# What Guides Knowledge Work in the Library? Maps, Routines, and Workarounds

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## ABSTRACT
Knowledge work in the library is guided by a complex array of maps that outline how work should be done, who should do it, and how staff should think and behave. These maps originate from human and non-human actors in the work system, including management, staff, patrons, technology, and physical space. In this study, six public library staff engaged in think-alouds and semi-structured interviews aimed at learning more about the function and content of these maps, how these maps were acquired, the challenges staff faced in trying to follow these maps, and how staff responded to these challenges. Results suggest how library management can support staff as they attempt to navigate the affordances and constraints of these maps—work that is key to sustained library resilience.

## KEYWORDS
Library management, work systems, information practices, knowledge management, organizational routines

## INTRODUCTION
Resiliency suggests the ability to overcome, and gain strength through, adversity (Lefebvre et al., 2020). From COVID-19 to social and political unrest, public libraries in America have anchored the country's resiliency efforts. As "second responders" and "first restorers" (Jefferson, 2021), the staff at these libraries provided critical support to community members facing job loss, economic hardships, health uncertainties, and shifts to remote learning. These knowledge workers (KWers) (Materska, 2004; Asogwa, 2012) were able to provide these critical services and resources amid library closings and reopenings, budget cuts, personnel cuts, and accelerated digital shifts (Frederic & Wolff-Eisenberg, 2020). This makes for a challenging and complex working environment, one filled with shifting expectations about the nature of library work. The sustainability of these efforts requires that staff can successfully navigate these work environments and the demands of these environments on their knowledge work (KW).

The current study is interested in how KW in the library is guided by maps and how management can support staff as they navigate the affordances and constraints of these maps. Since Machlup's (1962) investigations into the *Knowledge Economy*, researchers have asserted that the primary source of value in any organization is the knowledge of its workers. Yet, definitions of KW remain contested (Pyöriä, 2005; Palvalin, 2019). While Drucker (1999) conceptualized KWers as those who would bring their own knowledge to their work rather than someone else's knowledge, few workers are dependent solely on their own knowledge at work. Something else guides this work (Michel, 2011). Some suggest, for instance, that managerial expectations of efficiency, output, and profit still overwhelmingly guide KWers. For example, the gig economy failed to fulfill its promise of a new wave of KW (Hasija et al., 2020). Rather than promote worker ownership of knowledge and upend capitalism, the gig economy has instead sought to "appropriate creativity within a digitized system of command and control to augment efficiency and maximization, which in turn discourages human creativity in the first place" (Holford, 2019, pp. 147-148). Although companies continue to hire for knowledge-intensive jobs, this KW is overly standardized around rigid job titles and predictable outputs (Martin, 2019).

The library presents an interesting case study for an investigation of what guides KW. On the one hand, research suggests that work in public libraries is guided by a concern for social justice, as libraries are "becoming more focused on social equity and adopting a framework of social justice, much like society itself" (Kosmicki, 2019, p. 56). On the other hand, libraries are susceptible to being guided by racism, segregation, and Whiteness (Velez & Villa-Nicholas, 2017). Furthermore, pandemic pressures may have caused some libraries to increase managerial oversight. It is unclear, then, what guides KW in the library and the extent to which library staff—as KWers—are independent and able to control their own work.

In the current study, six public library staff members engaged in think-alouds (TA) and semi-structured interviews (SSIs) aimed at learning more about the function and content of KW maps, how these maps were acquired, the challenges staff faced in trying to follow these maps, and how staff responded to these challenges. Analysis shows that these maps originated from different parts of the work system, including management, staff, patrons, technology, and physical space. Each set of maps outlined specific requirements and established routines that enabled and constrained library staff. The ways in which these maps enabled and constrained staff and how staff responded to these maps suggest several implications for how library management can support staff resilience. This should, in turn, increase the resilience of the library—a crucial resource for the sustained resilience of the larger society.

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## REVIEW OF THE LITERATURE

### Knowledge work as situated

One place to begin the discussion of what guides KW in the library is to outline the systems within which this work occurs. According to the work system method (WSM), these are systems "in which human participants and/or machines perform processes and activities using information and technology to produce products and services for internal and/or external customers" (Alter, 2012, p. 2). This suggests that KW in the library cannot be understood apart from a consideration of the entire system, e.g., patron expectations influence the design of products and services. Similarly, activity theory (Engeström, 1999) suggests that activities are best understood as systems comprised of the people engaged in the activity, how their efforts are structured, their objectives and motivations, the tools they use, and the rules they are obliged to follow. The tensions and contradictions within these systems—and across systems—can provide insight into their development and change.

