [4]. Affinities between resources and between issues are relevant to public libraries because libraries have traditionally been associated with access to resources (books, technology, reference services etc.) and addressing unique needs of their communities (e.g. technological literacy, serving immigrants, children’s programming etc.). But a public library can also be a place that connects and shapes identities. Members of the community can use their libraries perform their identities, such as a stay-at-home mother, a retiree, a student etc., which in turn imbues the library itself with meaning [65]. Public libraries also help establish civic networks in the community [88] by raising awareness about its resources, enabling and reinforcing connections through regular in-person encounters within and outside the library. While digital civics aim to “support citizens becoming agents of democracy with and through technologies” [90], there is also a recognition that “civics is an ecosystem of institutions where communities, public institutions and private interests are in constant exchange with each other.” [4] This ongoing exchange is manifested in public libraries in how librarians navigate the tensions between private and public interests [1]. The professional and ethical standards of public librarians put them in a position akin to activists who often have to work outside of formal political and institutional channels. [5] Keeping library spaces open and accessible is an inherently political project, since the space itself is constantly under pressure from market logics (e.g. market competition, private property, marketization) and neoliberal policies (e.g. austerity, individualism). Recognizing the challenges in theorizing modes of interventions that do not fit familiar forms of political action in the face of structures of capitalism, Lindtner *et al* proposed alternative analytical sensibilities of “noticing differently”, “walking alongside” and “parasitic resistance.” [59] These analytical frames can be useful in understanding librarians’ engagement with their communities, given the pressures of market logics, and neoliberal policies of public administration.

## 2.2 Infrastructuring, Publics and Institutions

Public libraries constitute an infrastructure as a network of spaces (called branches), as a set of personal and professional relationships that make them work, and as set of laws and policies that support them. The Deweyan notion of publics has been taken up by participatory design (PD), HCI and CSCW researchers [41, 44, 53, 87] as it has shown to be productive in articulating issues in socially engaged contexts. The publics are formed through the process of identifying common issues and taking action towards resolving them in a way that crosses multiple boundaries and connects stakeholders [23]. Publics are constituted through attachments of various actors to

issues. These attachments act as “sources and resources for “the enacting of public involvement in controversy.” [63] Another characteristic of Deweyan public is the alignment around achieving a *future* outcome [63]. This orientation is closely aligned with Ehn’s argument for design-for-future use in PD [29]. It shifts the focus of design away from proximate use embodied in a product towards ongoing participation throughout the entire lifecycle of an artifact or a system [53]. Ehn theorized design-for-future use through with the concept of infrastructuring [84]. Lindström and Ståhl offer another perspective of “publics-in-the-making” where issues are not preset but come out in the process of collaboration and making. This is an alternative to deliberative notion of publics in which continuous re-patterning or patching of connections creates new understanding and knowledge of issues [58]. Seravalli *et al* argued that infrastructuring along with commoning, can support civil servants engaged in co-production in their communities. [80]

In recent years, researchers continued to refine and expand the concept infrastructuring. Bødker noted that it is often the case that infrastructuring work focuses on front stage and highlights the need to “address messy and multifaceted processes that unfold on the backstage” of design interventions and workshops. Similarly, Korn and Volda argued that infrastructuring for civic engagement should focus not on the “privileged moments” (such as PD workshops and other interventions) but on the “product residue” of everyday life. [49] Bodker *et al* proposed the concept of knotworking to account for how agency can be dispersed across people and organizations which helps us understand how backstage infrastructuring work comes to matter. [10] The backstage and everyday infrastructuring will become evident in the work of public librarians, much of which is invisible and routine. Such everyday and “routine infrastructuring” is productive not just in periods of continuity, but also in moments of disruption such as traumas or significant life events [79]. Here, infrastructuring practices can become strategies for resilience and care, especially for the marginalized and disenfranchised, giving rise to alternative forms of infrastructuring such as inverse infrastructuring [28] and guerilla infrastructuring [91] and unplanned infrastructuring aimed at formation of tiny publics [87]. Finally, recognizing the increasingly blurred nature of design work in the public realm (among designers, stakeholders, citizens etc.), Huybrechts *et al* proposed increased engagement with institutions with a concept analogous to infrastructuring -- institutioning. Institutioning refers to “gradual processes of altering (consolidating or challenging) existing frames of institutions.” [38] As the work of librarians continues to extend beyond their traditional realm into new services, technologies and spaces, they are faced with choices that push against the institutional frames of public libraries and municipal services.

## 2.3 Related work in Library and Information Science

While our research is intended for researchers in the HCI design community, it is important to understand the work has been done in LIS and bring it into the conversation with this research. In this section we outline LIS research on infrastructuring and the work of librarians.

### 2.3.1 Libraries as Infrastructure

In LIS, the notion of library as an evolving and constantly changing infrastructure has been gaining prominence. The most evident of these changes were brought by the publishing industry which made new kinds of digital content such as e-books, audiobooks, online learning, and other electronic resources available through libraries. This was made possible, in part, by the rise of digital lending and collection management platforms such as OneDrive, Hoopla, BibiloTech and others. Libraries also provide access to ICTs, playing a crucial role in bridging the digital divide [8, 9]. Scholars have argued that libraries should be conceived of as platforms, not only providing access information, but also allowing others to build services on top of it [93].

The importance of physical space in public libraries as has been noted both as an amenity that provides equitable access to a friendly and safe environment, an important element of community building. [78] It has also been described as antidote to privatization of public space [7]. Public libraries are often cited as an exemplar of “a third place”, a place different from home and work and an integral part of “infrastructures of human relations”. [67, 68] The on-site collections in libraries create opportunities for communal ownership. The public library is not just an

intermediary for dissemination of information to the outside world but a conduit for “looking inward toward the small world to which it is integral.” [83] Furthermore, in recent years U.S. public libraries have been at the forefront of meeting socio-economic challenges, such as urban food deserts [55, 69], the opioid crisis [75], the mental health crisis [73] and others. Reflecting the greater responsibilities to meet community needs, LIS scholarship has seen an increased focus social justice [39] and growing attention towards critically examining how librarianship reinforces existing power structures through its practices and infrastructures [27]. Libraries can also be social infrastructures [48]. These consists of physical conditions that foster social encounters, which can improve resilience in periods of shock. [47] To sum up, there is a growing recognition that libraries need to be understood as a social-technical infrastructures, deeply connected to community needs and the broader infrastructural ecology.[64] However, despite this recognition and the existing diverse perspectives on public libraries as infrastructure, *infrastructuring* has not been widely explored in LIS literature, especially in relation to the work of librarians.

