

Creating Space: The Impacts of Spatial Arrangements in Public Library Makerspaces

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Abstract:

This multi-site ethnographic case study examines the spatial arrangements of two public library makerspaces. These spaces are participatory social and spatial arrangements aimed at least in part at creating physical or digital objects, which are open for the free use of all library patrons, irrespective of the types of workshops, tools, staffing, materials created, or location. Library creative places shape the possible actions and experiences of those using them through policy and practice, including the planning and implementation of spatial arrangements. Power relations are often invisibly embedded in the affordances intentionally or unintentionally designed into the spaces. This study examines these spatial arrangements and inquires how users and library personnel describe the impacts of the space. It details how two makerspaces in public libraries serve their communities in novel ways, and offers transferable, praxis-based recommendations for spatial arrangements which reflect equitably-shared power relations among the library-as-institution, the library personnel, and the users. Furthermore, it describes how users co-construct their libraries through their hands-on making activities, helping to redefine what libraries are and librarians do.

Keywords: makerspaces, library space, public libraries, user studies, ethnography

In public libraries, makerspaces and other creative places are emerging to meet the creative, social, educational, and innovation needs of individuals and communities. These spaces are participatory social and spatial arrangements aimed at least in part at creating physical or digital objects, which are open for the free use of all library patrons, irrespective of the types of workshops, tools, staffing, materials created, or location. Reports of such spaces often present them as “empowering,” but little has yet been published on library user or personnel perceptions of this presumed empowerment. Library creative places shape the possible actions and experiences of those using them through policy and practice, including the planning and implementation of spatial arrangements. Such socially constructed space is power-laden. Power relations are often invisibly embedded in the affordances intentionally or unintentionally designed into the spaces.

This research reports initial findings about the spatial arrangements in two libraries, and how users and library personnel describe their impacts. It details how these makerspaces in public libraries serve their communities in novel ways, and offers transferable recommendations for

spatial arrangements. Furthermore, it describes how users co-construct their libraries through their hands-on making activities, helping to redefine what libraries are and librarians do.

1 LITERATURE REVIEW

Critical space theorist Henri Lefebvre (1991) proclaimed, “(Social) space is a (social) product” (p. 26), highlighting the social constructions and uses of space, which are often invisible or forgotten. Each organization plans and executes its spatial arrangements according to some coordination of values, needs, mission, and physical limitations. In public libraries, some space is open to the public, and other areas are open only to authorized personnel. Arrangements may devolve further into public and private, with locked closets available to library staff, and open areas or stacks available to certain members of the public, under certain conditions, and for certain reasons. The arrangements of tools and materials within the space demonstrates how the library interprets its use, and how it legitimizes particular activities or groups within the space. To many library staff members, the curtailment or facilitation of some activities is often invisible, or visible in different ways than the public perceives. The code by which the space is constructed primarily operates in terms of institutional priorities such as efficiency or physical access (McCabe & Kennedy, 2003; Novak et al., 1987; Sannwald, 2009).

The critical examination of library-as-space is an emerging field, blossoming since the late 1990s (e.g. Black & Pepper, 2012; Kleiman, 2008; Lees, 1997; *The library as place*, 2007; Van Slyck, 2001, 2007). Library space scholar Matthew Griffis (2013) notes, “library buildings are a form of information technology” (p. 1). This technology is rarely noticed as such, but is a tool that enables and constrains user agency. Library spaces shape the possible actions and experience of those using it just as other user interfaces do. Nevertheless, few studies have examined the users’ perspectives of library spaces (Radford, Radford, Lingel, & Bawden, 2015).

Several library-focused works focus on the intersection of space and power. Black and Pepper (2012) offer an historical perspective on public library architecture, calling it a “successful exercise in ‘social engineering’—which can be defined as a collection of techniques designed to control, change, or manipulate people’s attitudes, actions, or social behavior” (p. 446). Sequeiros (2011) explores user perceptions of institutional control and individual power in light of their social reading practices in public libraries, and finds that library staff, and other users, enact their versions of perceived policy, with some users hushing others.