Consistent with definitions of *knowing*, KW emerges out of these work and activity systems. Knowing is a term for knowledge that is used in action (Cook & Brown, 1999, p. 80), and it denotes practices that are "negotiated, emergent and embedded" (Gherardi, 2009, p. 357). This work occurs within the context of shared understandings and language—i.e., encultured and encoded knowledge (Blackler, 1995)—that suggest what is acceptable and how a worker is perceived by others. This work is also *materially mediated* (Nicolini et al., 2003, p. 26) and occurs within spaces marked by distinct technological and physical affordances and constraints. Nonaka and Takeuchi (1999) highlighted this physical component of KW by referencing the holistic mind and body education of Japanese Samurais. This approach to KW is distinct from approaches that define KW as primarily an individual cognitive activity. Under this definition, KWers are those engaged with theoretical concepts (Bosch-Sijtsema et al., 2009) and skilled mental labor (Reyt & Wiesenfeld, 2015). In other words, KWers are those who "think for a living" (Davenport, 2005). This focus on the mental labor of KW tends to situate KWers as individuals working on their own and with their own ideas. Knowledge becomes a "free-standing entity" (Nag et al., 2007, p. 823) that individuals cognitively possess. Such a view fails to account for the influence of other components within work and activity systems.

Notwithstanding debates over the definition of terms like information and knowledge, the study of KW, then, is similar to the study of information practices. Savolainen's (2007) description of information practices as considering "the continuity and habitualization of activities affected and shaped by social and cultural factors" (p. 126) mirrors the definitions of knowing. The precursors to information practices are also similar to the precursors of knowing. Information practices researchers push back against early "mentalistic approaches" in library and information science (LIS) (Hjørland & Albrechtsen, 1995) in the same way that knowing researchers push back against the definition of knowledge as a cognitive possession. Information practices research acknowledges that the information a worker needs, how they seek it out, and what they do with it are all influenced by the situated realities of everyday work and the *work of living* (Hogan & Palmer, 2005). Lloyd (2010), who directly ties information literacy with tacit knowing, is a constructive backdrop to the current study. Lloyd (2010) studied embodied knowledge as an information source for emergency services workers, noting that practical knowledge "comes from the experienced body in practice and from the implicit nuanced information that is embodied within the whole group" (para. 33). Activity theory, in particular, can help information practices researchers better account for context and the materiality of technology, as well as increase the applicability of this research to practice (Allen et al., 2011).

The current study defines KW in the following way:

*Knowledge work is the thinking and doing of workers, situated within the everyday practices of work, as these workers navigate the affordances and constraints of the work system.*

Under this definition, all workers are KWers. Indeed, it is difficult to conceive of anyone in an American workplace who does not *think for a living* as they attempt to navigate technology, fit the culture, solve problems, or manage relationships. This is a detour from previous studies of KW, which suggested that this work was reserved only for certain classes of workers. Echoing Machlup's (1962) classification of KW by formal occupation, Davenport (2005) suggested that KWers are seen primarily in sectors like management, finance, technology, law, medicine, and education. Others have defined KW, in part, according to levels of formal education (Sulek & Marucheck, 1994; Choi & Varney, 1995). Drucker (1993) suggested, for instance, that KW was a shift for all but service workers, whom "lack the necessary education to be knowledge workers" (p. 8). KW tends to be the purview, then, of only the most highly qualified and talented individuals (Costas & Kärreman, 2016). Including all workers in the definition of KW has the benefit of avoiding arbitrary determinations of who *gets* to do this work. If KW is creative, one might assume that only the most creative workers in an organization should do it. Freeburg (2018) found, for instance, that library management separated staff into the *creatives* and the *non-creatives*. This is problematic given that presumptions of creativity often fall along the lines of race and gender. Research on patent applications suggests, for

instance, that neither women (IPO, 2019) nor those from minority groups (Schuster et al., 2020) are likely to be perceived as innovative.

## Knowledge work guides

Three research areas provide a theoretical framework for addressing what guides KW within these systems—organizational routines, canonical and noncanonical knowledge, and the theory of workarounds. Together, they inform the current study's primary metaphor of map following and map-making.

### *Map following*

Organizational routines are ordered, repetitive patterns of learned behavior (Felin & Foss, 2009; Cohen & Bacdayan, 1994). They can originate from workers themselves or in relation to any other component of the work system. These behavior patterns are guided by rules and *theories of action* (Argyris & Schön, 1994), which are shared assumptions about what must be done, by whom, and in what order to achieve the desired result. These assumptions represent the *ostensive* aspects of routines (Feldman & Pentland, 2003), which exist as social structures that outline the ideal ways in which work should be completed or how workers should behave, i.e., the social architecture (Jaccaci, 1989). They are the abstract blueprints or recipes that outline the steps necessary to execute a certain task or behavior (Becker, 2004; Felin & Foss, 2009). Becker (2004) highlighted four functions of routines, which suggest how routines guide KW. Routines enable coordination, can be used as decision guides, allow workers to focus on the non-routine, provide stability, and effectively capture and store knowledge.