### 2.3.2 The Work of Librarians

Until relatively recently, ethnographic methods in LIS have rarely been used. A comprehensive survey by Khoo *et al* showed a growing interest in libraries in the late 1990s and early 2000s. [46, 52] Much of the research that *has* been done is focused on the information retrieval processes or reference services. However, Boothillier argued that traditional conceptions of service in LIS “provide little understanding of the socially situated nature of service delivery, and of the social mechanisms underlying this activity in a given context. They do not establish relationships between the micro-reality of a library, or the idiosyncratic features of library services, and macrolevel phenomena such as politics and governmental level of funding in public services.” [11] Cavanagh’s ethnographic account of an urban public library in Canada, demonstrated how reference desk interactions between librarians and patrons can be sites for rich exchange of tacit knowledge and formation of relationships. [13] What some might consider trivial “chit-chat”, in fact plays an important social and cultural function, especially in smaller local branch libraries, where interpersonal communication is a building block of a public sphere.[96] LIS researchers have also studied the evolving needs and uses of library patrons such as personal information and technology management [19], development of social capital [45], or use as make-shift shelters for the homeless. [34] Social work in libraries is an another emerging area of research in LIS. [60] However, the day-to-day work of librarians outside of narrowly defined contexts have been mostly overlooked. It especially true of the kind of relational and long-term infrastructuring work that is the focus of this paper. However, this is beginning to change. Responding to the limitations of the fact that LIS operates under a scientific paradigm, Clarke argued that librarianship can be better understood as a kind of research through design practice. [15] This bolsters our selection of infrastructuring as an analytical lens to re-evaluate the work of public librarians. As outlined in the preceding sections, the work of librarians touches on a range of theoretical and practical concerns relating to civic and community engagement, socio-technical infrastructures, and everyday experience. The changing nature of librarians’ work and their growing impact on local communities suggest a for HCI design space that has been relatively unexplored.

## 3 Context, Participants and Method

In this section we briefly discuss the unique historical context of U.S. public libraries, the background on FCLS and the urban area it serves. Next, we describe the participants and methods.

### 3.1 The Fulton County Library System

The tensions in American public libraries we observe today are reflective of the historical tensions within American civic institutions. The stated commitment to liberty and inclusion through knowledge collides with a legacy of exclusion, colonialism and other kinds of oppression. Wiegand’s historiography of early American libraries reminds us of this: “*Public libraries can certainly take credit for educating their patrons through collections*

*and services, but because these collections and services largely reflected values of locally powerful groups, on many occasions public libraries functioned as obstacles to cultural democracy by perpetuating the racism, sexism, classism, and homophobia their collections supported.” [94]* Another source of tension that is arguably unique to American society is commitment to individualism and free private enterprise, coupled with an inherent suspicion of government. Whereas municipal government is commonly associated with providing service and care for its citizens in the rest of the world (particularly Europe) [57], in the U.S., it has been historically tied to private enterprise. Benjamin Franklin, the founder of one of the first American libraries, identified their value not with leisure or civics, but with work and productivity. [33, 94] Up to the early twentieth century, the most influential force in the growth of American public libraries has been Andrew Carnegie, a steel industrialist, who funded the construction of 1679 public libraries between 1889 and 1919. [94]

At the same time, the deep-seeded suspicion of government “overreach” has gradually evolved into disdain towards government assistance and service, reflected in cultural tropes such as “the nanny state”, and those who use such services reflected in racial prejudice and stereotypes (e.g. “the welfare queen”, “the moochers” etc.). In the American South (of which Atlanta is a part), where a large portion of the population identifies as socially conservative, public libraries can face an attitude that social services of any kind is a “hand-out”, another trope intended to stigmatize and delegitimize municipal service and its recipients. [60]

FCLS spans urban and suburban areas which are characterized by many of the socio-economic divides common in American metropolitan areas such as gentrification, crime, and others. Atlanta has long been an epicenter of racial tensions and disparities many of which continue to this day. The 31 branches and the main central library serve neighborhoods ranging from the very poor to the very wealthy. These divides shape how public libraries are used in a wide variety, often contradictory, ways. At the same time, the population of the area is rapidly changing like in the rest of the State with non-white share of population gradually growing. This too shapes the work of public libraries as new cultural, ethnic and racial groups become regular library patrons.

In 2008, Fulton County held a referendum to approve a \$275M bond measure to fund the construction of new and renovation of existing libraries in Atlanta. For us as researchers, this presented an opportunity to observe and discuss how librarians and the public understand the current and future changes in their libraries.

## **3.2 Participants and Method**

Over the course of 18 months, we participated in several research activities and developed relationships with the library management. This allowed us to collect data in multiple ways as described below. This research was conducted as part of the first author’s doctoral research. While it was supported by FCLS administration it was not funded either by the first author’s institution or by the library system. However, FCLS did provide institutional support as part of an informal collaboration in which researchers provided knowledge, insights and design activities to FCLS as part of the broader effort of library renovation and transformation.