Griffis (2013) also explores how public libraries express power and control; how users perceive and use spaces; and what they may do within them. He explores the territorial markings of furniture and walls in library spaces which, often subliminally, shape feelings of belonging or exclusion. He found that library activities were prescribed by their locations in the building. He also found that user groups were often separated from one another through the manipulations of space. Users often felt watched, monitored, and controlled in their use of the space, with staff reporting surveillance and control as a primary work task. This surveillance is embodied with panoptic emplacements of personnel desks, counters, and sightlines. He also found, “To some users, there is no “user territory” in a public library...all library space is staff territory or some extension thereof; it is merely a question of where users (“the public”) are permitted to go, under what conditions, and where they are not” (p. 153). This finding challenges the idea that public libraries are open community spaces, third places, or public spheres in which users create the interactions in the spaces. Instead some users felt like guests, interlopers, or nuisances interrupting the “real” work of library staff.

Only one series of studies, by Bilandzic and co-authors (Bilandzic, 2013; Bilandzic & Foth, 2013; Bilandzic & Johnson, 2013; Bilandzic, Schroeter, & Foth, 2013), has examined the social space of public library makerspaces. These articles investigate how users interact with the space and each other in library co-working and makerspaces. They delineate the difficulty in facilitating the sorts of knowledge sharing and sociability required or mediated by these spaces. Other studies have begun to look at the professional competencies necessary in a library makerspace (Koh & Abbas, 2015), user agreement policies (Moorefield-Lang, 2015), and the need to ensure that makerspace-type programs are accessible in light of physical or cognitive differences (Brady, Salas, Nuriddin, Rodgers, & Subramaniam, 2014). Several case studies describe institutional perspectives on implementations of such creative places (Brady et al., 2014; de Boer, Seadle, & Greifeneder, 2015; Gierdowski, Reis, Seadle, & Greifeneder, 2015; Holt, 2008; Moorefield-Lang & Seadle, 2014; Moorefield-Lang, Seadle, & Greifeneder, 2015; Peltonen & Wickström, 2014; Roberson, 2015; Sheridan et al., 2014). However, none of these studies examines users' perspectives about the spaces or what they can or cannot do in them.

2 METHODS

This multisite case study uses ethnographic methods to explore users' impressions and interpretations of makerspaces by looking at two public libraries. The research questions are: How do users and library personnel interpret the spatial arrangements of public library makerspaces? And (how) do these spatial arrangements construct or reflect power relations between the library and the users, or impact what users may do?

The study examines how the users and library staff perceive the spaces of library makerspaces and how the spaces reproduce power relations between users, staff, and the institution. The sites include one large urban and one small rural library. The study, which is ongoing, will continue at a third library located in a small city. I have spent over 200 hours in the first two library spaces, participating, observing, interviewing, and making with the study participants. By the end of the study in June, I will spend approximately 360 hours in all three spaces.

I analyzed the collected data inductively to seek out patterns of impacts and perceptions regarding the spatial arrangements of each makerspace. I analyzed each site's data separately, categorized the resulting codes, then compared and re-combined them into categories. I used Kathy Charmaz's (2006) constructivist grounded theory methods for the data analysis.

3 FINDINGS

Each library presents different spatial arrangements, but they both suffer from lower usage than expected, in terms of either the amount or types of use. While patrons use the large urban library extensively, they are not collaborating as some staff expected. The dearth of use or collaboration can be understood in the context of the spaces and how they are arranged. At the same time, the successes of the space, in the eyes of the library staff and users, are often made possible by spatial choices.

3.1 Case P

Case P is a small library in a village of 7,000, located in an hour from two different urban centers in upstate New York. The space has been available for use to the public for the last year. Many of the affordances of the space are hidden in this 600 feet² room. It comprises both "clean" (3D printer, electronics, sewing machines) and "dirty" (woodworking)

technology tools. The makerspace room is tucked at the end of a long library. Even if one is seeking the makerspace, it is not immediately apparent. One participant noted that the makerspace, situated past the children's area, was not visible from the areas of the library he visited, since he has no children. Despite signage, outreach, and marketing, community members were sometimes unaware the space existed or what it entailed. Library trustees and staff worried that few people knew of its existence.