Consistent with structuration theory (Giddens, 1976), routines both enable and constrain what workers do. Collections of routines equip organizations with capabilities that enable essential activities (Winter, 2003). Used as decision guides, routines allow work to continue in the face of uncertainty (Becker, 2004). Stability, afforded in part by routines, is a vital function of an organization that can help it reduce risk (Kelly & Amburgey, 1991). Yet, each of these functions also carries with it potential constraints. Decision-making guides can oversimply work. The stability afforded by routines can restrict innovation and constrain an organization's ability to adapt. The assumptions and theories of action embedded in routines may be outdated or irrelevant, which is more likely to occur when they are not brought to the surface and examined (Senge, 1990/2006).

A similar concept comes from Brown and Duguid (1991), who outlined the role of canonical knowledge in an organization. Canonical knowledge represents the formal concepts, procedures, and values of an occupation that come from—or are in some way legitimized by—management (Billett, 2010). This knowledge is often documented in manuals and handbooks. For instance, Brown and Duguid (1991) cited Orr's (1996) study of Xerox technicians carrying extensive technical manuals to job sites. These manuals represent canonical knowledge. This knowledge is abstract, separated from work, logical, alienating, and individualizing (Cox, 2005; 2007). Brown and Duguid (1991) suggested that canonical knowledge is like the depiction of a journey on a map. It is created after a journey is completed and exists outside of the situated realities of the journey itself. It thus serves as an abstract and simplified depiction of the journey that cannot account for the realities and obstacles of the actual journey, e.g., potholes, traffic, storms: "The map, though potentially useful, by itself provides little insight into how ad hoc decisions presented by changing conditions can be resolved" (Brown & Duguid, 1991, p. 42). The current study considers the function and origins of these maps, suggesting that they can come from any agent within the work system.

Map following, then, is what workers do as they apply canonical knowledge primarily *as is*. This occurs when workers do not feel the need to leverage their discretion (Becker, 2004). Instead, they follow the existing rules and structures. This is similar to what Argyris called single-loop learning, which is performance-based learning that "does not question the fundamental design, goals, and activities of [the organization]" (Arygris, 1976, p. 367).

### *Mapmaking*

Canonical knowledge is not the only knowledge available to workers, however, and routines do not exist only ostensibly. All routines have performative aspects: "The specific actions, by specific people, at specific times and places, that bring the routine to life" (Feldman & Pentland, 2003, p. 94). Through the performance of a routine, workers can change these routines or act in ways that counter them, leading to the creation of workarounds. Alter (2014) defined a workaround as improvisation or change to work systems to overcome constraints preventing the system from operating effectively. Workarounds are possible because workers have agency—"[the] feeling of being in the driving seat when it comes to [their] actions" (Moore, 2016). They are capable of detecting "gaps in their current and goal states" (McElroy, 2002, p. 7) and creating knowledge in the form of "conjectures, assertions, arguments, or theories about which potential actions might lead to desired outcomes, in ways that will close the gap between current and goal states." This is consistent with structuration theory, which suggests that people, in response to social structures, can choose "to do otherwise" (Giddens & Pierson, 1998, p. 84). Given the collective nature of routines, workarounds tend to arise as workers begin to act more individually (Weick, 1990). Thus, although workarounds are developed collectively, the impetus for a workaround is an individual's sensing of gaps between what is happening and what they think should be happening (McElroy, 2002).

Workarounds are similar to noncanonical knowledge, which is situated, loosely structured, and created through mutual problem solving (Cox, 2005; 2007). Noncanonical knowledge emerges from the journey of work as it is experienced on the ground and, thus, can account for more of the complexities and realities of the journey itself (Brown & Duguid, 1991). Here, rather than follow an existing map, workers create new maps. When the Xerox technicians in Orr's (1996) study encountered issues that the manual could not solve, they turned to each other. Through dialogue and storytelling, they developed new approaches to completing their work that accounted for the limitations of the manual. So, whereas map following involves correcting deviations from a routine, mapmaking accounts for perceived inadequacies in the routine itself. This work centers around double-loop learning—"when errors are corrected by changing the governing values and then the actions" (Argyris, 2002, p. 206). Mapmaking might also involve triple-loop learning, which can include challenging the underlying paradigm of the system (Tosey et al., 2011).

The current study asks:

- **RQ1**: What are the sources and functions of knowledge work maps in the library?
- **RQ2**: How do library staff acquire these maps?
- **RQ3**: What challenges do library staff face as they try to follow these maps?
- **RQ4**: How do library staff overcome map barriers?

## METHODS

The current study's design was informed by social constructivism, which assumes that individual behavior and cognition are heavily influenced by social context (Talja et al., 2005). This enabled the study to account for the situated nature of KW, and it also suggested the need for interpretive approaches to data collection. The research design also needed to account for the more tacit and explicit elements of KW. Participants may have a more front-of-mind or back-of-mind awareness of system maps and their deviations from them. For instance, when driving a nail, one maintains a front-of-mind *focal awareness* of the nail and a back-of-mind *subsidiary awareness* of the feelings of holding the hammer and how to swing it effectively (Polanyi, 1962/2009). Thus, a worker's perception of their work is informed, in large part, by what is *not* immediately before the mind's eye. A full accounting of KW should include both. Distinguishing tacit from explicit can present a problem for researchers, however, particularly when all knowledge is understood to include both tacit and explicit elements (Jasimuddin et al., 2005). The current study was less interested in analyzing the nature of this distinction than it was in ensuring that the study did collect data about both tacit and explicit map behavior.