### **3.2.1 Public Meetings**

In early 2019, the library started the second phase of branch renovations. As part of this process, the management conducted a series of public town hall meetings. During these meetings, the library management, architects and, in some cases, local government officials, unveiled the initial architectural drawings and renderings of the renovations. Members of the public had a chance to learn how their input, provided in the first set of public hearings a few months earlier, influenced the design decisions. Although we did not participate in the initial meetings, which were conducted months prior to this research, we were able to document the issues that were brought up in those initial meetings as they were brought up again in the second round of meetings. Participants had an opportunity to ask questions about proposed designs and raise concerns about design decisions. We attended a total of nine public meetings. Each meeting lasted approximately 90 minutes and consisted of a presentation projected on a screen followed by public discussion. Both members of the public and branch librarians asked questions. Participation in meetings ranged from 3-5 people to over 30 people, depending on the size of the library. We took field notes and, in some cases, had an opportunity to informally speak with the

architects, patrons, and branch librarians about the renovations. In most cases, these conversations involved librarians and administrators with whom the first author already had existing relationships through volunteering, workshops, and others.

### 3.2.2 Interviews

In this study, we conducted 18 one-on-one interviews with employees of the library system. The interviews were voluntary and anonymous. Each interview lasted approximately 60 minutes, was semi-structured and was recorded and transcribed. The demographic description of our interview participants is presented in the table below. The term *staff* refers to library workers who are not part of management. Some of them have the title of librarians (i.e. they have a professional degree) and others don't. Administration includes people who are part of the library management and don't work in individual branches (e.g. IT, marketing, management, etc.), and branch managers, who are part of the management but also have responsibilities in individual branches, including desk duties, shelving, answering patron questions, etc.

**Table 1: Participant Demographics**

Roles	Staff	Admin
Count	8	10
%	44%	56%

  

Gender	Male	Female	Non-binary
Count	3	14	1
%	17%	78%	6%

  

Race	White	African-American	Other non-white
Count	11	6	1
%	61%	33%	6%

  

Age Range	18-25	26-35	36-45	46-55	56-65	66-75	75+
Count	1	2	7	3	4	0	1
%	6%	11%	39%	17%	22%	0%	6%

While we tried to organize and conduct the interviews consistently, they varied in depth and breath. This was not only due to the diversity of experience among participants, but also because the interviewer had deeper relationships with some of the participants as compared to others. Specifically, some participants knew the interviewee from volunteering activities or other collaborative encounters. In such cases, the interviewer could draw from these shared experiences to guide the discussion. Other participants were unfamiliar with the researchers and the interview was their first encounter. We note these circumstances to acknowledge the positionality of the researchers in this project, which was that of an active participant in this professional community, rather than a distant or “neutral” observer.

### 3.2.3 Volunteering

Prior to, during and after this study, the first author volunteered at several branches. The volunteering activities included developing and facilitating a library program on interactive fiction, participating in the library's annual staff development day as a speaker and as an observer, and helping with other routine tasks at one of the branches. While these engagements were not part of the formal study, they provided deeper insight into the local context of libraries in Atlanta, including the daily work of librarians, their interactions with library patrons and with the management and technologies they use. These observations informed the formal interview process. For this study, we analyzed the transcripts of interviews and field notes from public hearings and volunteering activities. Our approach in analyzing this data is based on grounded theory which is “a systematic, inductive and

comparative approach for conducting inquiry for the purpose of constructing theory”.<sup>[12]</sup> We selected this method because it was well suited to the circumstances of our research and the relationship with the site and participants, which produced a variety of open-ended encounters and collaborative engagements. Finally, we note that these research activities overlapped with each other. For instance, some interviews were conducted between the public meetings. Furthermore, between interviews, the first author spent time at the library to participate in volunteering activities. Thus, the data collection activities informed each other in non-linear ways. We analyzed our field notes and interview transcripts using Atlas.Ti qualitative research software and open coding method to help us identify key themes, issues and tensions from which we constructed a grounded theory and, subsequently, the design provocations for public librarianship.

## 4 Themes

In this section, we present four key inter-related themes that pertain to public librarianship as infrastructuring. These themes illuminate with (1) how collection management influences and reflects community identity, (2) how librarians design programs and services, (3) how libraries are can be sites for political activity and controversies, and (4) how library work is entangled with market logics.

### 4.1 Collection Management as Nurturing and Fostering Community Identity

Managing the library collection is one of the core activities of the profession. It is also one that has changed the most due to the introduction of digital technology. Among our participants, there were many experienced librarians who recalled using physical card catalogues and all the labor associated with it. But despite the advances in cataloguing methods and technology, it remains a practice firmly grounded in local context. Furthermore, libraries are still associated with physical books, and both librarians and patrons strongly believe in the value of physical books. As one participant stated *“I mean it’s [books] still the only reading device that has its own power source. Encoding is right there on the page. You just need a light source. Unless it’s a Braille book, then you don’t even need that. Books are a great piece of technology.”* – P3.

For librarians, collection management is a constant negotiation between the constraints of the physical space, available financial resources, and the unique needs of the communities they serve. On the one hand, much of this work is automated and streamlined. The library has recently started using a product called Collections HQ, which can predict what books readers will be interested by Zip Code (postal code), and automatically order them to the nearest branch. The library director noted that using this data allowed the library to save \$600,000 in a single year, by eliminating books that aren’t used, so called “Dead on Arrival”.<sup>[66]</sup> For any library system constantly under threat of funding cuts, this is a significant financial advantage. It also frees up librarians’ time from administrative tasks of ordering the books.

On the other hand, for librarians, managing the collection is an inherent and situated part of attending to the unique needs of the communities they serve. This was especially evident given the socio-economic disparities and cultural differences across all the different locations in which FCLS serves. In one branch, which served a predominantly African American and lower socio-economic status (SES) community, a library worker told us about the importance of reading literature that is reflective of the community itself.