When I arrived in the space, craft and electronics supplies were visible in open wire bins. These bins contributed to a sense of "storage room," which confused patrons wondering whether they were able to come in. The bins also showcased the variety of creative activities possible in the space. Two weeks later, attractive but institutional-looking cabinets replaced the bins. These locking cabinets keep sawdust out of the "clean" technologies, and keep some supplies secure. The woodshop (lathe, chopsaw, drill press, etc.) is located in the same space as the more delicate instruments, and sawdust is a concern. The library director added



Figure 1 The wire bins made some of the possible types of making visible.

woodworking tools to the space to bridge any contextual gaps for this rural community and ensure that the types of making in the space aligns with the types of making the community already does. But the shared space presents logistics problems for the equipment and for the makers. One participant, a fiber artist, questioned how she would do her work if someone were also using the woodworking tools.

of this problem, they present another: How will people know that they can use the equipment in them? Some users said they would open the cabinets, but others said they would not feel comfortable doing so. One library user said that, even with signs, she would not open the cabinets. The cabinets reduce clues about what types of making might be possible in the space.

While the cabinets solve parts

Since "exposure" is one of the key themes that arise in this study, and participants in both spaces describe seeing something as being "exposed" to the possibility of access, hiding the equipment acts as a barrier to its use. Library staff say they will put up signs and materials lists on the cabinets to signal the usability of the contents, but bemoan the fact that such signs are often not seen or read.

The strength of the space is its overall warmth, supplemented by a welcoming staff. The maker workshops were often full, with waiting lists. All participants who attended workshops said they were fun, socially engaging, and that the space worked well for them. However, in an entire month of daily use (138 hours) of the space, I never saw a person come into the space and use tools outside of classes, until they came specifically to work with me. The lack of use of the space presented its own spatial dilemma: It was lonely back there. Sometimes I moved my own making activities, as a participant-observer, to the more populated areas of the library.

3.2 Case C

This Midwestern central library makerspace spreads across 9000 square feet, and is one of the largest library makerspaces in the nation. The library is located in a vibrant, diverse downtown area. The makerspace includes digital and electronic tools, including a laser engraver, vinyl cutter, Espresso book-binding machine, 3D printers and scanners, recording booth, photography area, button makers, analog-to-digital conversion stations, and many computers with high-end design software. Unlike Case P, there are eleven staff members assigned to the makerspace at least part-time. Two to four library staff members always roam the makerspace. This space is used by many community members.

The room offers space to spread out. Users identify the large tables as a particular benefit—though they are generally used by individuals rather than groups or pairs, and it is unclear if one may use tables with equipment on them for other activities.

Despite the name “collaboration station” the two tables meant for group work are rarely used as such. I have seen little clear collaboration occur during project-making, other than at the button-making table, and in the audiovisual area. Nevertheless, the space does offer opportunities to socialize and collaborate. A community has arisen at the computer design stations. The computers are oriented around a table, and each user faces the others. Because the computers are not sectioned off in carrels, designers can see what the people around them are creating, and offer support and encouragement to one another. People swarm around the



Figure 2 The large urban makerspace.

room at times, asking others what they are making, complimenting products, offering advice, watching the processes. While the space is not seeing the intentional communities of creation that some library personnel expected, the space feels welcoming and “allows for conversations to spring up.”

Some patrons wished they felt comfortable asking everyone what they were making, and wanted a book with photos displaying all the products made in the space.

Although there are several display cases, filled with various products one can make, the lack of signs in these cases means that some people might be unaware of how they can be made, or the processes involved in their making.

One participant, who has only toured the space, said he thought it looked like a too-large space filled with mysterious machines. Even after being told which each machine did, he did not perceive significant value in the space. This patron had come to the space when few people were there, so did not see many projects being made.

This library follows a deskless model of librarianship, in which personnel roam the library and seek out patrons to assist. The staff move and survey the space constantly. With few visual barriers in place, there is little sense of privacy. This does not appear to deter participants of this study, few of whom expressed concern about the staff or other patrons watching them. Both staff and patrons mentioned difficulty finding help when they needed it—there was no central place to seek help as there would be with a staffed desk. However, because staff did not need to staff a desk, they are free to assist patrons wherever they need

help. The library workers all said that they did not wish to teach how to use the tools beyond basic assistance, but preferred patrons to use online resources to learn. Nevertheless, the staff assist, connect, and chat with patrons. The regular makerspace patrons thus know which person to ask for help on given projects, and if staff come in on their own time, patrons will still ask them questions.