To address this challenge and capture more of the situated nature of KW, the current study used the think-aloud (TA) method. TAs represent one form of protocol analysis, termed concurrent protocols that ask participants to say out loud everything they think as they work on a task. They provide "thoroughly reliable" insight into thought processes (Ericsson & Simon, 1980, p. 247). Because these data are collected closer to the event itself, they provide rich insights into complex thinking and problem-solving (Koro-Ljungberg et al., 2012). TAs are particularly well-suited to the current study because they can provide insight into working memory, where "only 'heeded' or noticed information goes" (Charters, 2003, p. 70). Thus, what can be—and is—said during a TA represents explicit knowledge. This fits with definitions of explicit knowledge as transmittable through language (Dhanaraj et al., 2004). TAs are also well equipped to capture the nature of obstacles and challenges participants face while doing a task (Branch, 2000). This is important in a study analyzing workarounds.

TAs were used in conjunction with interpretive semi-structured interviews (SSIs), which have a goal of "discovering the experiential world of the respondent within topical dimensions" (McIntosh & Morse, 2015, p. 4). SSIs represent a form of retrospective questioning commonly used in conjunction with TAs (Charters, 2003). They are conversations with individual participants that flow loosely according to a pre-determined set of questions, and they are instrumental in situations where participants may require additional follow-up questions to understand questions fully (Adams, 2015). Interviews give participants a chance to reflect on the work they did during the TA. This can elicit more tacit elements of organizational maps. Because participants can talk about it, however, these interviews are more a representation of implicit knowledge, which refers to tacit knowledge that can be made explicit (Muñoz et al., 2009).

### Process

After receiving institutional review board approval, participants were recruited from a public library system in the SE United States. This system is made up of a main location and several smaller branch locations. It is a nonprofit organization funded mostly by local tax dollars and charitable donations. Public libraries in the United States exist to serve the needs of local communities, ranging from after school programs and employment support to immigrant assistance and language classes (ALA, 2019).

The system's main branch helped recruit participants for the study by distributing a flyer to staff. This flyer outlined the nature and requirements of the study. All staff were allowed to participate, though the main branch was informed of the researcher's interests in working with staff who are typically underrepresented in these kinds of studies, e.g., staff of color, pre-professional staff, roles without "library" in the title. Six full-time public library staff participated in the research (Table 1). Participants first engaged in a 20-minute TA at their place of work. Participants were allowed to choose the work they did, with the only suggestion that it be typical work for them. A similar approach was used by Aitken & Mardegan (2000), who elicited reliable data by asking nurses to engage in TAs while working with patients. The researchers audio recorded participants talking aloud as they worked, interjecting only to remind participants to keep talking. Participants engaged in various work during this time, including processing books, pulling holds, curating content for a volunteer newsletter, interacting with patrons at the drive-thru and entrance, and choosing books for display.

Following the TA, participants engaged in a 30-minute SSI with the research team primarily focused on the work they had just done. This included questions about perceived outcomes, why participants worked the way they did, what they hoped to achieve, and what resources they relied on. Probing questions were included to interrogate how different agents within the work system influenced the work participants did. Interviews were also audio recorded, and each participant received a $25 gift card. Because the study asked about sensitive work-related issues, pseudonyms were used to protect the identities of participants and transcripts were edited to remove identifiable information.

Audio recordings were transcribed and imported into Nvivo for qualitative thematic analysis. Thematic analysis attempts to uncover patterns of meaning in data through the application and grouping together of codes (Clarke & Braun, 2017). The two members of the research team followed the steps for thematic analysis outlined by Braun and Clarke (2012). First, the researchers listened to each recording to familiarize themselves with the data, meeting at multiple points to compare notes on emerging themes. Next, the researchers began applying codes to the data. While initially guided by concepts noted in previous research, coding was primarily inductive, aiming to allow codes to emerge from the data (Hsieh & Shannon, 2005). Each researcher coded the same first two transcripts, meeting to discuss and agree on the meaning of the codes and the codebook structure. A single researcher then coded the remaining transcripts. In the next step, researchers identified themes under which similar codes could be grouped. This was done after each TA and interview and was revised several times. Themes emerged around map sources, how maps were acquired, the barriers participants faced when trying to follow maps, and the workarounds participants devised to overcome these barriers. A codebook was created that described codes and themes and provided excerpts from the transcripts. Transcripts were then recoded according to this final version of the codebook.

| Name | Age | Race | Gender | Library Experience |
|---|---|---|---|---|
| Robert | 59 | Not identified | Man | Over 10 years |
| Mary | 49 | White | Woman | 6 years |
| Brianna | 47 | Black | Woman | 27 years |
| James | 28 | White | Man | 3 months |
| Imani | 43 | Black | Nonbinary | 10 years |
| Alexis | 34 | Black | Woman | 1 year |

**Table 1. Participant Demographics**

## RESULTS

### Map functions

RQ1 asked about the sources and functions of maps that guided the KW of library staff. Analysis uncovered five map sources: management, staff, patrons, technology, and the physical space. The following section details the contents of these maps.