*“You’ve got a lot of people [and], they like fiction about themselves. We’ve got a lot of people who check our urban fiction. Not so much the bestsellers... Most of them are familiar with the authors but, I also have a list because we did that at one of the branches I was at, we pulled it together. So we can just give you a list and say, this is a list urban fiction authors that you might want to check. But surprisingly, they already know who they want.”* –P7

This illustrates how mainstream reading lists like the New York Times bestsellers, aren’t always well-suited to identify what would be relevant to a particular community. We heard a similar story in another branch, located in a more affluent and older community. *“It’s funny because we’ve had a few author talks and I thought that we would get a better crowd for one of them, because it was a war book and our patrons are interested in history and wars and this and that. Nobody came in! Nobody was interested because it was the Vietnam War. I was like, okay, I’m really*



*didn't anticipate that thought. You know, I didn't think like that. The people who read about World War II [would be interested in the Vietnam War]. But I mean, it kind of makes sense. I mean, they're such different wars." – P14.*

Librarians have a strong sense of responsibility for knowing the community they serve and even a certain sense of pride. As such, centralization and automation of this activity can be met with reluctance and suspicion. *"I know that, you know, it is a, a slightly older demographic and a fairly conformist one. But I also know the ages, I know the, the races, religions, creeds, all of those things here. And not to say that the automated ordering doesn't pay attention to those demographics, but it definitely does it in a colder, more sterile way." – P10."*

Librarians do appreciate some of the benefits of efficiencies of automated and centralized collection management. What librarians refer to as "weeding", the identification and discarding of books that are deemed unnecessary or out of date, is a constant and time-consuming challenge. But they also highlight the limitations of using algorithms. *"This [software] kind of takes some of that guesswork out of it, but at the same time... For example, you know, this book about all that Cassini's designed for Jackie Kennedy. I think it's interesting. Like it hasn't circulated a long time and you think, well... In two years, do you think it will? Has it not circulated because it's been hidden amongst other garbage? So, there's still some questions that you might have about an item that even though the computer's identified it as it should be gotten rid of, you think, well, will Jackie Kennedy's style and the designer ever really go out of style? I mean, should we keep this book?" – P1.*

Collection management is not just a logistical activity, but a way for the librarians to connect with their community and help the members of the communities perform their identities [65]. Furthermore, books are not just interchangeable consumable objects. Rather they, and the collections they comprise, are situated in a particular place. Therefore, in certain cases, a librarian is in a unique position to ascribe a subjective value of the book in a collection.

## **4.2 Beyond Books: Programs and Services**

This theme pertains to the growing importance of programs and services in librarians' day-to-day work and the various entanglements this work creates for librarians and the communities they serve.

### **4.2.1 Programming**

One of the most diverse and creative set of activities we observed is programming, which refers to different services, activities and events that librarians organize or facilitate, outside of providing access to materials (physical or digital). Programming activities also reflect the expanding and diversifying role of the public library in their communities. Library programming expands uses of the physical space through a variety of activities such as community gatherings, dance classes, STEM clubs, puppet performances, art installations and many others. Programming also forces librarians to be very attuned to the needs of the community and their technological and information resources. Librarians mentioned how in affluent neighborhoods computers are used very rarely since most people have access to their own devices and know how to use them. *"We have, programs like how to make digital movies for teens using their cell phones. Cause I mean, you [can] shoot 4K on your cell phone. There's movies in theaters now made just like that. We can see that. We know that this will play to this demographic. All of these kids have expensive phones. Bring them in, teach them to make movies, doing something good." – P10*

In lower SES communities, technological access and literacy are in much bigger demand, which librarians recognize and address. The predominant age, ethnic and cultural mix of the neighborhood also shapes what programs will be successful.

*"Here when we do something, say estate planning, because we have a lot of older folks here that we know that that's going to work for them" – P10.*

*"Then with the programs that we plan can be kind of eclectic... we have a Ukulele club, you know, we have, we will talk about, we have death cafes, we have, you know, drag queen story time. These are all things that I don't think could really exist in any other branch because the community here is just sort of used to the unusual and patient with each other." – P1.*

What is noteworthy about these programming practices is that they are continuous and creative activities requiring public librarians to recognize needs and opportunities. *"I mean we think, we try to think of everything. Like, I don't mean to brag, but if you have an idea a librarian has also had that idea and probably tried it". – P13. "I will do a lot of the old things, the traditional things that I've done all this time, but then new ideas just constantly. I just think I was born to program." – P8.*

In developing programs, librarians often need to acquire new skills like learning to play a musical instrument or learning about arts and crafts activity well suited for seniors. Furthermore, programming requires establishing new relationships with experts, volunteers, and other members of the community. This is becoming an increasingly important role as FCLS, like many other public libraries, is encouraging librarians to engage with the communities outside of the building.

#### **4.2.2 Outreach**

Some of the more unexpected programming we observed was outside of the library space through activities referred to as outreach. Outreach, and programming in general is an important part of how FCLS is evolving. The library director set up a new group specializing on outreach services which tries to reach out to different populations that either have never been or stopped using library services. In addition, all librarians are now encouraged to do more outreach activities *"We do more outreach into the community now we set up tables and places would take programming to people and that's always happened. But the push is to do more of that." – P10.* The term "outreach" is also associated with the future of the library, as there is a growing expectation that librarians need to do more of this new type of work. *"I think we'll have fewer staff here. And I think a lot of it will be more outreach things." – P1. "So I think it's inevitable that moving outside more and more engaging in different ways, not just behind a desk." – P13.*

Outreach services demonstrate how librarians change their relationship to the community outside of the building in interesting and unexpected ways. One example is the Library in The Park program. This new program was implemented, in part, to serve the community during library closures. In this program, libraries set up small stations in public parks and offer different programs and activities such as story times for children or library cards for new patrons. Implementing the program took some effort, learning and relationship building. One librarian told us that they had to request permission from local authorities to offer this program. Initially there was some resistance to it, partly because there wasn't a precedent for these kinds of programs in parks. Librarians had to develop a relationship with the local authority to secure permission for the program. They also had to learn tactics of identifying which parks are good for these programs to be successful. For example, they learned that if they use pavilions that are close to a playground, they have more chance to draw children and parents who happen to play there. In addition, they learned to wear more comfortable clothing more conducive to outdoor activities, which in some cases had to circumvent county employee dress code policies.