3.3 Themes

One of the primary themes emerging from the data is “exposure.” Both institutional actors and library users point to the benefit of exposing communities to new opportunities, new technologies, and new ways of thinking about libraries and creation. Meanwhile, these opportunities, technologies, and ways of thinking remain under-exposed. The patrons rarely know what the librarians assume they know or want them to know. In both cases, most information about the spaces is online, and not visible in the spaces themselves. The physical access to tools in the spaces does not always mean that cognitive access (skills), or psycho-social access (awareness of why a tool could be useful or pertain to one’s own circumstances) are well-supported. The mere arrangement of free tools in a space does not constitute access if users cannot benefit from the tools or space (Ribot & Peluso, 2003).

These spaces are intended to benefit their users, and the library personnel do their best to ensure that the spaces are usable. Still, the institutionally-legitimized uses for the space are not always what the users need or want. In the small library, the classroom-like spatial arrangement did not signal a cozy room for social making and sharing creative ideas to patron participants, even though this was what both librarians and patrons desired. The library offers classes in their makerspace to lure people in, and people see the space as a classroom. In contrast, the large library does not wish to offer classes, and wants the space to be used by individuals who figure out the technical skills to use the tools on their own. Those in charge of the space do not place as high a value on the social sharing of the creative process as the librarians running the small library space. Instead, the urban library leaders seek to promote the greatest possible exposure, and hope that the users are self-motivated enough to figure out the spaces use, or confident enough to ask for the limited help that the staff are able and willing to offer.

Neither of these spaces offer much signage to signal the rules, the possibilities of the space, or other information that the users need to know. Patrons don’t know when or how they can use the spaces or the equipment. The library staff in both libraries say that patrons will ask if they want to use something, but some patrons disagree. Some asserted that they disliked asking for help, or that they did not even know some things were possible. I observed several patrons in the large library leave without asking questions of the staff, because they assumed they had no access to tools such as scissors or glue. None of these smaller, yet vital, pieces of equipment are visible in the space, and the patrons did not know they could request access to them. In my observations, I saw some people ask for exceptions, extensions, help, or if things were possible, but many did not.

The possibilities of the spaces are so hidden that even I, whose job is to ask questions, found that I knew little about what was possible. For example, in the large urban space, I did not know that I could request an extension of my allotted time while using the design computers or 3D printer, and subsequently could only make very simple objects. I did not know that I could request to be placed on a waiting list for the most popular machines in the space, and could use them if the people who had reserved the tools did not appear. In the small library, I did not know if children could come in and use the space with childcare providers, which materials they could use, or the processes by which one was authorized to use the computer

in the space. The lack of salience cues in these spaces limits the use and understanding of them.

These spaces are co-constructed by their users, sometimes through their lack of use. However, many of the participants in this study are unsure of their abilities to affect changes in the space, other than by requesting aid from librarians. The power the users have, which they often describe confidently when thinking about the projects they could make, falters when considering what impact they could have on the space itself, its tools, rules, arrangements, or events. Users in the small library express more confidence in their ability to suggest changes or workshops. Users in the large space are less sanguine about their ability to affect any sort of change. The power the users describe is filtered through the tools, the space, the knowledge they possessed or to which they have access, and the authorities—the library staff.

Library users and staff both say that these spaces are flexible and could be “whatever you want it to be,” within limits proscribed by the library. This flexibility comprises another theme of this research. The movability of heavy equipment in the small space allows the library to reconfigure it to meet programming needs. The urban space does not have reconfigurable tables or tools, but offers enough open floor space to allow for flexibility in how the space is used. This flexibility is also a challenge. For example, the large library does not allow the laser engraver to be vented outside because library administrators wanted to be flexible in terms of its final location and to avoid cutting multiple holes in the wall. While this flexibility allows the institution to reconfigure the space according to its needs, the users cannot use this powerful tool to cut or etch the types of material that require outdoor ventilation, such as thick leather. In this regard, the institution’s needs for flexibility trump the user’s need to work with certain materials. Flexibility can also be read as a lack of cohesion or structure. As one participant notes, “I suppose you can do whatever you want in the space, but I have no idea what sorts of stuff I could do.” The flexibility that accommodates many tasks neglects to scaffold particular tasks. This lack of scaffolding does allow users with their own vision to realize them, but may not assist other users to perceive a vision of their own.