#### *Managerial maps*

One function of managerial maps was to outline the expectations for what staff would work on. This was codified in a printed schedule next to Alexis' desk, which separated her career coaching and customer service responsibilities. Even though she had downtime in-between drive-thru patrons, she was concerned about doing career coaching during the time allocated to customer service:

> "Another coworker here told me . . . you shouldn't do that, because then [management is] gonna think that you can't handle your work in the amount of time that you're here . . . That was one of the things that influenced me to not send a certain email . . . because if they see it, they're going to think that you're not able to finish your work within that allotted time and that maybe you shouldn't be promoted."

Another function of managerial maps was to articulate expectations for how work should be done. Robert was explicitly aware of this map as he pulled holds: "My brain tells me that my boss says to squish them up like that. They don't want any gaps." He was initially hesitant to participate in the study out of a concern that he would violate these maps: "[My manager] can fire me on the spot if [I do] something wrong." Management was, at times, available to clarify these maps. A patron asked James about using a room for a for-profit watercolor workshop during his TA. While he was aware that a policy likely existed for this, he was unsure about the specific policy and called in a manager: "When it comes to what he's trying to do, because it's a for-profit, I doubt he'd be able to . . . but, I'd rather my manager be able to give a clear-cut answer than me just say no."

### *Staff maps*

Staff maps functioned similarly to managerial maps, but they clarified the expectations of a participant's colleagues and served as alternatives to managerial maps. One function of staff maps was to outline *norms of reliance* or informal and emergent structures developed by staff to get work done. Alexis relied on these structures as she worked drive-thru: "I rely on people to do that because . . . [patrons] will call straight back to the desk when I don't have time to answer. My coworkers will intercept that like, 'Hey, she's busy right now, but I can take the information.'" Robert noted how these structures emerged through a series of agreements and negotiations among staff: "And our crew's good . . . I'll do this for you if you do that for me. I'll watch the desk; you'll do holds." Alexis recalled how these emergent structures also encoded communication norms: "We have to use pronouns now. And I'm bisexual. Back in the day . . . it wasn't like we had to use pronouns and all that stuff. Like, you just say him, her, whatever." Another function of staff maps was to outline alternative ways of getting work done. James noted that staff maps functioned better than managerial maps at outlining the process for finding books on a theme for a display: "I went through the 16-step process because that's what I was taught through the videos that I watched. But then somebody showed me how to do it in four steps."

### *Patron maps*

Patron maps clarified the expectations of the people in the library who were not employees, including library users and volunteers. Thus, the function of this map was to outline the requirements for meeting patron expectations. James highlighted patrons' expectations for accuracy: "The last thing I want is for the patrons to go home with a book that wasn't checked out to them. That's the biggest thing going through my mind." Brianna noted patrons' expectation for speed: "I do feel like in my mind I need to move quickly and get the stuff out. I don't want customers calling and going, 'I had that hold for two months.'" Patron maps served as decision guides for Mary as she curated content for a volunteer newsletter: "I wonder what they'll want to learn about what's going on in the library today or this week?" Because Alexis had a passion for working with people, patron maps functioned as a tool to fulfill that passion: "At the end of the day, whether I'm doing career coaching or [drive-thru], I still need to help people. So that was good. It makes me feel, like, all warm, fuzzy."

### *Technology maps*

As an integral non-human actor in the work system, technology introduced its own set of maps. The function of these maps was to articulate what technology could and could not do. Because Imani used a laptop she was not familiar with during the TA, she had to change how she completed the work: "Like, I can usually right-click on things, but because it's in a web version, I cannot. So, I have to figure out how to see the same information a different way." The laptop she used had a software version meant for the public, so it did not automatically save searches. As a result, she had to save work herself: "So, now I'm going to save it because if I don't save it, it may not save. And then I'll lose all the work I've done already." Technology specified how Robert processed holds: "We had to put them in a certain way, or the lists would not generate right." Alexis' work centered around these maps: "And I prayed to God that the system doesn't go down again because it's just what it does. There's, like, literally nothing to do because everything revolves around a computer and Internet."