Library in the Park program is just one example of how FCLS is providing services and resources to places and people outside of the physical building. Others included working with Atlanta's Department of Senior Services or Department of Corrections, as well as collaborating with local businesses. It is noteworthy that when doing outreach services, librarians carry with them the commitment to openness and inclusivity. One librarian described this as "cracking open the public space", meaning that even when they work in private or restricted places, they need to adhere to the professional commitments of a librarian, and thus *cracking open* a public space within the otherwise private space. The librarian elaborated on this metaphor as follows. *"When we started providing books for inmates the jail wanted me to censor the material we brought. I explained that I could not censor any material that patrons requested (even if they are incarcerated). I said I could bring the material and if the jail wanted to go through and censor it, they could, but I could not, due to professional standards." – P20.* The metaphor of *cracking open* became useful to us because it can be used to understand librarians' infrastructuring work more broadly. It evokes how librarians must operate with and against socio-material conditions to carry out their mission maintain their commitment to openness and inclusivity.

Outreach activities, and programming in general, also encourage librarians to rethink and reconfigure their technological resources. One librarian explained that when providing programming at a senior center, they had to come up with a way to order books for seniors who weren't accustomed to using libraries or didn't have library cards. Since the library didn't have an existing system to do that, they designed a workaround. Seniors would give consent to librarian accessing their accounts and ordering books on their behalf and deliver them. This kind of ad-hoc problem-solving is common among librarians.

### 4.3 A Site for Political Activity

The public library is not only a site to receive services but also a site rich with political activity. Librarians themselves tend to be very politically aware, due to their professional standards. In addition, the different networks that the library builds or helps build enable different kinds of civic engagement.

#### 4.3.1 Professional Political Awareness

A notable theme in our conversations with the librarians was how politically engaged they were. This stems from the commitment of the profession to keep the public space as open and free and a certain egalitarian aspiration. *"It makes it kind of an even playing field for people. If you're wealthy [or not wealthy], you can come. – P18"*

Some librarians deliberately chose the profession because of their disillusionment with capitalist values or, at the very least, a passion for public service.

*"The idea that public libraries are holding space for people just to be, for everyone to be in that space just really fit for me. Like politically, you know, the idea that I'm providing accurate information, access to information and public space. I think those two things are, and not to be dramatic, like the foundation of democracy, you know. This is the most radical work I've ever done in my life." – P9*

*"It's just the way I have always been. You know, I've never liked capitalism. Don't want no part of it." – P10.*

Librarians are also aware of the influence of privatization and elimination of public space and see their role as defending that space. *"I think the struggles are going to be defending the physical public space [from privatization]. I think [about] elimination of public space. I mean you've got libraries are being privatized in Florida right now. – P9."*

But it does not mean that librarians are always engaged in direct activism or openly discuss their views with the public. In fact, talking politics can be somewhat of a taboo in daily interactions with patrons. *"Um, politics is a no, no, that surfaces a lot, but that's not a good place to go. You don't want to talk about politics but clothes and sports [are acceptable]." – P15.* Nevertheless, political awareness and professional standards seems to drive their commitments in their everyday work.

#### 4.3.2 Navigating Controversies

In part because of the political commitment of libraries and librarians, the institution can be a site of controversy both on a national and a local level. For example, the issue of patron privacy has gained prominent attention among librarians. *"Public libraries have consistently been a place that protects patron privacy. The American Library Association was the very first organization to come out in opposition to the Patriot Act<sup>1</sup> because they didn't want to turn over patron records."* Libraries have historically been sites for cultural controversy as well. Debates about what literature the public is "supposed to read" and what books to ban, goes back all the way to the beginning of public libraries. Furthermore, cultural debates in the U.S. libraries are intertwined with its racial history and segregation. [94] Today, such controversies take new forms. One story we heard from several librarians (which was unfolding at the time of our interviews) was about the Drag Queen Story Time. This is a program where a performer, usually dressed in drag, reads children's book. It is a derivative of a common story time program usually performed by a children's librarian. A local performer was scheduled to deliver this program on of the branches, was unexpectedly cancelled, reportedly due to the involvement of county management [89]. After

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<sup>1</sup> The Patriot Act (officially (officially the Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act) is a law in the U.S. that was enacted after the September 11, 2001 terrorist attacks. It gives broad surveillance powers to domestic law enforcement agencies and is often criticized by civil society as too intrusive and easy to abuse without any checks and balances.

public outpouring of support, the program was put back on the calendar as a private event (libraries have reservable spaces for the public), but not as an official program offered by the library. Even then, local reports suggested that the event was met with some hostility. Eventually, the mayor of Atlanta got involved in the controversy and showed support by inviting the performer to do a story hour in the City Hall [30] This example highlights not only how librarians can get involved in controversies, but also how they can be unequipped to deal with them. *"If you've heard about recently the drag queen story time debacle at [anonymized location]. That had nothing to do with the library. That was the county that was pure politics. The library's getting blamed. The library's getting bad PR [and] the library cannot defend itself. Because of a politician."* Such issues don't always reach to the level of public controversies and are more mundane. For example, in one public meeting there was a discussion about whether the restrooms should be under lock and key to discourage the homeless population from using them as showers. While some patrons and librarians supported the idea, others found it discriminatory and contrary to public library's mission of openness. These kinds of issues are public librarian's role as a mediator of contested spaces.

#### **4.3.3 Volunteering and Organizing**

Another kind of political activity that takes place in the library is through the 'friends of the library groups' organizations (commonly referred to as "friends groups"). A friends group is a loosely affiliated group of people who volunteer for the benefit of the library. It can be either an informal group or a separate legal entity such as a non-profit corporation. The most common activity for friends groups we observed is to conduct regular book sales for fundraising. The group collects books (both discarded by the library or donated by the community) and holds books sales, usually onsite. The friends group is an important source of community support and funding. Since they are volunteers and the funds they raise are not tied to the local budget, they can support library needs in a more flexible way. In one branch, a friends group funded a shadow puppet performer for the entire summer to provide programming for children's summer reading activities. Other examples include a group funding a self-checkout machine to make it easier for the librarians to serve patrons and funding the librarians' attendance to professional conferences.