In both spaces, patrons praise the expansiveness of the room, and say that they “can spread out” and that “just the space alone is brilliant.” Patrons value the expanses of open tabletop. Participants mentioned that their desks at home were messy, that they could never afford to take up as much space as an enormous cutting-mat-covered table required, or that the multitude of empty tables allowed them to organize and finish tasks involving many steps or parts. The open space that allows some users to spread out also appears to stymie others. Large tables separated by open spaces signals “keep your distance” to some library users. While gregarious patrons feel comfortable interacting with their fellows across these spaces,

others do not. In this regard, more intimate spaces could facilitate social interaction.

The libraries implement control mechanisms to channel where or how patrons may engage with the space, which limits the space’s expansiveness and flexibility. Closed and sometimes locked doors, cabinets, and areas delineated as off-limits are evident



Figure 3 A staff-only area.

in both spaces. In the large library an alcove containing supply cabinets is cordoned off by a small sign, a laptop computer on a stand for staff use, and the tacit understanding of the patrons. In the small library, a partial wall in the space creates a storage area. This area is not closed or marked as off-limits, but patrons do not enter it. Maintenance equipment is visible in the entry to this area, signaling that this space is for staff. The “do not enter” message of this area is tacit and unexplained. Unlike the invisible messages to “enter” and “use these spaces” which are also in play, the patrons receive the controlling message clearly. As Griffis (2013) found in his study on library space, patrons are subliminally aware that the library is space for library staff, and the patrons are only to interact in areas they are explicitly invited to do so. The designers of the space, when queried, were surprised at their own assumptions that people will not open doors or enter spaces without clear permissions, and what this reveals about power relations. The director of the small library was dismayed by the thought that patrons needed permission to use the space, while the manager of the urban space expressed satisfaction that her staff had retained this control.

4 CONCLUSION

The four main themes of this study—exposure, flexibility, expansiveness, and control—are key points to keep in mind when offering or evaluating the success of the spaces. The data suggests that exposure is the most critical aspect of the arrangements in these creative spaces. Saliency clues are challenging to design into an information system or device, but the affordances of a space are not realized until and unless they are apparent (Gibson, 1977). Users decoding the spaces easily read saliency clues signaling “keep out,” while they struggle with the clues inviting their participation.

Bilandzic and his co-authors (Bilandzic, 2013; Bilandzic & Foth, 2013, 2014; Bilandzic & Johnson, 2013) describe a lack of social interaction and collaboration in library spaces, and their solution is to build a computerized interface that patrons may check into and describe their skills, projects, and willingness to connect with other users of the space. In an earlier study of library makerspace leaders, I found that librarians can catalyze the understanding and use of the space, and help to build collaborative relationships among patrons (Crawford Barniskis, 2016, in press). Without some sort of active facilitation of social interactions and collaborations, or other ways of revealing both the possibilities of the space and the actual uses of it, these makerspaces may fall short of their potential value to library users.

Software solutions, staffing initiatives, and signage are ways to convey the potential uses of the space. Libraries may want to consider further scaffolding to ensure that the affordances of the spaces are visible, such as displays of objects with clear instructions or kits available for patrons to learn the various tools and skills of the space. Makers-in-residence, library personnel, or volunteers that offer informal drop-in projects or training are also valuable. While a patron may not be interested in the offered activity, they may value the social engagement such interactions ensure. In the small library, my own presence in the space day after day began to encourage others to come in and learn about and use the space. Through the act of engaging with library users and talking about my own making—of this study and of various projects in the space—I learned about the types of making the users would like to pursue, and how they liked to create and connect with others. Ensuring a curious person resides in the space to talk with those who enter may make a significant difference in the perception of the space. But librarians should not assume that all users will ask for help, and may need to remind themselves of the emotional risk entailed by requesting assistance (e.g. Kuhlthau, 2011). Finally, the designers of the makerspaces may interrogate their own assumptions about coding the space to control its use. Many patrons miss the message that

these spaces are for using, or why and how they should use them, but understand that some areas are off-limits. Thus, librarians may wish to reevaluate the power relations between the institutional actors and users to recalibrate their message from “keep out” to “come in.”

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