### *Physical space maps*

As a second integral non-human actor in the work system, the physical space provided its own set of maps. The function of these maps was to guide a participant's movement through time and space. Brianna, for instance, worked at a desk as she processed books, which required lots of sitting: "I work 7.5 hours a day. [I sit] probably six [hours] because I usually don't go outside or do much more until I go on my lunch break." As Robert pulled holds, he was explicitly aware of the need to bend over to reach things on the bottom shelves: "My brain is saying, 'Man, I got to squat again. These are down at the bottom.'" The drive-thru at Alexis' library was sectioned off in a separate room. As a result, she could do things in the drive-thru that she could not do elsewhere: "Being closed off, I can turn this

fan on, which I'm going to do. I can have a phone out . . . because the area's just closed off." COVID restrictions limited the spaces James could use for a youth program: "I think it's a little interesting that we can't do a program inside in certain spaces . . . But, I'm sure that as time goes on, they'll open more stuff up."

### Map acquisition

RQ2 asked about how library staff acquired these maps. Participants rarely engaged with the codified versions of any of these maps. Alexis avoided such documents: "The policies and procedures . . . is like 26 pages long. I ain't read not one bit of it. Maybe the first and second page, but I'm a learner where I got to see you do it." Instead, participants acquired maps in two ways: observation or interaction.

*Acquisition through observation* included watching how others followed and enacted the requirements of a map. James acquired managerial maps by watching managers respond to questions posed by patrons: "I like listening in, like if I've got a manager or someone that's up front here that's got a question like that. I like listening in so that I can better prepare myself for questions like that." Brianna acquired staff maps by observing longer-tenured workers:

> "She's a senior cataloging librarian, and she's been here longer than me . . . she showed us just little tips on how to do some of the basic cataloging . . . she sat down with us a few times."

Alexis observed a patron's body language in the drive-thru to determine whether they expected a conversation:

> "If I see a person sitting at the window is looking out the window, they probably don't want me to talk to them. If they're making weird eye contact and, like, gesturing towards you, then they want to say something. They probably want to talk."

To acquire patron maps, James kept track of the returned books: "It's little like things like that, that in the end make my job easier, because I say, 'That looks like a good book that people are reading currently. They might like these books that they've never even heard about.'"

*Acquisition through interaction* included efforts by staff to engage directly with the mapmakers themselves. Imani acquired staff maps for book displays by initiating conversations with colleagues:

> "Me and my coworkers talk all the time . . . we talk about books constantly. I'm always asking what someone read, what they thought about it . . . what kind of person would be interested in it . . . learning across a spectrum of information, as opposed to having to rely on just yourself, is really helpful."

Interaction was necessary to acquire nonhuman maps. Technological maps, for instance, were often acquired through trial and error. As Robert printed out the holds list, he "had to print it and hope it prints it out right." Physical maps were acquired through an exploration of the space. James continuously surveilled this space: "I constantly like to look out around, [to see] if somebody back there needs help faxing something or scanning something."

### Map following

RQ3 asked about the challenges library staff faced as they tried to follow these maps. Challenges came from one of two feelings—feelings of restriction or feelings of uncertainty. Robert felt restricted by the managerial maps that required him to pull holds: "I don't say, 'Oh, yeah, I want to do holds today.' . . . It's just part of my job. I know I've got to just do it." Alexis felt overburdened by the managerial map separating her career coaching and customer service obligations: "I'm customer service. I'm everything. I try not to be burnt out." Brianna noted that these maps could also feel restrictive depending on how patrons delivered their maps: "It was a little stressful because sometimes…. customers can be really abrasive about things like fines." The physical space forced Robert into painful positions: "My legs are bad. I used to do plumbing for 14 years before I did this. When you got shot knees, you never like to squat." The physical space also forced Brianna to sit more than she wanted: "I think I need to move around more . . . just for body circulation. It's not good to just be sitting, looking at a screen."

Uncertainty barriers emerged when participants did not know how to continue following a map, i.e., they got lost. As Imani searched for books for a display, she did not understand why the system kept providing results for eBooks: "Why are there so many eBooks? I don't need eBooks." At one point, Mary pleaded with technology to work: "Now, don't get mad at me, CERVIS." Alexis was faced with uncertainty when trying to follow the staff maps around pronoun use at work, which was heightened by the threat of social isolation: "[If I don't use the correct pronoun], then I'm going to get bullied for it . . . I always thought she—I think it's they—I always thought they hated me." While staff maps created valuable work structures, they could also lead to uncertainty about whom to trust. Robert referred to his workplace as Peyton Place—a reference to an American soap opera—noting that some of his colleagues would "talk behind your back" and "text you behind your back."