Friends groups also highlight some of the socio-economic disparities we observed across the communities. *"I think that is very dependent on the branch. So like this one has a lot of people that, that come in every week to help sort through books and to, to do things with that. Um, some of them don't have friends groups at all. Some of them have friends groups, but they're not very active. So, it really just depends on who your members are."* – P16.

The physical infrastructure of the library is also used for other public purposes of local and national importance. For example, the volunteering program helps high school students earn credit as part of their community service requirement. In some cases, convicted criminals (usually of non-violent crimes) serve part or all of their sentence as community service in libraries. One librarian noted that those volunteers can be especially valuable because they are educated and motivated to do a good job as part of their sentence. In addition, library branches often participate in elections both as polling places and as voter registration stations. They are also crucial in administering and supporting the U.S. Census (the next one being in 2020 at the time of this analysis).

## **4.4 Influence of Commercial Interests and Market Logics**

This theme pertains to different ways market logics librarians in visible and invisible ways. These logics include profit maximization, various notions of efficiency and measurement along with emerging economics of digital publication.

#### **4.4.1 Digital Material**

Digital material (also known as electronic circulation or electronic material) refers to various digitally published and distributed content and is increasingly important part of public library operations. The Public Library Association reports that per capita circulation of electronic materials as percent of total circulation has increased from 3.2 percent to 10.3% between 2012 and 2016 and has continued to grow since then. [77] Digital material

allows libraries to serve the needs of the community without face-to-face interaction, which is especially important for patrons who have transportation challenges or simply do not have the time to visit to the library. But the mechanics and economics of digital material influences the notion of the library in interesting ways. First it redefines what it means for a library and patrons to be connected to each other. There is now an entire class of patrons who use the library exclusively for digital material. *“We do have patrons that I know have come over from that apartment complex, come over to set up their library card, and then we don't see them again for two years, until they need to renew it. And they're just using the e-books and that's what they want it for. And then of course that's fine. We're happy to do that.”* – P14.

This is enabled by emerging digital infrastructures like the services Overdrive and Hoopla, which are specifically designed to provide digital content for libraries. But these same services exist in a broader digital publishing economy that puts commercial pressure on libraries in a way that threatens to upend their entire operating model. For example, the way e-books are licensed to libraries through intermediaries is significantly different from physical books. Once the book is purchased or leased by a library, it can be lent to a patron for an unlimited number of times or it can be resold. This is known as the First Sale Doctrine, which allows the owner of a lawful copy of a copyrighted work to sell, lend, rent or give it away without the original copyright holder's permission. [76] With digital material, the library has to pay an additional fee for each instance of lending, significantly increasing the cost to the libraries [72]. Digital rights management for e-books and other digital material tends to be more extractive than their physical counterparts because it focuses on and exerts control over each individual user of each individual copy of the work. This is evidenced by a recent decision of a major publisher, Macmillan, to impose temporary embargoes for licensing new titles to public libraries, which caused uproar among the public and librarians [92]. After a public outcry, the publisher reversed its decision, but it highlights the ongoing tensions between commercial publishers and community-oriented organizations such as public libraries.

#### 4.4.2 Market Influences in Everyday Language and Practices

Market-based commercial conventions can also influence public libraries in less direct ways. Namely in everyday language of the librarians themselves and the expectations of patrons. First, librarians often use the term customer service when referring to the quality of their work and performance. *“And I will say our customer servers is high up there basically because the patients tell us that all the time. Sometimes it even compares to other branches.”* – P12. This framing can also translate to taxpayers as consumers who expect a good “return on their investment” in evaluating the quality of the library and librarians. Another way market mechanisms influence libraries is through perceived competition for patrons as well as patron's expectations of what a library should offer. *“We're going to be doing more, it's going to be just like a Barnes and Nobles. [a major bookstore chain]”* – P2. Such framing also suggests that libraries, bookstores, coffee shops and other, so called “third places” are all market actors who are in competition for consumers, their attention, time and money.

These examples, along with many management practices, which also tend to be borrowed from corporate governance, illustrate the subtle ways commercial conventions penetrate public space and undermine its fundamental values and commitments. Furthermore, they show how blurry the boundaries between profit-driven and public service-oriented spaces can be and how librarians navigate them in their everyday practice.

## 5 Discussion

Each of the above themes provide insights on how the evolving work of librarians is entangled with civic, social, and material infrastructures. Next, we discuss how we can understand librarianship as a distinct type of infrastructuring and implication for HCI design in public libraries.

### 5.1 From Public Service to Civic and Social Infrastructuring

The role of libraries is associated with the notion of providing services to its patrons. However, as we have seen, providing services is not just a matter of access to resources. Rather it is an active engagement in and

reconfiguration of infrastructures [54]. In FCLS, this process increasingly takes place outside of the physical bounds of the library. Librarians reach out to different populations that either have never used or stopped using library services. In this process, public librarians identify potential resources in the community, foster new relationships and configure these resources and relationships into accessible, and legible programs for the patrons, assembling these elements into a public-in-the-making [58]. Furthermore, through the process of collection management, librarians develop personal connections with patrons. This work also constitutes social infrastructuring [48], which help establish social encounters among strangers thereby increasing the capacity for mutual support and resilience. Finally, as we have seen with the example of friends groups, libraries assemble civic infrastructures around themselves in the form civic networks and affinities [4, 88], which can act as forms of self-governance. Furthermore, when the library becomes a site for a controversy, like in the case of the Drag Queen Story Time, it stimulates activist interventions both on the part of librarians and patrons. In other words, libraries create centers for civic and political engagement and power. These engagements are local and situated and can be both formal and informal [5]. They also reflect how librarians construct and participant in digital civics both by maintaining the openness of the public space and by responding to controversies.

Seeing libraries as social and civic infrastructuring opens up new paths for design in public spaces and public services that explore notions of resilience in the community [79], support interpersonal relationships between municipal service workers and the public, foster various forms of political self-organization and mutual support, and enhance the creativity and agency of librarians. We can imagine systems that make such opportunities more visible to librarians and more readily available to act upon. We can also imagine better and more sustainable systems that can account for the inventive and open-ended work of librarians, without resorting to neoliberal management practices focused on efficiency and return on investment. Such systems can refocus the library's efforts on recognizing and rewarding richness and depth of relations rather than pure output (e.g. book circulation, membership growth, etc.). They could be especially beneficial in accounting for routine infrastructuring work [79] that resists standardization and requires tolerance for ambiguity. This will become increasingly important as public libraries are challenged with addressing issues of social justice [39]. Along these lines, we see design opportunities for systems that can accommodate institutioning work [38] between librarians and other professions such as social workers. Such systems could connect the rich community knowledge of librarians to professional practices of other communities that are better equipped to deal with issues such as mental health, homelessness and drug abuse. Beyond professional practice, systems can be used to create platforms of care [57, 79] within libraries which could mediate novel mutually supportive relations. Such systems can become crucial in supporting infrastructuring work of librarians which takes place beyond the physical and institutional boundaries of libraries. As they form new attachments among issues and communities and institutions [4], they will need new ways to interact with and navigate them. More broadly, we envision systems that support other relational practices of librarians such co-production [80], construction of publics [53, 87] and form attachments around broader community concerns and controversies [63].

These design opportunities help us recognize that systems that aim to merely optimize or automate the work of public librarians are bound to interfere into or disrupt intricate, highly localized patterns of social and civic infrastructures. Furthermore, recognizing the work of librarians as infrastructuring helps us reframe the institution of a library as a set of relational, long-term commitments between librarians and patrons rather than merely a resource for common use. This, in turn, could help change how communities fund and support local libraries and other public service institutions.

## 5.2 Infrastructuring Publics with and along Market Logics

Privatization of public space is indeed a real concern for libraries and their mission [1, 14]. But as we have seen in our analysis, while librarians are motivated by their professional standards and political commitments, which makes them suspicious of market institutions, they also integrate market-based mechanisms with their public function. This happens in subtle and often invisible ways. Faced with evolving expectations of patrons about the usability of public space, along with constant budgetary pressures, libraries bring in new services like vending

machines or cafes into the space. They are increasingly reliant on commercial sponsors for additional sources of funding. Furthermore, proliferation of digital lending, while opening opportunities to expand the reach of public libraries, impose economic and legal burdens. As we have seen digital publishing models disrupt the economic model of libraries predicated on community ownership of physical objects (books, DVDs, recordings, etc.) [83]. In that sense, librarians are engaged in constructing publics and attending to issues of common concern to limit the impact of market logics [23]. However, rather than simply resisting these logics, libraries integrate them into existing infrastructures thereby expanding what it means to be a public space and what it means to serve a community. While digital lending might be helpful for libraries in expanding their reach, it also introduces market logics in how patrons relate to their libraries. For a patron who uses the library exclusively for digital content, the relationship to the library becomes almost entirely consumer-oriented. There is no interaction with a physical space, with the librarians or with the community. Furthermore, the interactions with the digital collections is taken over by the commercial platforms, which manage the lending process and algorithmically recommends other relevant content.

To navigate these tensions, librarians employ different infrastructuring strategies. For people who are regular patrons of the library and who do borrow physical books, digital lending becomes an opportunity to expand services and, in some cases, improve technological literacy. This work is distributed among librarians at each individual branch. Librarians need to learn about digital lending platforms themselves in order to recommend these resources and be able to help patrons if needed (set up, troubleshooting etc.) Not all librarians are comfortable with that task because it requires a certain level of technological fluency. In other words, the work of a librarian is very much present through the attachment created by digital lending. [4] For some library patrons, digital lending can become a way to use the library remotely and the librarian becomes less visible. We can also make sense of this work through the lens of relational agency and knotworking. [10] In other words, it is not the case that digital lending simply replaces or supplements physical books. Rather, librarians have to make connections and form knots so that digital lending becomes meaningful within the context of their existing relations, commitments and labor practices.

These observations highlight the challenge of designing systems for solely public/civic or solely private or commercial use in the contemporary neoliberal conditions under which public libraries operate. It challenges designers to consider how public librarians can better negotiate the constant exchange among public, private and commercial interests, [4, 90] while maintaining their professional commitments to openness and accessibility of public space.

We propose several design implications for collaborative systems in public libraries, in light of the entanglement of market logics and budgetary pressures that are likely to intensify further in the coming years. First, in digital lending, we see a potential benefit in systems that can counter the consumer-oriented logic of current DRM systems, fostering more communal and convivial interactions between librarians and patrons and among the patrons themselves. [50] There is a rich area to explore collaborative borrowing, communal owning, lending, and reading practices that could create new attachments among readers. Given the institutional role and bureaucratic entanglement of librarians, there is a need for alternative and unfamiliar types of political engagements and resistances such as the ones proposed by Lindtner *et al* [59]. Librarians need new kinds of resources to “walk alongside” with marketing logics and exert opportunistic and “parasitic” resistance without resorting to conventional activism advocacy, which is not always available or sustainable for librarians. Furthermore, we can imagine novel rights management systems that would benefit publishers but would also allow the owners of copyrighted works to recover some economic benefit to help community and library needs. As the size of physical book collection shrinks, public libraries will need alternatives to traditional book sales to raise funds to support their programs. We can also imagine systems that would enable community ownership and co-production [80] of information in other domains such as local history, environmental data, public safety, public works and other. Such systems could be aimed at enabling community-oriented economic activity that integrate market logics in a bracketed and mutually beneficial manner. They could also reduce or re-distribute the burden of precarity and uncertainty associated with inventing and delivering new services. More broadly, there is a need for systems that

enable alternative civics in public space that foster closer cultural, economic and political exchange [1, 4, 5] using the public library as a caring platform [57].

## 6 Implications: Cracking Public Space Open as a Design Provocation

Having articulated two distinct infrastructuring strategies and having explored some HCI design opportunities, we now turn to public librarianship as a potential space for design. Here, we draw from the metaphor of *cracking public space open*, offered by one of our participants, which reflects socio-technical and political complexities of public librarianship today. Next, we outline this potential design space with a set of thematic provocations.