### Workarounds

RQ4 asked about the workarounds library staff enacted to overcome challenges in the following of maps. Two workaround strategies emerged—creating a new map and hiding deviations from the map. Feeling restricted by managerial maps that felt burdensome, Alexis developed an official proposal for restructuring work, which she sent to management: "I have the proposal, and then I have three job descriptions that I'm putting together for career coaching." Imani also created a new map for how to create book displays, but she did not wait for managerial approval: "My boss really, really hates those [covers] that are just plain—like those orange covers and stuff. But I still sneak them in every once in a while. It's a good book." Faced with the restrictive requirements of managerial maps, Robert devised a new way of doing his work that got it done much quicker. This involved not marking books as missing and leaving these books on the list: "I mean that ain't protocol, we should mark it missing." Faced with physical requirements to sit, Brianna's workaround was to choose tasks that she knew would require her to stand: "There are books back there to shelve, so I can get up there and shelve and move around and do different things." Robert's workaround for the requirement to bend over was to change the order in which he pulled holds: "If it's a lot of kids . . . that means a lot more bending. And what goes through my brain [regarding the children's section] is I do those last."

Hiding was another workaround strategy used by participants. Hiding occurred when staff had trouble following a map, which led to difficulty behaving in accordance with that map. Rather than create a new map, they chose to hide their deviations from the map. Alexis suggested that, in a previous job, having a panic attack did not align with managerial maps outlining how an employee should behave: "I did have one of my panic attacks at work, and I was, like, so embarrassed. And then my supervisor told me, 'Well, you're too old to be acting like this.' So, she thought it was just, like, fake." Because of this experience, she hid her panic attacks from her current manager: "If my manager knew . . . I'd probably, like, freak out, because [of the] reaction [from] my [previous] supervisor." Alexis also took a hiding approach when faced with uncertainty following staff maps about pronoun use: "I vocalized that to you. I didn't vocalize that to them." Robert's workaround for the mistrust created by staff maps was to avoid specific staff: "Walk on pins and needles. Don't go poke the bear." Brianna's workaround for rude patrons was to be polite, hiding her true feelings: "I thought I handled it well. I was nice to them."

Not all barriers could be overcome with a workaround, however. For instance, Imani tried several workarounds to remove eBooks from the software's search results before giving up. She tried filtering the search results, but "it still gave me eBooks." Then she tried changing the type of material, but "it will not let me change that. That sucks." Eventually, she said, "Okay. I guess I'm just going to have to deal with eBooks." Even though it threw the books out of order, Robert followed the map for processing holds because he did not have a better way: "Well, this is still the best way to do it—just out of sync a little bit."

Analysis also suggested ways through which workarounds became routine, i.e., the way a map was canonized. This was primarily done through knowledge sharing. When James and his team learned of a faster way to create book displays, they shared it: "Hey, we know a way of doing this a lot faster and a lot simpler in a much shorter span." Imani established a process to intentionally gather workarounds to develop a single standardized process: "We're going to come together to see if we can incorporate several different methods to create one way that works really well and is easy and quick."

## DISCUSSION

The current study considered the presence of maps within the library that outline how staff should behave and how they should conduct their work. These maps originated from different parts of the work system (Alter, 2012), including management, staff, patrons, technology, and physical space. Each set of maps outlined specific requirements and established routines that enabled and constrained library staff. At times, staff faced little difficulty following these maps. At other times, staff faced significant hurdles that made it difficult to continue following the map. Using the language of activity theory (Engeström, 1999), the object of KW in this study tended to focus on meeting patron expectations and completing work. There were often tensions between this object and the technological tools used by staff. Managerial maps outlined specific rules about procedural order and the allocation of work. These rules often introduced tensions with the library staff—the subjects of the system—who had identified alternative and preferred approaches to work activities. Findings suggest that workarounds represent one means of changing the system in response to these tensions and contradictions. Findings also suggest that, despite assumptions that KW brings flexibility and freedom from constraints, this work is still largely controlled. As Michel (2011) suggested, "One of our knowledge economies' greatest paradoxes is that knowledge workers perceive their efforts as autonomous despite evidence that it is under organizational control" (p. 325). The following section outlines implications of these findings for research and practice.

## Redesigning maps

Particular attention should be paid to the support of staff whose very identities present deviations from these maps, as these deviations have the potential to lead to feelings of restriction and uncertainty. For instance, Alexis' experience with panic attacks suggests that mental health issues may present themselves as deviations from managerial expectations. Robert's experience with knee problems suggests that physical ailments or disabilities may make it more difficult for some staff to follow physical maps. When a disability requires staff to use technology differently, technology maps may present additional burdens and restrictions. Physical maps that are not easy to follow—or workspaces not designed using human factors—can negatively impact worker health, productivity, and output quality (Greig et al., 2019). Staff who represent racial and ethnic backgrounds underrepresented in the library profession may find themselves at odds with the expectations of staff and patron maps. This contributes to the emotional work of librarianship, which libraries often fail to acknowledge (Rodger & Erickson, 2021).

This suggests an important role for management. As management learns more about the presence of these maps and the hurdles staff face following them, they have an opportunity to redesign these maps. Management can alter the expectations of human agents within the work system and change the requirements of non-human agents. For instance, research suggests a unique role for management as change agents in organizational culture. Models of planned change outline the steps management can take to initiate change that is "deliberately shaped" (Levy & Merry, 1986, p. 5). Management can adapt Lewin's (1947) model of change—which includes unfreezing, moving, and refreezing—to shift expectations from agents within the system. Management can also support change by naming the functions, contents, and challenges of these maps. One of the reasons mental models and theories of action have such staying power is that they are often unchecked (Senge, 1990/2006). Through regular reflection on these maps, the library system can begin to collectively question how these maps function.

## Workarounds

The current study also shows that the nature of workarounds in the library impacts the extent to which maps remain hidden and unacknowledged. Workarounds that lead to the creation of new maps enable an open questioning of existing maps. They are capable, then, of showcasing the inadequacies and deficits of these maps. This is what Alexis did when she communicated to management the restrictions of their maps. However, workarounds that lead to hiding behavior are done quietly and individually. As a result, it is more difficult to question and critique the existing map. For instance, because Alexis did not have a conversation with her colleague about their preferred pronoun, this map was not updated. Management can encourage critique and provide spaces for staff to develop and propose new maps.

It is also important to consider how workarounds lead to an intensification of work. For instance, insofar as a workaround enables staff to do work the way they want, it suggests some degree of autonomy. Yet, Pérez-Zapata et al. (2016) indicated that the perception of autonomy—and its accompanying self-generated demands—can lead to burnout and *workaholism.* Increased empowerment has also been linked with increased work strain (Harley, Allen, & Sargent, 2007). Michel (2011) showed how organizational control could lead to KWs abusing and neglecting their bodies. Similarly, Lupu and Empson (2015) found that supposedly autonomous workers in accounting are susceptible to organizational pressures to overwork. Additional research is needed into the intensification of KW in the library and how this leads to work strain.

## Contribution to research

The current study contributes to research on routines and canonical knowledge by considering two additional sources of maps that influence how work in the library is done: Patron maps and physical maps. The use of TAs in the current study contributes to research on organizational routines by showing that the content and requirements of maps were often explicitly present in the mind of staff as they worked. This suggests that routines are not always tacit (Winter, 2003). The current study also contributes to the study of information practices by connecting it with KW and highlighting the role of organizational maps as rich information sources for participants. The fact that participants acquired these maps through observation and interaction rather than document transfer confirms the centrality of situated experience within information practices (Savolainen, 2007). The study's findings about the role of the material workspace also build on previous studies, such as Kuuru and Närvänen's (2020) analysis of the physicality of service work and Lloyd's (2010) conceptualization of corporeal information practices of emergency services workers.

Although not capturing the entirety of the explicit knowledge of participants, the TAs used in the current study were able to provide an additional layer of rich data about what participants were thinking as they worked. For instance, participants provided important details about the challenges of following technological maps *as* they worked with this technology. While they provided a broad overview of their approach to technology in the interviews, the TAs provided insight into specific ways in which these maps influenced their work. Because these TAs were more natural—i.e., participants conducted their normal work—researchers had increased confidence in the applicability of

findings to the realities of library work. Because of the highly situated nature of work, researchers interested in the nature of work would benefit from the use of natural TAs.

Future research is suggested into the presence and influence of other maps outside the scope of the current research. For instance, because the study focused on the work environment, participants were not asked about the influence of non-work factors. Burnett and Jaeger (2010) suggest that small worlds—like those at work—do not exist in isolation, but rather touch other small worlds. Overall perception in the lifeworld is a function of several small worlds. Map behavior at work, then, is likely to be influenced by things like family life, nonwork friends, hobbies, etc. An investigation into the influence of these other worlds and map behaviors can provide additional insight into the nature of library work.

### Limitations

Because of the study's design of the TA, findings are limited to the types of work that staff felt they could talk about as they did it. This limited the study's ability, for instance, to analyze staff interactions with patrons—though these interactions still occurred. The presence of the research team during the TA also suggests that another map—from the researchers themselves—was present. To the extent that participants are performing, or feel they are being watched, they may change parts of how they do their work. However, participants generally agreed that the presence of the research team—although awkward at first—did not significantly change what they did. This is likely because the TA lasted for 20 minutes, participants completed mostly routine work, and the researchers interacted minimally with participants during the TA. As a study of public library staff with a smaller sample size, the current study's findings may not be generalizable to other library types.

## CONCLUSION

The current study engaged six public library staff in TAs and SSIs to uncover the function and content of organizational maps that guide KW, how these maps were acquired, the challenges staff faced in trying to follow these maps, and how staff responded to these challenges. The ability of library staff to navigate these maps is crucial to a library's resilience. Analysis suggests a vital role for management here, as they can support staff by redesigning the requirements of non-human agents in the system and altering the expectations of human agents. Staff can also increase the visibility of these maps by naming and labeling them, as well as their deviations from them, as a means of critiquing them. The current study contributes to research in KW and information practices by showing additional synergies between these areas of study and highlighting maps as significant resources at work.

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