### 6.1 Designing for Everyday Heterogeneity and Contingency

Cracking public space open is heterogeneous and contingent. This quality speaks to the idea that dealing with cracks requires resourcefulness, risk and tolerance for lack of control. The everyday experience of a public librarian is extremely unpredictable and constrained. Librarians rotate from one station to another depending on who is available at any one time. Between the circulation desks, customer requests, shelving, running programs and other activities, librarians have to constantly adapt to the changing environment. Furthermore, libraries have to attend to the growing needs of vulnerable populations such as the homeless or mentally ill and they have to constantly be ready to deal with a potential volatile situation such as a rude or aggressive patron. The physical space itself is subject to this contingency and contestation as we have seen with the example of Drag Queen Story time and the use of restrooms by the homeless population. When developing programming and outreach activities, librarians often experiment by forming new attachments between resources [3, 62] people and institutions. These attachments can be formed through simple objects like books and other information objects, or they can come together through a service that draws various members of the community like the friends group, or the Library in the Park program. Recognizing such heterogeneous and contingent everyday practice of public librarians, we propose HCI design that:

- Supports, relieves or redirects the burden of heterogeneity and contingency of librarians' work.
- Makes the work of public librarians more open to public engagement, support and novel attachments to humans and non-humans.
- Helps public librarianship be more present and recognizable outside its physical and institutional boundaries.
- Improves emotional and physical well-being of librarians arising from heterogeneity, uncertainty and contingency.

### 6.2 Designing for Quasi-legitimacy

This design provocation draws from the idea that cracks don't belong, and we don't want to see them. On the contrary, they are expected to be hidden, filled in or otherwise eliminated because they pose threats to the integrity of existing structures. In their research on designing ICTs for activists, Asad and Le Dantec drew attention to how the unpredictability of activism work requires an *underdeterministic* design that allows flexibility in dynamic and emergent environments. [5] This approach works well when we think about activism work as oppositional or alternative to the existing power structures. The work of librarians is different from activism, because it is a hybrid of legitimacy and illegitimacy. It is quasi-legitimate meaning that their activities and relations exhibit characteristics of both. On the one hand, libraries are institutions with longevity and legitimacy, enacted through laws, physical structures, and funding mechanisms. Librarians have a significant authority and agency in the space itself through the work they do. At the same time, this work is constantly undermined at various levels. This is evident, for example, in how librarians negotiate the demands of programming and circumvent institutional and technological constraints (e.g. the employee dress code, library card issuing protocols, etc.) as described earlier. While programming activities are needed by communities, they



appear to be extractive on librarians, because librarians are expected to do more with less, often causing them to spend their personal money and time. Since the work of developing programs is often disparate, small scale and invisible, librarians also need to make this work legible and legitimate to the institution, through administrative mechanisms such as monthly narrative reports, in which a librarian describes all the significant and valuable activities he/she has done over the past month. Finally, we have also seen libraries bringing together resources and assets with incommensurate values in their infrastructuring with and along market logics. Following this line of thought, we propose HCI design that:

- Supports quasi-legitimate interactions and exchange among humans and non-humans in public space.
- Helps negotiate relations between objects, people and places with incommensurate goals and values.
- Reshapes librarians' quasi-legitimate practices into legitimate ones and vice-versa.
- Help bring together quasi-legitimate resources to deal with spontaneously arising community needs.

### 6.3 Designing for Longevity at a Small Scale

Cracking public space open focuses on small scale action that is repetitive and continuous. Some cracks advance very slowly, their impact is felt not immediately, but after progressing in multiple, unpredictable directions. Cracks cannot be reversed, only patched over. The work of librarians, even in cases where they create something new, is localized and small-scale. Their impact on the community comes from longevity and a kind of permanence that can be afforded by large-scale institutions. Within this permanent structure, programs, services, and things are constantly appearing and disappearing. Books are weeded out, new books arrive. Programs are offered on and off, year after year. Drawing on Bødker *et al* again, we can characterize these activities through the notion of knotworks, which are more fluid than networks. Knotworking focuses more on long-term sustainment rather than privileged moments of interactions such as design workshops.[10] One example of such knotworking are thematic book displays. These objects, which are usually in a form of a small shelf or a more substantial display, contain small, featured collections of books that libraries change every month according to a theme. For example, in the U.S., February is Black History Month, and it is common to see displays feature books on African-American history and authors. Other times, the book displays can reflect something more specialized or be inspired by an individual librarian's personal interests. One participant designed a book display with elaborate thematic decorations to commemorate the 80<sup>th</sup> anniversary of Batman graphic novels. This shows that librarians can incorporate their own forms of expression into displays. What's interesting about displays is that their impact is small in scale. Most people who come to the library ignore them completely, or glance at them briefly before moving on. At the same time displays allow the patrons to participate in the life of the library in small-scale, unprivileged ways. The book display is always there, in the background, always changing every month. Other examples of such knotworks include art exhibits, reading circles, craft stations, pet corners and others. These incremental, barely visible practices of librarians, challenge one-off, interventionist sensibilities of conventional design. Along these we propose HCI design that:

- Creates non-interventionist interactions in public libraries and public space.
- Operates at the smallest yet longest-lasting scale in the public library
- Makes small-scale interactions in the library more visible and meaningful over time.

## 7 Conclusion

In this paper, we reported on a qualitative study of librarians in an urban public library system undergoing substantial renovations and transformations. We framed the work of librarians as a design practice by taking infrastructuring as an analytical lens. We articulated two types of infrastructuring (1) civic and social infrastructuring and (2) infrastructuring with and along market logics, which help us understand challenges for HCI design in public libraries. Furthermore, we articulated a set of design provocations aligning to the theme of *cracking public space open*, which can help researchers design for an increasingly complex work of public

librarians. By foregrounding the work of librarians as infrastructuring, and articulating these design provocations, we contribute to the ongoing conversation in HCI design research around design for communities, civic engagement, and alternative forms of political engagement.

## ACKNOWLEDGEMENTS

The authors thank FCLS administration and staff for their support of and participation in this research.

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